Contents

INTRODUCTION

WHAT IS ARCON?

ArCon is a software program that turns your dreams of living into reality.

It is completely irrelevant whether you prefer to live in an apartment or a house. You use the methods that you would apply in a real-life situation: first you build your home, then you furnish it. Except that it's a lot quicker and it takes place in three-dimensional space. But don't worry, you won't need to take a course in computing. ArCon takes care of sorting out the microcosm of bits and bytes. You draw as usual, only more elegantly. Instead of a drawing pad you use the screen, and instead of a pencil and eraser you use the mouse cursor.

ArCon needs a fast Pentium computer with at least 16 MB of RAM memory, a high-resolution monitor and the Windows 95 operating system. More information can be found in the chapter Installation.

You will probably remember the term plan view from your school days. Firstly the plan view is drawn. The screen contains a dot grid into which you can insert the walls. Then doors, windows and staircases are installed. Then the decisive step follows: you can furnish your home. Make use of ArCon's self-service furniture market. Everything that goes into making a comfortable home you will find in the catalog, and it's completely free! Paint and paper the walls, install a luxurious fitted kitchen, tile the bathrooms, fill the rooms with furniture and hang curtains and lamps. There are no limits to your imagination. Is there enough daylight coming through the cellar windows? ArCon will let you know. Because you are working to scale, you notice by coincidence that the wardrobe is too wide for the wall section. No problem. ArCon works accurately to size. Just lean back in comfort and admire your work.

Build your house up by adding more stories. You can have the perfect roof for your house with just a few inputs. Face or plaster the outside walls.

ArCon is self-explanatory. You can get new ideas while reading up the manual. To save you the trouble of looking up a command in the printed reference section, ArCon also provides on On-line Help system.

With a click of the mouse, you are given context-related information on the current command.

And now you can really get to know ArCon: walk into your home, look around. Switch on the lights and observe the shadows they cast. Of course, your can also look around the outside of your house. Are the wall construction, facade and roof shape to your liking? Any details you are satisfied with you can print out in color and show to your friends. This is anticipated reality through virtual architecture. And if there's anything you don't like, change it - at the flick of a wrist. ArCon will forgive your mistakes - and it doesn't present you with an invoice.

WHO IS ARCON AIMED AT?

ArCon is for the expert and for everyman.

With ArCon you can work accurately and professionally, and it enables you to get a first impression of your building project. Why? Because to answer the question "is it possible?", you don't need accuracy to the centimeter.

You don't need to be a computer freak, nor do you need to be an architect or construction engineer. But you should enjoy designing. This is a challenge to your creativity. ArCon takes care of everything else. ArCon takes its name from architecture and construction. But ArCon can do a lot more than this. With ArCon you can "do magic".

ArCon is intended for people planning to build a house, or even for young people who may wish to build a house at some time in the future and are still at the pre-planning, or even the dreaming stage. If you are about to buy a house, draw it with ArCon and furnish it. This will mean the end of expensive surprises. And if you intend to modernize or newly furnish your home, ArCon can also help by answering the question "how would the living room look if we laid a burgundy carpet? Does it match the green leather upholstery?". Well, why not have a look. Perhaps you will then decide for a carpet in rosewood. Perhaps you would prefer something completely different.

But may be you are a computer freak, or simply enjoy working with computers. ArCon is also fun to use. You can create and modify three-dimensional objects with playful ease. And all this in real time and in impressive quality.

HELP IN ARCON

ArCon contains a comprehensive On-line Help System, which comes to your aid when you don't know the meaning of a particular term or what a certain button does. There are several ways of obtaining Help in ArCon: the first is to press the **F1** function key. The **F1** key can be pressed at any time, and you are presented with the ArCon Help Overview screen, from where you can branch to any other point in the Help system. The mouse equivalent to pressing the **F1** key is to choose **Contents** from the **Help** menu.

The second means of obtaining help is to select **Search** from the **Help** menu. You can then enter a specific expression you wish to search for help on. You have undoubtedly used this function in other Windows programs.

The third possibility is to use the button. When you click on this button, the normal mouse pointer changes to a mouse pointer with a question point attached. Click the modified mouse pointer on the item of interest. ArCon will then automatically switch to the corresponding place in the Help text and presents you with the required information.

The final method of obtaining help is through ArCon's status line, which is always displayed at the bottom of the ArCon window and provides information on the item currently under the mouse pointer as well as the short help messages displayed when you hold the mouse pointer over a button for longer that a few seconds. By the way, you can switch off these help messages by choosing **Brief infos** from the **Help** menu.

The final item in the **Help** menu is the item **Info**. Click on this menu item to read information on ArCon.

If while reading the Help file you click on the button to advance one page, you can use the Help file just like a "User Manual". In this way, you can "thumb through" the Help file from beginning to end.

One more tip: by clicking on one of the buttons that appear in the Help text, you will be taken in most cases straight to the place in the text that describes this button. Try it out using this:

USING THE OPTION SWITCHES

At various points during the Working with ArCon , you will need to use   so-called option switches. These can be recognized by the fact that a small black triangle appears in the bottom right-hand corner of the button. These tools can take on various forms; to obtain a form other than that currently displayed, hold down the left mouse button on the required tool and drag the mouse pointer out and to the right. The various alternate forms available will be displayed. Move the mouse pointer to the required form and then release the left mouse button.

SETTINGS TO MAKE

ArCon gives you the opportunity to make a wide range of adjustments to its operational behavior to match the capabilities of your computer with respect to storage capacity and speed. Although ArCon will in principle run on "smaller" PCs, we urgently recommend the use of a Pentium processor with at least 16 MB, preferably 32 MB of memory. To adjust ArCon to your computer's specifications, proceed as follows:

• Start ArCon

• Choose **Program Settings** from the **Options - Program** menu. A dialog box will be displayed in which you should make the following entries, depending on the specifications of your computer.

For computers with less than 16 MB of memory:

1. Buffer memory for 3D views 1600 Kbytes

3D pixel size 2 times 2 pixels

Color depth for 3D pixels High Color

Size pre-generation (Mipmaps) not marked

Buffer size for textures 256 Kbytes

Path for objects freely selectable

Path for textures freely selectable

For computers with more than 16 MB of memory:

Buffer size for 3D views for the entire Monitor

3D pixel size one pixel

Color depth for 3D pixels High Color

Size pre-generation (Mipmaps) marked

Buffer size for textures 256 Kbytes

Path for objects freely selectable

Path for textures freely selectable

The entries for <u>Path for Objects</u> and <u>Path for Textures</u> may be different from those shown in the illustration. The correct entries will be made automatically by ArCon's Setup program and there is no need for you to make any amendments.

- Confirm your entries by clicking **OK**.

- Choose **General** from the **Options - Program** menu. The one dialog box will be displayed:

- In the area **Limit the number of polygons on walkabouts** select **show all** if you have a very fast Pentium. Otherwise select **limit to** and enter a number between 1000 and 2000, depending on the speed of your computer. In the area **Display of moving pictur**e components select **as wire frame, colored, without texture, textured, average quality** or **as for stationary picture components**, whereby the first option is the one which is least demanding on processor power; the last option is the most demanding. Deselect **Update illumination while moving lamps**.

- In the area **Observation head, 3D input** you should deselect swap left and right for the Observation button and for **Movement with right mouse button pressed** select **"into" the screen**.

- Close the dialog box by clicking on **OK**.

- Exit ArCon by choosing **Exit** from the **File** menu.

Note: the settings you made in the first dialog box (Program Settings) are evaluated only at the start of ArCon. Therefore, to achieve the desired effect, you must make the required changes, exit ArCon and then restart ArCon. Normally you will make these changes only once for your particular computer and won't need to change them again.

After making the entries described above, the settings for ArCon are complete.

These adjustments are necessary because the settings described depend on your computer's memory configuration, and also on your own decision as to whether you prefer a slow, but high-quality screen display or a very fast screen display, but perhaps with a reduced image quality. If you have a fast Pentium computer with at least 16 MB of memory, the settings made on installation should be correct for you. In this case, there is no need for you to make any of the above changes.

BASIC INFORMATION

BASIC INFORMATION FOR PROGRAM OPERATION

ArCon is in many ways very similar to other Windows 95 programs, but differs in other ways. If you have already worked with other Windows programs, which we will assume, then you will be familiar with the principles of operation. You know how menu items are chosen from menus, how to enlarge and reduce window sizes and how to start programs. If you are unfamiliar with any of these procedures, then now is the right time to brush up on them in your Windows 95 User's Guide.

BASIC LAYOUT OF THE *ARCON* SCREEN

As is also the case for other Windows programs, the ArCon screen consists of a menu bar and one or two other tools bars below this menu bar, and one or two other tools bars at the left-hand side of the ArCon screen. The menu in the menu bar can take on one of three different forms. The first is displayed when no project has been loaded. It consists only of the two menu items **File** and **Options**. You are presented with the second view of the menu bar when you are in the <u>Construction Mode</u> . Here you can make the adjustments that are valid in this mode. The third variation of the menu bar appears in <u>Design Mode</u> Some parts of the menus for Design and Construction Mode are identical, others are different, just as parts of the program operation in Design Mode are the same as in Construction Mode and other parts are different.

Apart from the menu bars, you will also see the toolbars already mentioned. Buttons are grouped in the toolbars which allow selection of certain operations or various types of views, etc. Buttons appear in the upper, horizontal toolbar which are valid for the entire project. The second horizontal toolbar, which is always situated below the first one, can only be seen in Design Mode. Here you can make adjustments that apply to the current window.

Apart from the horizontal toolbars, ArCon uses vertical toolbars which are always placed to the left of the screen. From these toolbars you can choose the various tools used in Construction Mode, in Design Mode you can manipulate your furniture items using these buttons. Neither the upper horizontal toolbar nor the left vertical toolbar will change as long as you remain in the same mode. This means that you will always find the same buttons, whether in Design or Construction Mode. This is in contrast to the inner, second horizontal and vertical toolbars. The second horizontal bar appears only in Design Mode, as already mentioned. This is used for making adjustments which apply to the view currently being displayed. Thus, if you have opened several views of your project, you can make changes that apply only to the current version using the second horizontal toolbar. The vertical toolbar appears only in Construction Mode. In contrast to the first vertical toolbar – with which you determine what you enter ("What" toolbar) – you use the buttons of the second vertical toolbar (i.e., the innermost of the two toolbars), to determine how the selected element should look ("How" toolbar).

A FEW DETAILS CONCERNING THE BUTTONS IN THE TOOLBARS

The individual buttons on the toolbars in the same way as buttons in Windows 95. You click on them, and appropriate operations are performed or an appropriate dialog box will be opened. However, in contrast to other Windows 95 buttons, some of these buttons can show different contents which are defined directly by you, the user. These *option Buttons,* or *option switches,* can be recognized by the fact that they are marked by a small black triangle in the lower right-hand corner. To see the selections provided by the option switches, click on the appropriate button however, do not release the mouse button, drag the mouse to the right out of the button. A list of the various options associated with this button will appear, and you can then position the mouse on the option that you wish to select. Information on the function of the individual options is given in ArCon's status line, at the bottom of the window. Whenever you encounter option switches in the following text, the text will show all of the possible options on this button displayed alongside one another. For example, when you see the picture , you will know that this is an option switch with seven options. On the other hand, single buttons are displayed, for example, as

.

Apart from the button's property of being an option switch, you can generally also make certain settings by right-clicking on the button. A dialog box will then appear in which the required settings can be made. A not inconsiderable part of this manual deals with these settings, by means of which you can make a wide range of adjustments to ArCon to suit your individual requirements.

THE CONSTRUCTION AND DESIGN MODES OF *ARCON*

A principle and important concept in ArCon is working in two different modes –Construction Mode and Design Mode.

In Construction Mode you enter all "static" elements of your home. These include walls, windows and doors, chimney stacks and roofs; that is, all the elements that won't change when you move in. However, in Design Mode you fit out your home with furniture and accessories and you can change the appearance of your design using paint and wallpaper, for example.

In Construction Mode you always work on a plan view, which shows your plans from above. In Design Mode, however, you can use various views: a view which is very similar to the view in Construction Mode, as well as a colored plan view and a perspective view, in which you can freely define the position from which you view your design in all three spatial directions. a detailed description of <u>Construction Mode</u> and <u>Design Mode</u> find by clicking on the required Mode.

WORKING WITH STORIES

In ArCon, you can plan and visualize your home with almost as many stories as you wish. The main influence on the number of stories you can have is the amount of memory you have in your computer; it will generally be sufficient.

So as not to lose sight of what you are doing, in Construction Mode you can only enter data for one story – the story you are currently working on. However, you can swap between defined stories whenever you wish, but entries refer only to the current story. In Design Mode, You can display all stories at once, to obtain an overall impression of the house, for example, and you can also display individual stories or a selection of stories.

THE MEANING OF SPECIAL KEYS IN *ARCON*

Almost all input in ArCon is made using the mouse. Exceptions to this are numerals, input in dialog boxes and certain control commands. In the Appendix you will find a list of all keyboard shortcuts and their functions. The **Control** (**Ctrl**) key has a special significance in ArCon as does the **Shift** key. In ArCon, these two keys have the function of modifying certain commands or program behavior.

THE CONTROL KEY

The **Ctrl** key in ArCon serves the purpose of suppressing certain dialog boxes which would normally appear after clicking on a button. If you hold down the **Ctrl** key while clicking on a button, the relevant dialog box will not appear; normally it will. If the dialog box does not appear, the settings used will be either those you last entered into this dialog box, or, if you have not made any changes, the standard settings, which contain reasonable values. In principle, the use of the **Ctrl** key when clicking on a button has exactly the same effect as clicking on the button without **Ctrl** and then immediately closing the dialog box by clicking on **OK**. In a way, therefore, using the Control key is a shortcut.

THE SHIFT KEY

In contrast to the **Ctrl** key, which represents a shortcut, the **Shift** key provides a sort of workaround. By pressing the **Shift** key when making certain inputs in Construction Mode, you can increase the functionality of this input. You can use the **Shift** key to manage certain difficult constructional tasks. You will find more detailed information on this in the description of the various input options in Construction Mode .

In departure from the above, the significance of the **Ctrl** and **Shift** keys is somewhat different for the Walkabout function . If you press **Ctrl** or **Shift** when walking around your home, the speed of motion is increased by a factor of 4; if you press both together, the speed of motion is increased by a factor of 16. This feature can be used, for example, to approach your house more quickly when you are at a relatively great distance from it.

THE PAGE

Because ArCon uses the "what you see is what you get" approach, you are not only able to display your three-dimensional designs on the screen, but your plans will look exactly the same on paper when they are later printed out. For this purpose, ArCon has two different views in <u>Construction Mode</u> , the Normal View, in which your workspace is "unlimited", the Layout View, in which you can also see the borders of the paper in the workspace. If you display the whole page in Layout View by choosing **Whole Page** in the **View** menu, you can see what you will get in the final printout. You can switch between Layout View and Normal View by choosing **Layout View** or **Normal View** in the **View** menu.

The menu item **Whole Page** in the **View** menu is only available in the Layout View, it is grayed out in the Normal View. Both of these views also exist in the 2D display in Design Mode. The Layout View is incidentally of special interest if you want to <u>shift the page beneath the plan</u> .

DISPLAYING PARTS OF THE PLAN

In the 2D views, both in Construction Mode and in Design Mode, you can display details of the plan by selecting any desired degree of enlargement or reduction. This is done either by using the and

 buttons or by choosing **Enlargement**, **Reduction** or **Show all** from the **View** menu. If you are in the Layout View , you can display the entire page by choosing **Whole Page** from the **View** menu. If, while in this view, you notice that what you have constructed in Normal View does not fit completely onto a sheet of paper, (and therefore only part of would be printed out), you have several possibilities to move your construction into the correct position.

1. You can change the scale of your plan so that your construction is smaller relative to the page size.

2. Change the paper format.

3. Shift the page "beneath your plan". This is done as follows: switch to Layout View and zoom the screen display until it is so small that you can still see enough gray border around the page.

Following this, you can shift the page by clicking with the mouse on the edge of the page and then move the page while holding down the left mouse button. During the shift operation, your entire plan will appear, including the part that had originally "disappeared" outside of the page. You can now position the page as you require it. When you release the mouse button, the page will be centered in the display and the contents of the plan will "slide" accordingly in the opposite direction.

SOUNDS

Certain operations in ArCon can be "signaled" using sounds. These include the opening and closing of doors, walkabouts, elevator riding, etc. Of course, you will only hear the sounds if your PC is equipped for this.

In principle, there are only three reasons why you may not want to use sounds.

1. You don't have a sound card. In this case, you should switch off the sounds so as not to "waste" computing time.

2. You prefer things to be a bit quieter.

3. You wish to achieve better speed on walkabouts. In this case, it is recommended that the sounds be switched off to relieve the additional burden on your PC.

PREVIEW WINDOW

In every dialog box for defining object options, ArCon displays a preview window. It displays the object to be worked on together with the standard values that have been entered for this. All changes that you then make in the dialog box, be it dimensions or the surface finish, can be viewed immediately. If there is a **Preview** button to the right of the dialog box, then the contents of the preview window will be updated by clicking on this button after extensive calculations have been carried out. (e.g. staircases). For most objects, the preview window updates automatically after a change has been made to an entry. The objects can be viewed by the user from any desired position.

The following picture provides an example of a preview window:

The procedures to be followed are as follows.

If your mouse pointer is placed in the preview window, it will change to the following shape

.

ROTATION

Click the left mouse button in the preview window and hold the mouse button down. Move the mouse pointer around in the window and you will see that you are able to rotate the image in all directions.

ZOOMING

In the lower right-hand corner of the preview window you will see key fields with **"+"** and **"-"**. at the ends of the scroll bars. If you click the left mouse button on **"+"**, the object will be enlarged, if you click on **"-"** it will be reduced.

Additionally, it is also possible to zoom directly in the preview window. Move the mouse pointer into the window and press the right mouse button. By moving the mouse downwards while pressing the right mouse button, the object will be enlarged, by moving the mouse upwards, it will be reduced.

SCROLLING

Scroll bars are provided at the right and lower edges of the preview window. By clicking and dragging the control bars, you can move the screen contents up and down or right and left. By clicking on *a*, the complete object will re-appear in the window.

GENERAL WORKING PROCEDURES IN ARCON

In contrast to all other toolbars, the buttons of the upper horizontal toolbar do not change while you are working with ArCon. The buttons on this toolbar can be used to change settings or to initiate operations, which is possible both in <u>Construction Mode</u> and in <u>Design Mode</u> . This includes the creation of new projects, loading and saving a project, printing or saving images, enlarging and reducing views and switching various plan details in and out of the plan. For example, you can define whether the dimensions, the rule or the roof are visible or not. The toolbar contains in addition a selection list from which you can select the story to work on.

In contrast to all other buttons on the upper horizontal toolbar, the stories selection list applies only to the current window. If you have more than one window open, then you can display, for example, the ground floor in one window and the second floor in the other window.

Certain views are possible only under certain conditions. If these conditions are not met, then the corresponding buttons are shown grayed out.

Various options can be set for most buttons. This is done by right-clicking on the button. The options in question can be found in the corresponding sections of this User's Guide.

AN OVERVIEW OF ARCON'S CONSTRUCTION MODE

Apart from the Design Mode, the Construction Mode is ArCon's most important mode. In this mode you enter the architectural features of your house plan. All fixed items in your house or apartment – that is, things which are generally immovable (which will not change on moving house) – are constructed in Construction Mode. In contrast to this, in Design Mode you fit out your home, to which end a whole range of furniture and accessories are available. You can switch Construction and Design Mode at any time by clicking the button . When you start a new project, you automatically start in Construction Mode.

The Construction Mode shows your current plan from above in one or several views - you can use as many views as you wish. Depending on the degree of enlargement you will either see just parts of your plan, or the entire plan. Apart from the views of your plan, you also have use of the menu and a horizontal toolbar directly below the menu and two toolbars at the left-hand side of the ArCon window. The entire left-hand toolbar contains all items that you are able to place Construction Mode; it is therefore a "what toolbar", so to speak. This allows you to select windows, doors, walls, and staircases, etc.

Through the use of option switches various options are "hidden" behind the various buttons, from which you can select the right one for your purpose. The second vertical toolbar has various buttons with which you can define the "how", depending on the "what" selected. "How" in this case means how you enter a certain constructional element into your plan.

This is illustrated by the following example: If you wish to set up a floor plan in ArCon without windows and doors, then you can draw each wall separately by clicking on two points, or, if setting up a series of adjoining walls,

.

Having the possibility to decide how you enter certain elements means that you can work very effectively. Certain elements on the "what" toolbar are equipped with various options. In this case the "how" toolbar is empty.

GUIDES AND RULES

A very important constructional aid in ArCon are the guides. You can use these guides to take care of various constructional tasks in your plan. You used the guides together with the <u>Snapping</u> function   to position items in your plan exactly or to define a new position by the intersection of several guides. Constructions to scale in ArCon are made very simple through the use of guides. You will find further information on <u>Guides</u> on clicking.

Apart from guides, Construction Mode also provides rules as a further aid to entering objects. This rule is reminiscent of a normal rule you may have on your desk; its purpose is certainly very similar. With a little practice you will be able to solve practically all constructional tasks with precision using guides and the. <u>rule</u>   .

WHAT CAN BE ENTERED IN CONSTRUCTION MODE

In Construction Mode, ArCon offers you the possibility to enter walls, windows, doors, supports, chimney stacks, staircases, roofs and slabs, etc. Furthermore, you can afterwards insert openings in ceilings and vary the properties of automatically constructed ceilings and floors. And last, but not least, apart from the guides already mentioned, the insertion of text at any point as well as semi-automated scaling is possible. ArCon possesses a high degree of intelligence and provides you with optimal assistance when using these constructional elements.

Of course, you will have to enter the individual walls into your ground plan yourself, as every ground plan is different. But you generally don't need to concern yourself with providing your rooms with ceilings and floors: ArCon knows that rooms are surrounded by walls and the required floors and ceilings. However, many of these automatic functions can be varied within a wide range. This goes as far as to allow you to enter not only the pitch of a staircase (in principle, the number of steps), but also the width of the individual steps.

AN OVERVIEW OF ARCON'S DESIGN MODE

Apart from the Construction Mode, the Design Mode is ArCon's most important mode. In this mode you create the interior design of your home by fitting it out with furniture and other items. In Design Mode you can also design the exterior finish and the surroundings of your house.

Apart from the upper <u>horizontal toolbar</u> – which is identical with that found in Construction Mode– Design Mode has a second horizontal toolbar by means of which you make entries relating to the current window. The second horizontal toolbar contains buttons with which you can define the type of display and the position of the viewer. Additionally, there is just one vertical toolbar. The buttons on this toolbar mainly serve the purpose of organizing objects: furniture, for example; i.e. grouping, deleting, rotating, mirroring and directing. You can also determine whether any individual lamp should be switched on or off.

When you switch from Construction Mode to Design Mode, an additional special window will be displayed which is only visible in Design Mode – the Objects and Textures Catalog. This window has a pivotal significance in Design Mode. It acts as a catalog, so to speak, from which you can use the mouse to drag items of furniture and accessories, even wallpaper textures, into your home (drag and drop technique). Because of its pivotal significance, a separate chapter has been devoted to the <u>Objects and Textures Catalog</u> !

WORKING IN DESIGN MODE

The four main tasks you can fulfill in Design Mode are

1. Loading Objects

2. Deleting Objects

3. Positioning Objects and

4. Changing the size and appearance of objects

In addition to these four tasks, you can also wallpaper rooms, change the floor or ceiling materials and also the material on the house exterior. Finally, it is also possible in Design Mode to view your apartment or house from various standpoints or even to walk through it. It is, of course, also possible to save the current view of your home to the hard disk and to print it out.

LOADING OBJECTS

After having drawn your floor plan and inserted doors, windows and other constructional elements in Construction Mode , you can begin to furnish your home. To do this, you will need to load the various furnishing items. There are basically two methods available for Loading objects   or Loading object groups :

• Loading from the Objects and Textures Catalog using drag and drop

• Loading via the **Furnishings** menu – **Load object** or **Load group**.

After having loaded an object or group in the manner described. this must then be placed in your plan. How this is done depends on the view type.

PLACING OBJECTS

ArCon has three different view types in Design Mode: the floor plan view, the plan view and the perspective view. Just as the display of height is different in each of these views, so is also the input of the height of an object when placing it in these three views.

It is not possible to directly determine the height in the floor plan view. Thus, if you place an object in this view, you simply enter the horizontal and vertical position of the object, ArCon will determine the height for you.

In the plan view and the perspective view you can enter the height yourself. In contrast to the plan view, in which, apart from the object itself, you see the mouse pointer as a cross-wire, a "3D mouse pointer" appears when placing objects in the plan view and the perspective view.

The cross-wire in the plan view and the 3D-mouse pointer in the plan view and the perspective view are placeholders for the actual object to be loaded. Only when you release the mouse button after a drag and drop operation will you see the actual object.

HEIGHT INPUT

When you drag an object into the current view using drag and drop, the operation in the plan view is relatively simple. If you release the left mouse button, the object will "land" at the position where the cross-wires is currently located. You determine the height in the plan view and the perspective view using the right mouse button while you are still holding down the left mouse button. Moving the mouse up or down in the plan view while holding down the right mouse button will alter the height of the object, i.e., in the direction of the ceiling or floor. In the perspective view, you can decide for yourself what will happen when you press the right mouse button during a drag and drop operation – i.e., whether the mouse pointer moves "away from you", i.e., into the screen, or whether it moves to the back while remaining at the same height or remains at the same depth while moving up or down. You make these Settings in a dialog box accessed via **Program** – **General...** in the **Options** menu .

At this point, instead of confusing you with further explanations, try it out for yourself on the screen. It may take a few minutes, but sooner or later it will go "click" and you'll be using the 3-D mouse as easily as the normal mouse.

DROPPING FURNISHING ITEMS

After having positioned a furnishing item in your plan using the drag and drop method described in the previous section, release the left mouse button. What happens next you can best see in the perspective view: depending on the object you have loaded, it will either fall to the floor or fly upwards or it remains in the position in which you released it. Objects such as tables, chairs and cups fall downwards, lamps intended for ceiling attachment "fall" upwards and objects you would normally fix to the wall, such as pictures, washbasins, etc. remain in the position in which they were loaded. This behavior is, by the way, the same in all three views, even if you don't see it in the plan view and only to a certain degree in the top view.

As you are not able to define the height in the plan view, ArCon does this for you in accordance with the following rules:

- Objects which fall downwards are loaded such that they are positioned just below the ceiling of the current story when you release the mouse button. In other words, they fall onto whatever you can see in your plan view. For examples, if you load a cup and position it above a table, then it will land on the table in the plan view.

- Objects which "fall" upwards are loaded such that they are positioned just above the floor of the current story and then land under the object immediately above them. If, for example, you load a ceiling lamp that will fit under a table in a position where a table is situated, then it will land under the table when you release the mouse button.

- Objects which "float" will be positioned at half the height of the current story.

MOVING OBJECTS THAT HAVE ALREADY BEEN LOADED

Moving objects that have already been loaded is almost identical to moving new objects loaded using drag and drop. If you wish to move an object, click on it, but do not release the left mouse button. From this point onwards, the object behaves exactly as if you had loaded it using drag and drop. The only difference is that you don't move the cross-wire or the 3D mouse pointer as placeholder for the object, but the object itself. Otherwise the procedure is identical to that described in the previous section.

SELECTING OBJECTS

If you briefly click on an object, i.e. you immediately release the left mouse button again, this object will be selected. Selected objects in the plan view are marked using a rectangle, in the top view and the perspective view by means of a three-dimensional frame. In the top view, you will only see the top edges of the frame.

You can select more than one object at a time by clicking on further objects whilst holding down the **Shift** key.

If you have selected one or more objects, you can perform various operations with these selected objects:

You can rotate the object using the buttons ▣▣▣▣▣▣ , delete it using the button

✕ or by pressing the **Del** key.
If you have selected more than one object, you can align the selected objects to one another using the buttons ▣▣▣▣▣▣▣▣▣▣▣ or group them together using the button
▣ .

If at least one of the selected objects is a lamp, you can switch the lamp on and off using the button ▣ .

By the way, it is also possible to move more than one object at a time by selecting all objects as described, but not releasing the mouse button after selecting the last object. If you now move the mouse, all selected objects will move together. If you now release the left mouse button again, the objects will fall in turn upwards or downwards.

THE VARIOUS VIEWS IN DESIGN MODE

In Design Mode, every window of your plan can be displayed in plan view, top view or perspective view. The three buttons ⊠ ,

⊠ and
🖿, which are to be found at the far left of the second horizontal toolbar, are provided for this purpose .
For the top view and the perspective view you can also determine the quality of the display required. This is achieved using the option switch 🔲🔲🔲🔲 .

The various views not only influence the quality of the display, but also the speed. The 🔲 variety is the most abstract, but also the fastest; the

🔲 variety is the best, but also the slowest.

WALKING AROUND THE PLAN AND VIEWING IT FROM ALL SIDES

If you are in the perspective view, the button will appear in the second horizontal toolbar . When you click on this button, you will be able to walk through your home. To do this, position the mouse pointer in the view and steer your way through your home while holding down the left mouse button – the walking direction depends on the position of the mouse in the view.

A walkabout in the plan view or top view is neither possible nor practical. In both of these views you have the possibility, as also in the perspective view, to change the observation position using the button. In contrast to all other buttons in ArCon, the position on the button on which you click is important in this case. For example, if you click at the left, you will move left in the plan view and in the top view – the view itself will shift correspondingly to the right. In the perspective view you will turn to the left going around your view. The view therefore appears to be turning to the right. The same applies when you click on the right side of the button
. Clicking on the upper or lower part of the button in the plan view and the top view causes the view to shift up or down. In the perspective view, it results in the observer moving up or down.

Note: With the button you determine the position of the viewer and not the position of the design. But when you move around an object to the left, for example, the object will appear to move around to the right. It has become apparent that this exchange of right and left is difficult to understand for some users. For this reason, it is possible to swap these functions using the **Program** – **Program settings...** dialog box in the **Options** menu.

ELEVATOR RIDES

If you have selected the top view or the perspective view in the current window, the buttons and

will appear in the second horizontal toolbar. With these buttons you have the possibility to travel from one floor to another. In the perspective view you even have the possibility to animate your "elevator ride" instead of moving in jerks. This is done by holding down the **Ctrl** key while clicking on the buttons and
.

FOR USERS IN A HURRY: MMX

And last, but not least, at the far right of the second horizontal toolbar the ▨ button will appear under certain conditions . To see this button, you must start ArCon on a Pentium computer with the <u>MMX</u>-extension . If this button is pressed and ArCon is operating in <u>High Color mode</u> , 3D images, i.e., the top view and the perspective view, will be computed using MMX commands. This will result in a considerable increase in display speed. If the button is not pressed, calculations will be performed as if no MMX processor were present.

Note: ArCon uses MMX commands only for <u>images</u> in High Color mode ; for images in True Color mode the "normal" Pentium commands will be used.

FIXED PROGRAM SETTINGS

Basic setting for ArCon which are used only at the start of the program are defined in the dialog box **Fixed program settings**. This can be found under **Program** – **Program settings...** in the **Options** menu As any changes made in this dialog box only take effect when the program is next started, provision has been made for making the required settings when starting ArCon by pressing the **Ctrl** key during program start.

For calculating a 3D view, each dot on the screen (also called a pixel) requires a certain amount of memory.. The amount required depends on the screen resolution and the color depth of each pixel as set in the Windows operating system and used in ArCon.

If the memory required for this exceeds the amount of memory installed in your computer, Windows will swap the memory to the hard disk - assuming that you have installed virtual memory in your Windows system. As this considerably slows down the 3D display, you can make the following adjustments to the settings in ArCon in order to minimize the amount of memory required.

You will find explanations on the individual areas of the dialog box in the following Help pages. Click on the ⟫ button in the button bar of the Help window to obtain the required information.

FIXED PROGRAM SETTINGS: BUFFER MEMORY FOR 3D DISPLAYS

Here you can determine the amount of memory ArCon should allocate for 3D displays. If you select the option **for the whole Monitor**, ArCon automatically defines and allocates the amount of memory that would be required for a full-screen 3D display. If you enter the memory allocation as an absolute value, it is possible that ArCon's program window will then no longer be displayed in full-screen mode.

If you limit the size of the buffer by choosing the second alternative, you can prevent the continuous swapping of data to the hard disk, therefore increasing the speed at which ArCon runs, especially in the case of computers with less than 16 Mbytes of memory.

FIXED PROGRAM SETTINGS: 3D PIXEL SIZE

Here you can change the size of a 3D pixel to reduce the amount of memory used, thus allowing you to work even with less memory.

THE OPTION ONE PIXEL

If you select this option, one 3D pixel in the memory will represent one pixel on the screen. This will provide you with an optimal display, but the memory requirements are relatively large.

The setting **One Pixel** is the default setting and should be changed only if problems with performance are observed.

THE OPTION 2 X 2 PIXELS

After selecting this option, one 3D pixel in the memory will represent 4 pixels on the screen.. Working with 2 x 2 pixels has one major advantage: as only one quarter of the pixels needs to be calculated for a scene, this takes place considerably faster and the display is therefore correspondingly faster.. This is of special interest if you a making a presentation using a projector and the projector does not provide a particularly high resolution from a distance.

The 3D display will therefore be somewhat coarse, depending on the screen resolution, but the memory requirements are reduced by a factor of 4.

THE OPTION 4 X 4 PIXELS

If you select this option, one 3D pixel in the memory will represent 16 pixels on the screen, displayed as a block. The 3D display will thus be even coarser, however, similarly to the previous example, the memory requirement is reduced by a factor of 16.

FIXED PROGRAM SETTINGS: COLOR DEPTH OF A 3D PIXEL

Just as for the pixel size adjustment, setting the color depth of a 3D pixel also has a considerable influence on the memory requirements for displaying a perspective view. The following options are available for this.

THE OPTION HIGH COLOR (= 8 BYTES PER PIXEL)

With this option, ca. 32,000 colors are available for the 3D display. Of course, this is only the case if you have also selected **High Color** or **True Color** as the color depth in the Windows operating system.

If your computer is capable of MMX , High Color-3D display will be output using MMX commends, i.e., speeded up.

THE OPTION TRUE COLOR (= 12 BYTES PER PIXEL)

When you select the option **True Color**, ca. 16 million colors are available for the 3D display. As in the previous example, this assumes that you have selected **True Color** as the color depth in the Windows operating system. If this is not the case, ArCon will accept your selection, but the color resolution will not change.

However – with one exception – it can be useful to select the option **True Color**, even if your monitor is only capable of less– and that is if you wish to produce high-quality images for printing out or for transfer to another computer. ArCon will use the selected setting for saving and printing images. You can thus avoid the typical "jagged" color renderings of **High Color** on your printer, for example. However, you should switch ArCon back to **High Color** mode after using this special output facility as this provides a much faster display output. This applies in particular to MMX computers ; as this speeds up the display in **High Color** mode, but not in **True Color**.

With the screen resolution you have selected in the Windows operating system and the selected color depth, it is now simple a matter for you to calculate the memory requirements yourself. Remember that ca. 20% of the screen is occupied by the menu and toolbars. The approximate memory requirement at a resolution of 1024x768 and True Color mode is therefore 7.4 MB, whereas only about 5 MB are necessary in High Color mode.

FIXED PROGRAM SETTINGS: TEXTURES

Settings are made in this area to establish the way textures are managed internally. For this purpose, data should be entered for the two items shown below in accordance with your hardware.

THE OPTION PREGENERATED SIZES (MIPMAPS)

If you have activated this control field, the textures will be stored internally in various resolution when loading. When textures are shown in a 3D view, the most suitable resolution will then be selected. Apart from this optical improvement, using this option means that more time is needed for computation of the various resolutions on loading the textures, and that the memory requirement for textures is about 33% greater than is the case when mipmaps are not used.

BUFFER SIZE FOR TEXTURES

All textures that you load are placed into a buffer memory, regardless of whether or not they are currently being used. They will only be deleted from the buffer if the buffer is full and other textures are loaded in addition. This has the advantage that you have much quicker access to frequently used textures. The value given here in Kbytes represents the size of the buffer memory for textures. You should set this value according to the amount of RAM memory in your computer.

The maximum amount of memory required for a texture is about 60 kB without and 90 kB with the use of mipmaps.

Incidentally, all textures currently being used as well as the textures still in the buffer memory can be displayed in the catalog   by clicking on the button.

FIXED PROGRAM SETTINGS: PATH FOR OBJECTS

The path statement refers to the directory in which ArCon will search for its objects, i.e., all furnishings. This information is set up automatically by ArCon on installation of the program and normally requires no change to be made. If you need to change the path at some future time, you can do this by entering the information directly into this field via the keyboard or by using the **Browse...** button in a standard dialog box.

If space is limited on your hard disk, it is recommended that the files be copied onto a compressed drive. Of course in this case you will have to make the corresponding change to the path information.

FIXED PROGRAM SETTINGS: PATH FOR TEXTURES

The program will search in this directory for the textures you use in ArCon. This information is also set up automatically and correctly by the installation program. If, however, you need to change the path, you can also do this by entering the information directly into this field or by using the **Browse...** button.

The above notes for objects also apply to textures, as these are usually well suited to compression.

When you have made the required changes, click on **OK** to record the changes and quit the dialog.

BASICS

You access the relevant dialog box by choosing **Program** – **General...** from the **Options menu**. The settings you make here mainly serve the purpose of optimizing ArCon's operating speed with and handling of 3D views.

These settings are divided into the various areas as described in the following.

LIMIT THE NUMBER OF POLYGONS ON WALKABOUTS

If the speed provided by your computer on walkabouts is unacceptable, you have the possibility to manually reduce the number of polygons displayed. Depending on the project, the number of polygons can amount to several hundred thousand. To limit this number, select **limit to** and enter a number to suit the hardware you are using. In this way it is possible to walk around your project at a brisk speed whilst obtaining a tolerable screen display. Enter a value of 3000, for example.

DISPLAY OF MOVING IMAGE ELEMENTS

Motion in a 3D view using the <u>View</u> button and placing of objects may be somewhat slower on your computer. By making appropriate settings in this area, you can increase the speed by using simpler screen representations..

AS WIRE MODEL

After clicking on the <u>View</u> button, the type of 3D view changes to a wire model representation during a walkabout (see also).

WITHOUT TEXTURE

During a walkabout, surfaces in your project will be displayed filled with an appropriate solid color, rather than with textures (see also).

TEXTURED, AVERAGE QUALITY

This option displays your project during motion with all textures and colors assigned to the objects. Textured walls are, however, shown without any additional color bleeds.

For non-MMX computers , this setting is the optimal compromise between quality and speed (see also).

AS CURRENT DISPLAY

If you have selected this option, the display type does not change during motion, regardless of the display type you have chosen for your 3D view.

ACTUALIZE ILLUMINATION ON MOVING LAMPS

Irrespective of the options described above, the possibility exists to deactivate updating the display of illumination during the movement of lamps that are switched on, as this is very demanding on computer power. In contrast to "normal" objects, not only must the object be moved, but the entire scene must be continuously reconstructed. The lamps are therefore not switched off, but the display is not quite in accordance with reality at the time of movement. When movement is interrupted, the illumination is automatically computed again and redisplayed.

VIEW BUTTON, 3D INPUT

Here you can adapt the function of the View button and of the right mouse button in the 3D view to your own requirements using the options described in the following.

THE VIEW BUTTON

Using the View button, either the viewer rotates around the building or you can rotate the building itself. Choose the required option. You can change the way in which this works by activating the option **swap left and right**. This means that if you click on the left arrow of the View button, the viewer will turn to the right. You should adapt this function to suit your own personal taste.

MOVEMENT WHILE HOLDING DOWN THE RIGHT MOUSE BUTTON

The options described provide a control of movements executed while holding down the right mouse button. These can be individually adapted to optimize operation of the software.

"Into" the screen

If you have selected this option, the object that you are presently manipulating while holding down the right mouse button will always move into the screen as seen from your position. This happens regardless of whether you are viewing your house from above or from the front.

To the "back" (height unchanged)

This option also depends on the perspective and, while holding down the right mouse button, moves the

selected object to a fixed height above the floor of your building.

If, for example, you view your house from above in the 3D perspective and move an object while holding down the right mouse button, this setting may not meet with your intuitive idea of how the operation should appear. If this is the case, we recommend you use the option **automatic switching between "back" and "down"** (see below).

"Downwards"

The option **to the "back"** (**height unchanged)** described above leads to strange effects if you view your scene in the 3D perspective almost vertically from above. If you then move the mouse upwards – that is, away from yourself –the object will not follow your mouse movements, but will move towards the floor. You must hold down the right mouse button to make the object move upwards on the screen.

If you have selected the radio button **"downwards"**, this behavior is reversed. This means that when you move the mouse upwards without holding down the right mouse button, the object will move up the screen. This is, however, only the case if you are looking almost vertically from above. If you press the right mouse button and drag the mouse upwards, the object will move into the screen.

Both of these options only make sense when used at certain angles. The following option exists for this reason alone:

Switch automatically between "back" and "down" ...

Using this setting, you can combine the options **to the "back"** and **"up"** and define an angle at which switching between these two options is to take place. In this way you can circumvent the effect described under the option **to the "back"** and avoid the need for manual shifting.

FUNCTIONS ON THE HORIZONTAL TOOLBAR I

In this section, the buttons on the horizontal toolbar and the functions associated with these are described. Some of the buttons shown here may not be available, depending on the mode you are currently working in. In this case they will be displayed grayed out.

The group of six at the left with the buttons 🗋 ,

📂 ,

💾 ,

🖨 ,

🖼 and

🖳 is used for project management and for working with views.

By clicking with the left mouse button on 🗋 you create a new project. If you click the button with the right mouse button, a dialog box will appear with the corresponding project options.

Clicking on 📂 opens a standard dialog box by means of which you can load an existing project.
By clicking with the left mouse button on 💾 you will save the current project. If you have not yet supplied a name for this, a standard dialog box will open to let you do this. A right mouse click on this button opens a dialog box for the saving options. You will find more information on these buttons in the sections Loading projects   and Saving projects .

By clicking with the left mouse button on 🖨 the current view or the current plan will be printed on your default Windows printer using the printer options accessed by clicking the right mouse button. You will find a detailed description of these functions in the section Printing .

By clicking on 🖼 you can save the current view as a bitmap or Windows metafile. You are presented with the corresponding options in a dialog box by clicking this button with the right mouse button. For further details see the section Saving views .

By clicking with the left mouse button on 🖳 you can create a further window with a new view. The available options are accessed by clicking on this button with the right mouse button. You will find a detailed description in the section Creating new views .

FUNCTIONS ON THE HORIZONTAL TOOLBAR II

The following button standing on its own or

 plays a pivotal role in ArCon, as it switches between the <u>Construction Mode</u> and the <u>Design Mode</u> . An exact description of these two modes can be found in the relevant chapters..

FUNCTIONS ON THE HORIZONTAL TOOLBAR III

The next group of two buttons, consisting of ![icon] and

![icon] is concerned with displaying the current view. For example, the button
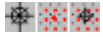
![icon] corresponds with the **Show all** command in the **View** menu and the button

![icon] corresponds with **Enlarge** or **Reduce** in the **View** menu. You can access the dialog box with the relevant option by clicking with the right mouse button on the last button. You will find a detailed description of these options and of the zoom function in general in the section Zooming .

FUNCTIONS ON THE HORIZONTAL TOOLBAR IV

The following group of four buttons consists of the buttons ![icon] ![icon] ![icon] ,

![icon] ,

![icon] and

![icon] and provides a help function for construction.

For example, using the buttons ![icon] ![icon] ![icon] it is possible to shift the origin, the grid or the origin and the grid together, depending on your selection. You will find a detailed description of these functions in the section Setting coordinates and grid origin .

The rule can be switched off by clicking with the left mouse button on ![icon]. If you click on this symbol with the right mouse button, you will be presented with a dialog box with the relevant options. You will find a description of the rule in the section The rule .

The buttons ![icon] and

![icon] switch the grid or the guides in the plan view on and off.

FUNCTIONS ON THE HORIZONTAL TOOLBAR V

The final group of five buttons ▨ ,

▣ ,

▰ ,

Abc and

⊞ consist purely of on/off switches which change the type of display in the views. The

▨ button switches wall shading on and off,

▣ is for switching the furnishings in and out,

▰ for switching all of the roofs present in and out,

Abc for switching the labeling on and off and

⊞ for switching dimensions on and off. These switches affect all active views.

The next element on the toolbar is a drop-down list, from which you can select the current story.

Click on this button with the left mouse button to obtain a list of all available stories. You can then select a story from this list.

FUNCTIONS ON THE HORIZONTAL TOOLBAR VI

To the far right of the horizontal toolbar you will find one or two buttons, the Help button   and the button for switching the Catalog on and off

 , which only appears in Design Mode, however. If you click on the Help button with the left mouse button, the mouse pointer will change. You cab then click on any visible element in the screen with this mouse pointer and get context-sensitive Help on the subject.

By clicking on the button for the Catalog in Design Mode, you can switch the display of the catalog on and off.

⬜ CREATING A NEW PROJECT

To create a new project, either choose **New** from the **File** menu or click on the ⬜ button. The current project options will be used for this new project. Normally when creating a new project the dialog box will appear in which you enter the data for the first story.

However, you can prevent this by holding down the **Ctrl** key when clicking on ⬜ .

PROJECT OPTIONS (DIALOG BOX)

You access the **Project options** dialog box by clicking with the right mouse button on ⬜ or by choosing **Project options...**. from the **File** menu.

ArCon uses the data entered here when creating the new project. However, these data do not have to be established right from the start, as you can make adjustments to meet your requirements as you work. You should, however, observe the notes given in the following.
Descriptions of the individual items in the dialog box can be found in the following Help pages. For the relevant information, click on ⬚≫ in the upper part of the Help toolbar.

PROJECT OPTIONS: PAGE FORMAT

Here you can select the size of the paper on which you wish to draw and print your plans. The formats available are A4 Portrait, A4 Landscape, A3 Portrait, A3 Landscape, printer-specific formats and also other, a user -defined Format. The printer-specific formats depend, of course, on the type of printer you are using.

Apart from providing the settings for printer output, the Page setup selected also affects the maximum size of your plan. For this reason, you should establish the Page setup and the Scale to be applied as far as possible at the start of your project. At a later stage you could, for example, display your complete plan on one page again by reducing the page size from A3 to A4, changing the scale and moving the page.

Note that when using an option which exceeds the maximum paper size supported by your printer, the printout will be split over several pages. You will find further information on this in the description of Printer output .

PROJECT OPTIONS: BACKGROUND FOR 3D VIEWS

Here you define the background color that you would like to use in the perspective view or in the top view. This information is entered separately for <u>day</u> and for <u>night</u>. Click on the corresponding button **define...** and in the standard dialog box that appears choose the color you require. Here you also have the possibility to define your own color. You will find further information on defining colors in your Windows 95 User's Guide.

The background color used here must not necessarily be identical to that used for printing a view. This can be set individually in the <u>Print options</u> .

PROJECT OPTIONS: SCALE

The scale selected here will be used for outputting your plans to the printer and additionally affects the maximum size of your plan.

Apart from the scales generally used in the construction industry, which can be selected simply by clicking, you also have the option of selecting any scale between 1:1 and 1:250 for your project by clicking on **other scale**.

PROJECT OPTIONS: UNITS OF MEASUREMENT

All measurement information you enter for your project in ArCon uses the measurement units defined here. The available units are **millimeters (mm)**, **centimeters (cm)** and **meters (m)**.

After making the required changes, click on **OK**. By clicking the button **make default**, the current settings in the dialog box will be used as default values for all future projects.

📁 LOADING PROJECTS

Projects are loaded in ArCon via a standard Windows dialog box. This is accessed by clicking on the 📁 button or by choosing **Open** in the **File** menu. Alternatively, you can also use the keyboard shortcut **Ctrl+O**. The standard file extension for ArCon projects is **.acp**, and for the corresponding backup files **.acb**. ArCon supports long filenames when entering a project description, i.e., up to 256 characters can be entered for the name. If you call up a standard Windows dialog box once again for opening or saving a project in ArCon, the last-used path will be selected for the operation.

During loading a progress bar is visible in the status line showing the percentage of the file loaded. and the information that has so far been read. This information can be very useful, especially in the case of large projects, as the loading process can be slowed down through recalculations performed with textures and can be interrupted by pressing the **Esc** key. If the loading process is interrupted, the dialog box described in the following section will appear.

INTERRUPTED LOADING OF A PROJECT

If you have followed the loading process in the status line and know which information has already been loaded, you can determine the further course of the loading operation in this dialog box, which you access by pressing the **Esc key**.

THE BUTTON DISCARD REST

The loading operation will be interrupted immediately and the information already loaded will be displayed.

THE BUTTON DO NOT LOAD THIS PART

The part of the project shown in the status line that was being loaded at the time of interruption will be omitted and the loading operation continued.

THE BUTTON CONTINUE LOADING

The interrupted loading operation will be resumed and the complete project loaded.

THE BUTTON DISCARD EVERYTHING

The loading operation will be aborted and all data discarded, i.e., the condition existing before the load operation will be restored.

🖫 SAVING PROJECT

Projects are saved in ArCon in a similar manner to loading, using a standard Windows dialog box. You access this by clicking on the 🖫 button or by choosing **Save as...** in the **File** menu. If you have already given your project a name, (in other words, you have already saved it once before), this dialog box will only appear if you select the menu command. Clicking on

🖫 in this case would initiate the menu command **File** – **Save**. Alternatively, you can also use the keyboard shortcut **Ctrl+S**. The standard file extension for ArCon projects is **.acp**, and for the corresponding backup files **.acb**. ArCon supports long filenames when entering a project description, i.e., up to 256 characters can be entered for the name. If you call up a standard Windows dialog box once again for opening or saving a project in ArCon, the last-used path will be selected for the operation.

ArCon also saves all program and windows information applying to your project, for example, the view last displayed and the screen resolution at the time of saving.

THE SAVE DIALOG BOX

You access this dialog box by clicking with the right mouse button on ▣ or by choosing **Save...**from the **Options** – **Program** menu.

You will normally save your projects by clicking on the ▣ button or by choosing **Save** or **Save as...** in the **File** menu. ArCon also offers you the possibility to save your project automatically at fixed time intervals. Descriptions of the individual items in the dialog box can be found in the following Help pages. For the relevant information, click on ⟨ ≫ ⟩ in the upper part of the Help toolbar.

THE SAVE DIALOG BOX: ON PROGRAM EXIT

This allows you to set how, if at all, your project is to be saved on closing, exiting ArCon or opening a new project. The following options are available for this purpose.

The option Always without prompting

If you choose this option, ArCon saves your current project automatically whenever you close the file, open another project or exit from the program.

The option Prompt for save

If you choose this option, ArCon will always ask if you would like to save your project whenever you close the file, open another project or exit from the program.

The option Do not save

If you choose this option, ArCon **will execute** the menu commands **File** – **Close...** , **File** – **Open...** and **File** – **Exit..** or the corresponding shortcuts and buttons without saving the current project or displaying a warning message.

This option must be used with caution, as in this case the most recent changes to your current project could be lost by mistake.

THE SAVE DIALOG BOX: AUTOMATIC SAVE

To increase the level of data security, you have the possibility to define time intervals at which ArCon should automatically save temporary a copy of your project. This temporary copy is made independently of any projects you have already saved and is deleted when ArCon terminates normally.

We recommend that you activate this option, as the automatic saving of a backup copy takes place very quickly and you will hardly notice it while working.

However, if ArCon has not terminated normally and automatic saving was active, a dialog box will appear the next time you run ArCon. You then have the possibility of restoring your lost project.

Should you see this dialog box after starting ArCon and you click on **Yes**, then the next step is to save the loaded project under a new name. The reason is as follows: if you do not save this project under a new name and ArCon terminates again unexpectedly, the project you are currently working on will be overwritten by the new automatic temporary copy; which is not what is intended in this special case.

THE SAVE DIALOG BOX: MAKE BACKUP COPY

If you have selected this option, ArCon creates a copy of the old version of an existing project on saving. The file is saved with the file extension ***.acb** (whereby "b" stands for backup). If after saving your project you wish you hadn't made the changes you did, you can reinstate the previous version by loading the acb file. You are probably familiar with this system from using word processing programs.

If you load an acb file, i.e., a backup file, and continue to work on it, you should save it under a new name. If you save it using the old name, you will overwrite the backup file with your project file, which has the same name, thus effectively losing your backup.

CLOSING PROJECTS

When you exit a project by choosing Exit from the File menu, you may be asked whether you wish to save the current project or not. Whether or not this question is asked depends on the <u>Options</u>, you have set for saving operations.

🖨 PRINTING

ArCon provides the possibility to print floor plans and views directly on a printer using the 🖨 button. Plans are printed at the scale you have selected, 3D views are printed at a definable size.

A particular characteristic of ArCon is that work can be printed at any size, regardless of the paper sizes supported by your printer. This is achieved by printing the work over several pages and then arranging the individual pages as required and joining them together. To help you do this, the pages are printed with a slight overlap and with small marks on the edges to be joined. Additionally, adjoining edges are numbered consecutively, whereby you simply need to lay the pages together so that the same numbers lie on top of one another. Using this procedure, it is possible to print an A0 drawing on your A4 printer, or to produce graphics of any size.

As output can be made to any installed Windows device and modified under Windows 95 using the command sequence **Start - Settings - Printer**, it is also possible to output an floor plan to a plotter. To make full use of this function in ArCon, you should always check and, if necessary, modify the print options as described in the following section.

DIALOG BOX PRINT OPTIONS

You access this dialog box by clicking with the right mouse button on or by choosing **Program** – **Printing...** in the **Options** menu. Here you specify the quality and size at which you would like to print your projects.

PRINT

Here you define <u>what</u> you would like to print. Select the option **Floor plan** to obtain a printout of the floor plan regardless of which view you are presently in. The option **Current Window** provides a printout of the currently active window. This can apply both to the floor plan and to 3D views.

If you are working in several windows, you should be sure to check that the "right" window is selected before clicking on the button..

3D PRINTOUT

Settings made here apply to printing of 3D views. The size of floor plans is determined by the scale you have selected..

SIZE

With the option **as Window** , the size of your printout will match the size of the window you are printing. By entering **1.00** in the following field, you can adjust your view to fit exactly on one page. Of course, you can also spread your printout over several pages, but note that the height of the graphic will be adjusted accordingly, and a correspondingly greater number of pages may be needed.

BACKGROUND COLOR

Here you have the choice of using the background color used for your project also for printing by choosing the option **as 3D views** or whether the background color should remain **white**.

The option **white** can on the one hand reduce costs, and on the other hand improve the print quality, particularly when outputting to a monochrome printer.

RESOLUTION

Here you set the resolution at which your printer is to work. If you select a lower resolution than the maximum resolution of your printer, the printing operation will be speeded up, however the output quality will be reduced. On the other hand, using a higher resolution than the maximum supported by your printer will naturally not improve the quality of output. If you choose the option **use printer's**, the maximum resolution supported by your printer will automatically be used.

SAVING VIEWS

In ArCon you have the possibility to save the view, i.e. the contents of the current window, as a bitmap or - in the case of floor plans - as a Windows metafile. Bitmap files can be optimized during saving by using up to 16 times oversampling and an edge smoothing filter. With the help of this function you can obtain amazingly good results suitable for use for presentation purposes.

In order to obtain the maximum possible benefit from this feature, before saving a view, you should first make the settings as described in the following section according to your requirements. Once you have done this, you can save your view to the hard disk simply by clicking the left mouse button on the ▣ after entering the required file name and directory for the graphics file in the standard dialog box that appears.

In addition to the possibilities for saving graphic images described above, you can also use the ray tracer to generate the image for saving. After having selected the appropriate option (see below), a raytracing computation is performed during the save operation. Using this option, you can produce raytracing images of your scene of almost limitless resolution.

DIALOG BOX SAVE VIEW

You access this dialog box by clicking with the right mouse button on or by choosing **Save graphic...** in the **Options** – **Program** menu.

FLOOR PLANS (2D VIEWS)

Here you can select the file format to be used for saving a 2D view, i.e., the view in Construction Mode or the plan view in Design Mode. This selection is available only for plan views, as 3D views can be saved only as bitmaps.

THE OPTION AS BMP-FILE (BITMAP)

If you choose to save your file as a bitmap, the file you create will consists purely of a pixel-for-pixel representation of your window which you can subsequently edit in a drawing program. The advantage of this method is that this file format can be read by practically any drawing program. Depending on the screen resolution at which they were saved, these files are generally larger than Windows metafiles and are subject to large quality losses on scaling.

THE OPTION AS WMF FILE (WINDOWS METAFILE)

If you choose to save your floor plan as a Windows metafile, instead of generating an image of your screen as for a bitmap, vector information will be saved describing the lines, points, etc. which make up your plan. This makes it possible to rescale the plan to produce a different sized graphic without having to suffer a loss in quality. Additionally, the file size, which depends on the number of elements in your plan, can usually be expected to be smaller than that of a bitmap.

Descriptions of the individual items in the dialog box can be found in the following Help pages. For the relevant information, click on in the upper part of the Help toolbar.

DIALOG BOX SAVE VIEW: 3D VIEWS

Information entered in this area applies only if you wish to save a top view or a perspective view

 . ArCon's current window must therefore contain one of these two view types.
Make adjustments here to the size and appearance of the 3D view you wish to save. Several additional options are available for improving the optical presentation of your graphic.

DIALOG BOX SAVE VIEW: DIMENSIONS

In this area, you have the possibility to specify the size of the graphic when saving a 3D view. By choosing the option **as view**, the current size of the view is used to generate the bitmap. This will produce the best size for viewing the graphic. Of course, it is also possible to select any other size. If you choose the option **custom, border ratio as view**, changing either the width or the height will alter the other component accordingly. By selecting this option, an image will be saved that corresponds exactly to the current view, however the resolution may be higher or lower. Finally, it is possible with the option **custom** to freely select the width and height of the image to be saved. To prevent the image from distorting, the saved version may then contain more of the scene than is currently visible in the window if the border ratio entered does not correspond with that of the current view.

DIALOG BOX SAVE VIEW: COLOR PALETTE

In this area, you specify the color depth in which a graphic file is to be saved. You have the two options **Color index (256 colors)** and **TrueColor (16.7 million colors)**. Your decision as to the option to select should be based on the intended use of the saved file. Images saved using the **Color index** option are very suitable for conversion into other graphic file formats, for example for transmission via the Internet or for inclusion in WWW pages. You should use the option **TrueColor** if you require your image to be saved with the ultimate quality, as the space requirement on the hard disk is three times that for color index images. When saving with **Color index**, the **optimal colors** function will be performed automatically. This function causes ArCon to automatically generate a color table optimized for the current view containing 256 colors and to save this together with the image.

Note: If ArCon itself is operating in **High Colo**r mode, only 32.000 different colors will be used, even if when saving as a **True Color** graphic – the disk space required is however identical with that for a **True Colo**r image (for the expert: the lower bits for the color value are not used). Only when ArCon itself is operating in **True Color** mode are all possible color values used when saving a graphic file. You should take this fact into consideration if you wish to save really high-quality images. In this case, you should start ArCon in **True Color** mode .

DIALOG BOX SAVE VIEW: OVERSAMPLING

Several aids are available to help you improve the quality of your graphic images. One of these is oversampling. Using this method, each pixel will have multiple internal representations depending on the selected rate and the colors of neighboring points are mixed together. This will result in a smoothing of the edges and color spreads will be displayed more realistically. For the options provided in this area, choose **without**, **4 times**, **9 times** or **16 times** to establish whether and at what rate oversampling should take place.We recommend that you use oversampling together with the **Edge filter** option described below.

THE EDGE FILTER OPTION

If you have activated this option, ArCon searches for all "visible" edges in your graphic when saving a view and attempts to smooth them. As this function has little effect on computing time, we recommend you always keep this option active.

We recommend you use the option **Edge filter** in combination with oversampling.

DIALOG BOX SAVE VIEW: THE OPTION RAY TRACING

If you have activated this option, the image will be additionally processed by the raytracer before saving. This will take place using the raytracer's current settings (accessed by clicking on with the right mouse button).

Note: After activating the option **ray tracing**, the computing time required to save an image can become *very* great, as a completely new raytracing image is generated on saving. This is particularly the case if you have selected a high resolution and, in addition, perhaps 4, or even 16-times oversampling. You should always be aware of this when using the **ray tracing** option.

GENERATING NEW VIEWS

You generate a new view in ArCon by clicking with the left mouse button on the button. Alternatively, you can choose **New view** from the **Window** menu. This view will be generated in accordance with the settings described in the following section and displayed in an additional windows. If you wish to work with several windows, this is possible by choosing **Cascade** or **Tile** from the **Window** menu.

DIALOG BOX NEW VIEW

You access this dialog box by clicking with the right mouse button on the ⊞ button or by choosing **Program - New view** from the **Options** menu. You can then make the following settings to select the view type for a new view.

TYPE OF NEW WINDOW

Here you define the contents of the new window. The option **as current window** effectively produces a copy of the currently active window. You can explicitly define the contents of a window to be newly created using the options **plan view**, **top view (color)** and **perspective view**. The window view selected here can, of course, be adapted later to suit your requirements

TYPE OF 3D VIEW

You select the required view type in this field. The four options available are **as wire-frame model**, **with uniform shading**, **textured (average quality)** and **textured (high quality)**, all of which can be later adapted . However, if you always work with your one preferred view type, you can save time by defining the required settings as default..

ILLUMINATION

In this selection field you can choose between the options **Day** and **Night**. These options can also be changed at a later time using the button ▨ .

ZOOMING

ArCon provides you with the possibility to enlarge or reduce a section of your current view. Click with the left mouse button on 🔍 , to activate the zoom function. After you have enlarged or reduced the size of your view, the zoom function will be automatically deactivated, i.e. the button is no longer depressed. If you wish to discard the zoom setting (for example, if you have walked up to your house) and see your whole project, click on

🔍. Clicking on this button also has the effect of fitting your project view optimally to the screen, regardless of the size.

Enlarging a screen section is always performed by clicking with the left mouse button. Reduction is also performed by clicking with the left mouse button while at the same time holding down the **Ctrl** key. If you have entered a fixed enlargement factor, you only need to click with the left mouse button in your current view window to zoom. If you haven't entered a fixed factor, you will need to define a zoom range in your view while holding down the left mouse button.

The way you enter this range depends on the settings you made in the **Zoom** dialog box (see below).

Note: In the perspective view, the depth is also adjusted on zooming, so that the center point of the selected region becomes the new observation point. Accordingly, the depth of what you see in the center is the new depth.

Apart from zooming with the 🔍 button, you can also use the numeric keypad for zooming and shifting the visible section. The key assignments are as follows:

Key **0**	Corresponds with the function **Show all**
Key **1**	Shifts the image section down and left
Key **2**	Shifts the image section down
Key **3**	Shifts the image section down and right
Key **4**	Shifts the image section left
Key **6**	Shifts the image section right
Key **7**	Shifts the image section up and left
Key **8**	Shifts the image section up
Key **9**	Shifts the image section up and right
Key **+**	Image section is centrally enlarged
Key **-**	Image section is centrally reduced
Key *****	Image section is enlarged centrally around the current mouse

pointer position

Key **/**   Image section is centrally reduced around the current mouse

pointer position

You can easily remember the key assignments by thinking of the numeric keypad as a "compass" with the 4, 8, 6 and 2 keys showing the principle directions and the numbers 1, 3, 9 and 7 the intermediate directions.

With the settings described in the following section, you can adjust the zoom function to meet your individual requirements.

ZOOM DIALOG BOX

You access this dialog box by clicking with the right mouse button on or by selecting **Program** – **Zoom factor...**.from the **Options** menu.

ENLARGEMENT FACTOR

Here, by selecting the appropriate options, you can adjust the settings for the zoom function. The settings made here apply both to enlargement and reduction.

THE OPTION SELECTED (FREE)

With this option you can freely select the section to be enlarged or reduced by clicking on any desired part of the image and, while holding down the left mouse button, drawing a box around the desired section to define the zoom area. When you release the mouse button, the final size of the zoom area is established.

THE OPTION SELECTED (CENTERED)

If you select this option, a zoom box is generated exactly as for the option **Selected (free)**. In contrast to this, however, you do not click on two opposite corners of the zoom area, but on the center and one additional corner of the area to be zoomed. Compared with the first, the second variation has the advantage that you can choose in advance of zooming exactly what is to be in the center of the screen. This is particularly important in the perspective view for determining the depth (see above). Which variation you decide to use depends on your personal taste.

THE OPTIONS 1.414, 2.0 AND 4.0

These are predefined zoom factors. You use these simply by clicking with the left mouse button in your current view window when the zoom function is active. The view will then be enlarged or, by pressing **Ctrl**, reduced by the stated factor.

THE OPTION OTHER

Here you have the opportunity to enter a freely selectable zoom factor. The only limitation to this is that the factor must lie in the range 1.00 to 20.00.

WORKING WITH STORIES

In ArCon, you are not only able to model one story of your house, you can also create a complete house. From the foundations to the attic. The menu item **Stories** is provided for this purpose and contains the following entries, both in Construction Mode and in Design Mode:

Before explaining these menu entries in detail, we would like to make a few general comments on stories. ArCon always works with just one current story. The story that is currently selected can be seen in the drop-down list in the upper horizontal toolbar.

You can make any other story the current story at any time by selecting it from the drop-down list.

Entries you make in <u>Construction Mode</u> always apply to the current story. So whether you insert windows, doors or walls, the corresponding elements will always be inserted in the current story.

In Design Mode, the current story is visible in any case. However, you can also make further stories visible. One exception is the top view, where only the current story will be shown

ALL THAT BELONGS TO A STORY

ArCon assigns all entries that you make to a certain story. in Construction Mode, this means all input you have made for this particular story. As a reminder: in Construction Mode, all entries you make always apply to the current story. These entries also include text, guides and dimensions. Objects that you have placed in Design Mode will be assigned to the various stories as follows: objects which are situated within an enclosed room belong to the story in which the room is also situated. "Within" in this context means that the center point of the object is in the room. Objects which are not situated in any room do not belong to any story. They will therefore not be altered when you alter the various stories and will not be deleted when you delete various stories.

DEFINITION OF THE FIRST STORY OF A NEW PROJECT

If you create a new project in ArCon by clicking on the button or by choosing **New** from the **File** menu, a dialog box at first appears in which you must enter information on the first story of your project. In principle, your enter the same information here as would be necessary for any other story. This information is described in more detail in the section covering the menu items **Stories** – **New story above…** and **Stories** – **New story below…**.

In contrast to the dialog box which appears after choosing the menu items mentioned, the dialog box that appears when creating a new project does not contain the field **Copy elements**. The reason is clear: as the story you are defining is the only story, you naturally can't copy elements from other stories. But you can define the Height of the Floor. If you wish to start with the cellar, you can enter a value of, for example, **- 3 m**. This information together with the information on the story height provides the height of the stories yet to be defined.

INTERDEPENDENCY BETWEEN STORIES

If you are working with several stories in ArCon, the floor levels of the various stories will be set such that all stories join together "seamlessly". For example, if you have defined the ground floor as having a story height of 2.80 m, and the upper surface of the floor of the ground floor has an absolute height of 0.0 m, then the upper surface of the floor of the second story will be at a height of 2.80 m. There is no way you can change this, unless you change the story height or the zero level of the ground floor.

This seamless fitting together of stories has consequences for the input of zero levels and story heights. If you have defined only one single story, you can define its zero level – i.e., the level of the upper surface of the finished floor – and the story height independently. Accordingly, it is possible to enter both values in the relevant dialog box.

If you have defined at least one story and you define a further story below all other defined stories, you can enter on the one hand the story height for this – the lowest – story, but also the level of the upper surface of the finished floor. However, these values are interdependent. If, therefore, you change the level, the story height will also change accordingly. You cannot enter the level for any story – apart from the lowest story in your plan. Although the value is shown for your information, no direct change is possible.

To help you to understand this dependency somewhat better, we recommend that you produce a simple plan with several stories and then enter the relevant information for the various stories.

MENU ITEM STORIES/VISIBLE STORIES

When you select this menu item, the following dialog box appears:

The contents of the list in this dialog box naturally depend on the number and types of stories contained in your project. Our example project has five stories.

You enter information into this dialog box to indicate which stories are to be visible in addition to the current story. In the Construction Mode window, the current story is shown normally, all other visible stories are shown grayed out. You can, however, snap to elements of the grayed-out stories. In Design Mode, the appearance depends on the view type of the window: In the Design Mode plan view, the appearance is identical to that in Construction Mode – i.e., all visible stories are shown grayed out, only the furnishings of the current story are shown in black. The appearance in the top view is independent of the information you provide in the dialog box. Here, only the current story is shown - otherwise you would only ever see the upper story. Finally, in the perspective view, all stories are shown equally. Specifically in the case of this view, you can use the dialog box to achieve special effects:

If you select <u>Display</u> the current story, you can display your house "layer for layer" if you make each level in the selection list in turn the current level.

Note: You can use the cursor keys (up, down) on the keyboard to select the stories if you first click in the selection list.

If you select <u>Display</u> all stories in the dialog box, you will be able to admire your entire house in the perspective view. The final option, <u>Display</u> the current story <<u>story name</u>> and the selected stories is of interest if you only wish to display certain stories of your house.

MENU ITEMS STORY − NEW STORY ABOVE …
AND STORY − NEW STORY BELOW …

If you wish to add a further story to your plans, choose one of these two menu items. "Above" in this case means above the topmost story and "below" means below the bottom-most story. The dialog box is split into two different areas, Story data and Copy element.

Story data:

In the selection field **Description** you can enter a description for the new story or select a predefined description from the list. This description is used to identify the story to be defined. After closing the dialog box by clicking on **OK**, you will find this description in the selection list for the current story in the upper horizontal toolbar.

Note: If you enter a name that has already been assigned, ArCon automatically adds a sequential number to differentiate the stories from one another.

You can enter the height of the newly created story and enter information for the individual parts of the ceiling for this new story.

Note: In ArCon, the ceiling and the room below it belong to a story. A story therefore goes from the upper surface of the finished floor to the upper surface of the finished floor of the ceiling above.

CEILING HEIGHT

As the ceiling in ArCon belongs to a story, when defining a new story you must define not only the height of the story, but also the heights of the various areas of the ceiling. The required terminology can be found in the following sketch. Note that the room height is equal to the story height minus the heights of the individual ceiling layers. The final data entry item in the Story data is **Level of upper floor surface**. This value is generally grayed out and cannot be changed. This is because it is calculated automatically from the sum of the story heights of the stories below.
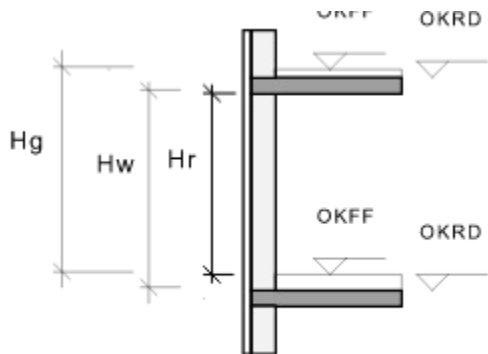
Hs   = Story height

Hw   = Wall height

Hr   = Room height

USFF   = Upper surface of finished floor

USUC = Upper surface of unfinished ceiling

COPY ELEMENTS

Normally the floor plan of stacked stories is in large parts very similar. To avoid having to enter a completely new floor plan for every new story, in this area you can define the parts of an existing story, if any, that are to be copied. If you wish to copy elements, then rather than entering **nothing** in the sub-area **Copy**, you enter the story which is to serve as the source for the elements to be copied. For this you use the drop-down list.

In the sub-area **Copy** you can select the items that are to be copied from this story. You can choose between **nothing**, **whole story**, **floor plan only** and **floor plan with doors**, **windows**, **supports**, **chimney stack**, **staircases**, **ceilings**, **ceiling openings**, **wall openings**, **texts**, **dimensions**, **guides** and **furnishings**. After making the entries are required, close the dialog box by clicking on **OK.** ArCon will then generate the new story for you.

MENU ITEM STORIES − EDIT CURRENT STORY ...

Select this menu item if you would like to make changes with regard to the height or the name of a story that has already been defined. You can then change the definition of the current story in the same way as naming a newly defined story. Additionally, you can change the story height and the height of the individual ceiling areas. In principle, the dialog box corresponds with the left half of the dialog box which are presented with when defining a new story. By clicking on **OK** to close the box, the new values will be accepted.

If you have changed the story height, then you still need to decide what is to happen with the stories above and below the current story.

Make your selection in the additional dialog box that appears. When you close this dialog box by clicking on **OK**, the final changes will be made to the current story. If you click on **Cancel** in this dialog box, the whole procedure will be canceled, i.e. no changes will be made to the story.

Note: If you change the story height, ArCon automatically makes certain changes to this story. These are:

• Staircases in the current story are adapted to the new story height.

• Objects in the current story having the characteristic of "falling upwards" will be shifted upwards by the same amount as the increase in ceiling height of the current story.

• All other objects, i.e., those that automatically fall and those that "float", will move down by the amount that the ceiling of the next lower story moves, if it moves.

• If the ceiling of the next lower story moves, the window of the current story will also be shifted so that the parapet height remains constant.

• Doors will be shifted in an analogous manner.

• If a window no longer fits in this story after shifting or because the ceiling height of the current story has been reduced – in other words, it protrudes upwards – ArCon will ask if this window should be deleted or if you would like to continue to use it. If you choose to keep it, you must manually adjust the height of the window affected.

• If because of changes in the current story other stories are changed in their height or position, this situation will be dealt with in a similar manner..

MENU ITEM STORIES – DELETE CURRENT STORY …

Just as you are able to add new stories to your plan, you can also delete existing stories again.. If you close this dialog box by clicking on **OK**, the story will be deleted. To avoid deleting a story accidentally, ArCon asks once again for confirmation of the delete operation in a separate dialog box. You then have the possibility to prevent by clicking on **Cancel**. If you confirm by clicking on **OK**, the story will be deleted together with all information you have saved for this story (walls, doors, windows and furnishings, also texts, guides, etc.).

WORKING IN CONSTRUCTION MODE

SNAPPING

ArCon provides various aids which simplify your work in the plan views of the **Construction Mode** and **Design Mode**. The method used is called **snapping**. With this function, you don't need to place elements exactly on the spot where you want them to appear, but you simply move the mouse pointer into a certain area around the desired point, which you define yourself, the so-called snap radius.

The aids mentioned above include the grid, the rule and the guides. In addition, it is possible to snap to wall axes, wall faces, openings and floor panels as well as intersections and ends. In general, the basic rule applies that it is only possible to snap to visible elements or aids. Therefore, if you, for example, switch off the guides with the button , snapping to these will no longer be possible - even if you have activated **Snap to guides** in the snapping settings.

If you wish to freely place an object without changing the snapping settings, you can switch snapping off for all elements by pressing the **F3** key until setting down the object. Note however that this function only remains active while placing the one object and snapping must be switched off again for every further object with the **F3** key. Therefore, if you wish to freely place a number of items, it is advisable to switch off snapping permanently in the snapping settings.

If several possible snapping points lie close together, you can switch between these with the key combination **Ctrl+F** before finally placing the object.

DIALOG BOX SNAPPING

You access this dialog box by clicking with the right mouse button on or by choosing **Snapping** from the **Options** – **Program** menu

ON/OFF

You can permanently deactivate snapping by choosing the option **off**. In this case, no further input is possible in this dialog box and you will be able to freely place all objects and elements on your page. If you activate the option **on**, you can make adjustments to this function using the settings described in the following.

RANGE

Here the so-called snap radius is entered. ArCon will attempt within this radius to find a point it can snap to. This could be a point on the grid, on the rule or an element within the **Snap to** range.

As it can frequently happen that several snapping points are situated within the snapping radius, the possibility exists to switch between these points using the key combination **Ctrl+F**.

The size of the snapping radius you enter depends to a large extent on the "elegance" with which you operate the mouse. Experience has shown that this depends very much on the person operating ArCon, so you should adjust the setting to your personal taste. If the snapping radius is too large, then input of the various elements can prove to be rather "laborious", as you will never hit what you are aiming at. On the other hand, if the snapping radius is too small, it can often happen that you are not able to snap to the point that you wish to snap to because you haven't quite hit it. It is best if you experiment with various settings.

SNAP TO

Here you select the elements to which you would like objects to snap simply by checking the elements for snapping to. It is basically possible to snap to **guides, wall axes**, **wall faces** and **openings/floor panels**. In addition, selections can be made in the field **Intersections and ends of** to snap to all sections and end points of the stated elements.

If the elements selected are not visible in your plan, then it is not possible to snap to them, even if the relevant option has been activated.

If you are working with several stories , then you can snap to all elements of the visible stories. Therefore also to elements in stories different from the current story . You can use this function to place walls exactly above each other in various stories, for example.

SETTING THE CO-ORDINATE AND GRID ORIGINS

Apart from the guides and the rule, the grid is probably the most important aid to construction. You can switch the grid on or off using the ⊞ button   and edit the grid characteristics by clicking on the button with the right mouse button. When placing objects and constructing elements, the mouse pointer will only snap to the grid if the grid is switched on – i.e., visible. Snapping is described in detail in the previous section.

Closely associated with the grid is the origin, as all co-ordinates shown in the status line are calculated based on this. Thus the origin, just as the grid, will provide you with a very useful aid for constructing and equipping your house. With the option switch ⊞⊞⊞ you can set either the co-ordinate origin alone, the grid origin alone or both the co-ordinate and grid origins together, depending on the selection you make.

The grid origin in this connection means the position of the grid dots in your plan. As the grid repeats periodically, there are in principle many possible grid origins. If you wish any one particular point which presently does not coincide with a point on the grid to coincide with a point on the grid, use the buttons ⊞ or

⊞ and position the grid on this point. All grid points will then shift accordingly by +/- one half of the grid measurement.

GRID DIALOG BOX

You access this dialog box by clicking with the right mouse button on or by choosing **Grid....** from the **Options** – **Program** menu.

SPACING

There are five different ways in which you can define the grid spacing. This spacing applies both to the x and y values, as it is only possible to define a "square" grid pattern. The first four options provide four fixed spacings which are nominal building dimentions and thus in multiples of 12.5 cm.

The last option allows you to define your own grid spacing, which can lie in the range 1 cm to 10m. In this field, you can enter this information directly via the keyboard or increment or decrement the value in steps by clicking on the arrows to the side with the left mouse button. The units of measurement for spacing depend on the units you have entered under **Project options** .

Note: Upwards of a certain grid point density (depending on the grid point spacing and the current degree of enlargement) ArCon no longer displays the grid even when it is switched on. This is because the situation may arise that so many grid points are displayed that you would "not be able to see the wood for the trees".

▦ THE RULE

In <u>Construction Mode</u>   you have the possibility to enter constructional details with the help of the rule. You can only see the rule when the button ▦ is depressed.

You can use the rule on the one hand for measuring, but also for constructing. If the rule is visible, then an entry bar appears in the current window at the lower left edge of the window into which you can enter values exclusively for the rule.
Before dealing with the individual parts of this entry bar in detail, first a few fundamental words on the use of the rule: in principle, the rule functions in a manner similar to a perfectly normal rule. You can use one edge of the rule as a rest, turn and shift the rule on the paper however you like, or even lift the rule in order to get your "pencil" (the mouse) past the rest edge of the rule. Together with <u>snapping</u>   and the tabulators which can be assigned to the rule, the rule provides a clearly understandable, but nonetheless powerful tool in ArCon.

CONSTRUCTION OF THE RULE

The rule basically consists of two areas: one area in which you will find the scale graduations, and a second area in which you find the scale inscriptions of the rule. Both areas behave differently when you click on them. The area with the scale inscriptions serves as the "gripping" area of the rule. If the rule selection button ▦ is pressed, you can move the rule by clicking in this gripping area and moving the rule while holding down the left mouse button. This type of rule movement only permits parallel movement. Note that during movement, the rule will snap to other elements of your project in the region of the mouse. When moving the rule as described above, the position of the origin of the rule does not change. In principle, all scale divisions of the rule run on lines vertical to the rule.

If in addition to moving the rule the origin of the rule is also to be shifted, this can be done by pressing and holding the **Shift** key during movement. You are then able to position the rule absolutely freely and the point at which you release the mouse button is the new zero position for the rule.

A third way of moving the rule is to rotate it. You access this function by clicking on the scale area while holding down the **Ctrl** key. You can then freely turn the rule about its origin.

RULE TABULATORS

Imaging that your timber rule had a notch at a certain position along its rest edge. If you were to run along the edge of the rule with a pencil without exerting too much pressure, the pencil would come to rest in the notch.

The equivalent of the notch(es) in ArCon are the tabulators. These tabulators are marked in color within the rule. There are three different types of tabulator: those marked green are periodic tabulators – they repeat at fixed intervals, whereby measurements always begin from zero. You can modify these periodic tabulators or even switch them off completely. You access the dialog box in which you make the relevant changes by right-clicking on the scale area of the rule. You will find a detailed description of this in the following section.

Apart from the periodic tabulators, you can set additional tabulators as needed. You do this by clicking in the graduation area of the rule at the required position. After clicking, a dialog box appears in which you can enter the exact numerical value for the tabulator. Tabulators defined in this way are colored red. You can move these red tabulators by clicking on them and then dragging them along the rule. If you drag them out of the rule, the tabulator will be deleted. You are possibly aware of this function with the rule of Word for Windows. Also after shifting a tabulator a dialog box appears again in which you can enter the exact positions.

Tip: If you wish to suppress the dialog box that appears on moving or setting "red" tabulator stops, press the **Ctrl** key while clicking.

The value used will then be the scale value that is closest to the mouse pointer when clicking.

OPTIONS FOR THE RULE

In the rule settings dialog box you determine which tabulators are to be used, where the origin of the rule is and the behavior of the rule when editing and scrolling your plan.

The settings you make for the rule apply only for the current window. If you have several windows in your view, you can make different settings for all views.

TABULATORS

Rule tabulators function as capture positions during construction. You can use periodic tabulators, for example to define a capture position every 50 cm on the rule. Periodic capture positions appear in green on the rule.

The significance of the individual elements in the **Tabulators** field is as follows.

Periodic tabulators every

When you check this box, you can enter the frequency of the periodic tabulators in the associated input field.

Use standard tabulator

Check this box in order to be able to use the standard tabulator. The standard tabulator is shown in blue.

ORIGIN

If the box **Origin at last point** (see below) is not checked, you can enter the zero position of the rule here. When you exit the dialog box by clicking on **OK**. the rule will be moved to this position relative to the 0-position you have fixed in the drawing

Note that the setting **Keep rule visible** (see below) has priority over the setting for the origin. If after the settings you have made the rule would not be visible, the settings will be adjusted after you click on **OK** so that it becomes visible.

KEEP RULE VISIBLE

Check this box to prevent the rule from scrolling out of sight when you scroll a view on the screen.

THE CHECK BOX ORIGIN TO LAST POINT

If this box is checked, the 0-position of the rule will always be moved to the point where you last clicked with the mouse to enter the position of walls, windows, doors, etc.

THE ENTRY BAR FOR THE RULE

In the rule entry bar, which when you are in Construction Mode and the button ▦ is depressed is always to be seen in the current window, there are certain entries you can make directly via the keyboard. Apart from the input range for numeric input, six buttons exist with which you can initiate certain operations for the rule:

🔺

🔻

🔺

🔄

🔙 and

▬ .

With the button 🔺 you lift the rule. This has the effect that when inserting walls, etc., the mouse or the element being inserted can be dragged past the rule without hindrance. This is not the case when the button

🔺 is not depressed. In this case, you can only pass the rule unimpeded from ''below'', when attempting to pass the rule from ''above'', the element will slide along the edge of the rule.

The function of the 🔻 button is to reverse the definition of below and above for the previous button. Normally the edge of the rule is on top; but when you click on this button, the edge of the rule will be underneath and the button will change to

🔺 . This procedure is identical in use to that of a genuine rule, which you sometimes have above the pencil and sometimes also below.

The purpose of the 🔺 button is to shift your rule by a certain offset in a parallel fashion. When you click on it, the direction of the rule will be maintained, but the edge will be shifted by a certain value. You enter the magnitude of this shift in the first numeric field of the rule entry bar. For example, if the value entered is. 1 meter and you click on the button, the rule will be moved up by one meter. Note that negative values in the entry field will cause the rule to shift down.

The button 🔄 rotates the rule by a fixed angle. The ''axis of rotation'' is the 0-position of the rule. You enter the magnitude of this angel in the second numeric field of the rule entry bar. The units for data entry are degrees, whereby positive values will turn the rule anti-clockwise, i.e., to the left, and negative values will turn the rule to the right.

The purpose of the 🔙 button is to rotate the rule by 90 degrees. For example, if your rule is horizontal and you click on this button, it will turn to the vertical position. Clicking on the button again will turn the rule back to the horizontal position.

The final button ▬ always positions the rule horizontally. Regardless of the present angle of the rule, clicking on this button will always cause the rule to take on an absolute rotational angle of zero degrees.

THE ENTRY FIELDS OF THE RULE ENTRY BAR

The first two entry fields have already been described in the previous section. The first field defines the offset to be used for parallel shifts on clicking the 🔺 button. The second defines the relative angle of rotation to be used on clicking the

🔄 button. For example, if you have entered 15 degrees, you can rotate the rule by 45 degrees by clicking three times on the

🔄 button.

The third entry field is used to define a standard tabulator . This fixed tabulator position can be entered at any time without the need to call up a dialog box on every occasion.

In the final entry field you can enter an absolute angle of rotation. If you enter 45 degrees, for example, the rule will be turned by this amount. Additionally, if you click in the numeric area of the rule while holding down the **Ctrl** key, this field will also display the current angle of the rule after the rule has been turned.

KEYBOARD SHORTCUTS FOR USING THE RULE

You can also operate the six buttons in the rule entry bar via the keyboard. The function keys F5 - F10 have been assigned for this purpose. Function key F5 is assigned to the first button, i.e., this is the ''lift rule'' key, F10 is assigned to the last button, i.e., the ''rule horizontal'' key. With a little practice using these keyboard shortcuts, you will be able to make very effective use of the rule for drawing your construction plans. Try constructing a 20-sided floor plan, for example, with the help of the rule.

Hint: Use the standard tabulator and turn the rule each time by a fixed angle of 18 degrees.

⊞ GUIDES

ArCon provides guides to help you quickly and accurately construct your floor plan and using these you and the various positioning facilities you can construct a grid of guides in very little time. You can define the type of lines to be displayed in the dialog box Guides, as well as entering the angle and the distribution ratio relative to reference lines in the dialog box entering guides. You can save these values as defaults for use in other projects.

You switch the display of the guides on or off by clicking on the ⊞ button.

⁄ ⁄ DEFINE GUIDE TYPE

You will find the button for the guide functions in the vertical toolbar. This is an option switch, indicated by the black triangle in the bottom right corner of the button. By clicking and dragging the left mouse button into the view window, a selection of two different types of guide will appear. Information on each type will be displayed at the bottom left of the screen. Move the mouse pointer onto the required type while holding down the left mouse button and then release the mouse button. The selected type will now appear in the toolbar.

DRAW GUIDE

With the first selection ⁄ the guide will be drawn over the entire work area. In the second case

⁄ only a guide segment will be drawn. You can determine for yourself the length of the guide you insert.

After you have selected a guide, ArCon will offer you a selection of different placement possibilities in a second vertical toolbar (the "how" toolbar). By clicking on one of these buttons with the right mouse button, the same dialog box will appear in each case. Here you can enter the following numeric values by clicking on one of the entry fields and entering the data via the keyboard.

For the entry type ⚁, **Angle to reference line** provides the defined angle, for the entry type

✛ the **Distribution ratio**

You click on the screen with the left mouse button at the insertion point. If you wish to cancel a guide insertion operation, press the **Esc** key.
In the following section, guides and guide segments will be described together. The term guide applies to both types.

⋮ DRAW VERTICAL GUIDE

Place a guide by clicking at any point in the work area. Vertical orientation is mandatory.

For a guide segment, the first entry point if the starting point of the segment, a second point designates the end point of the guide segment and therefore defines the length the guide segment. If when entering the starting point you press the **Shift** key at the same time, ArCon remembers the position of the vertical line. By then entering a second and third point on top of this, you determine the start and end of the guide segment.

This extended function allows you to position a guide segment, the extrapolation of which goes exactly through a certain point.

▬ DRAW HORIZONTAL GUIDE

The procedure for placing horizontal guides and guide segments corresponds exactly with that for vertical guides. The possible means of entry are identical.

╱ DRAW FREEHAND GUIDE

After clicking the first entry point, you can freely rotate the guide around this fixed point and then locate the guide at any required angle by clicking on the second point.

Two entry points are also required for positioning guide segments. These define the start and end points. The **Shift** key has no effect.

⚟ DRAW GUIDE VERTICAL TO A REFERENCE LINE

Guides: Click with the mouse on the desired reference line (wall face etc.). The run of the new guide vertical to the reference line will appear on the screen. Place the guide by clicking with the left mouse button at the required position. If you press the **Shift** key when marking the first point, ArCon remembers the angle of the guide. The position of the guide can still be shifted, even past the reference line that was clicked on.

Guide segments: By marking the first point you identify the reference line. This is at the same time the starting position of the guide segment. The second point determines the length of the guide segment to be set vertically on the reference line. If you press the **Shift** key when marking the first point, ArCon remembers the angle of the guide segment. The position of the segment can still be shifted. By marking the second and third points on this line, define the start and the end of the segment.

⚟ DRAW GUIDE AT A FIXED ANGLE TO A REFERENCE LINE

By using this function it is possible to place a guide at a fixed angle.

Placing guides and guide segments with or without the **Shift** key is performed in the same way as placing

a guide vertical to a reference line. The only difference is that the guide is not positioned at a right angle, but at any desired angle. You can set a value for this angle by right-clicking on the "how" toolbar when placing guides, and then entering the required value in the dialog box that appears.

DRAW GUIDE PARALLEL TO A REFERENCE LINE

Right click on the line parallel to which the guide is to be placed. With the second point you click on, you determine the offset to the parallel line.

In the case of guide segments, the first click identifies the reference line. With the second point you click on, you determine the offset to the parallel line and the start of the guide segment and, with the third click, the end. The **Shift** key has no effect.

DRAW PARALLEL GUIDE AT A FIXED OFFSET TO A REFERENCE LINE

First click on the reference line and then to the left or the right next to the reference line, depending on which side the guide is to be placed. ArCon now displays a dialog box in which you can enter the offset to the reference line.

Entries that you make in this dialog box are retained. Therefore, if you place several guides using this placement method, you do not need to re-enter the value each time.

You can suppress the display of this dialog box by pressing the **Ctrl** key when clicking on the second entry point.

When placing guide segments, ArCon uses the parallel position of the second click relative to the reference line for the starting point. You determine the end point of the guide segment with the third click. Between the second and the third click a dialog box appears in which you enter the offset to the reference line. You can also avoid displaying this dialog box by pressing the **Ctrl** key. In this case, the "previous" entry will be used.

DRAW GUIDE MIDWAY BETWEEN TWO POINTS

Between two points entered, the starting point with any desired distribution ratio is calculated. You access the dialog box for entering the distribution ratio by clicking with the right mouse button on the "how" toolbar for guides. The guide will be placed in the form of an axis between these two points.

In the case of guide segments, the starting point lies in the stated distribution ratio between the two reference points. A third point determines the direction (left or right) and the length of the guide segment. If the **Shift** key is pressed during entry of the first two points, the position of the guide segment will be shown on the screen. You can then determine the start and end points by marking a third and fourth point.

DELETE GUIDE

You select the guide to be deleted by clicking on with the left mouse button and then clicking on the guide. The selected guide will be displayed on the screen in red. It will be deleted on pressing the **Del** key. If you want to delete all guides in the display, you can do this by choosing **Delete all** – **guides** from the- **Edit** menu.

GUIDES DIALOG BOX

This dialog box is opened when you click with the right mouse button on [icon] or by choosing **Program - Guides...** in the **Options** menu.

CHOOSE LINE TYPE

Five different line types are available for you to choose from.

CHOOSE COLOR

If you wish to use a certain color for your guides different from the previously used color, then click on the button **Select color**. A color palette will be displayed in which you can either choose from one of the basic colors offered or mix your own color together by selecting **Define colors**.

DEFAULT BUTTON

By choosing **Make default** in the dialog box, you can permanently save the values you use most frequently. Changes you make without saving as default will only be available for the current construction project.

▲ SELECTING IN THE CONSTRUCTION MODE

When you are working in ArCon's <u>Construction Mode</u> , the button ▲ appears right at the top of the left vertical toolbar. It has a special significance compared with all other buttons on this toolbar. It is not used for placing elements, but to select elements. If this button is depressed, you can select elements placed in your plan in order to then delete or move them, for example, or to change their properties in some way. To select an element, click on the desired element while the

▲ button is depressed. The element will then be marked red. If several elements are located at the point you are clicking on, then the smallest element will be selected first. If you click again, then the next larger will be selected, etc.. Selectable elements are walls, window, doors, labeling, texts, floors and ceilings (the internals of rooms), floor panels, openings, staircases and roofs. If you click in a room and there is a roof above this room, then the floor and the ceiling of the room will be selected first, if you click again, then the roof (which is, of course, larger than the floor and ceiling) will be selected.

You can perform the following operations on selected elements:

- You delete a selected element by pressing the **Del** key

- You move an element after having selected it by clicking again on the element and then moving the element without releasing the left mouse button.

Note: Not all elements can be moved in Construction Mode. For example, you cannot move staircases. If necessary, you must first delete these and then re-insert them. Some elements can be moved only under certain restrictions. For example, windows can only be moved within a wall.

- You can change the properties of elements. If an element is selected and you double-click on it while it is marked red, a dialog box for this element will appear in which you can alter its properties.

Note that when you switch from the Design to the Construction Mode, you are automatically presented with a pressed ▲ button.

ELEMENTS IN THE CONSTRUCTION MODE

The following chapter explains how you work with elements such as walls, windows and doors in the Construction Mode. The various elements are described in the order in which they appear on the left vertical toolbar. The description of each element is divided into in following sub-items:

- General description of the element

- Types of input for the element

- Options for the element

In the description of the types of input for the element, you will find precise explanations of the possible buttons on the ''how'' toolbar for this element.

The options for an element can be used in several ways:

- You can change the size and appearance of an element that has already been placed.

- By right-clicking on an element button, e.g. the button, you can determine how elements should appear that are newly placed after this clicking. Of course, you will still be able to change new elements as described immediately above.

- The possibility described immediately above refers only to your current project after right-clicking. However, you can make default settings for all future projects, which will then be used after these default settings have been made. For example, if you start ArCon again at a later point in time and use a window without having made changes as described above, then the default values stored will be used. You always have the possibility to define or change the default settings for a certain element whenever a dialog box for this element is open. Here you will find the button **Make default**. If you click on this button, the settings presently visible in the dialog box will be used as default settings from this point onwards.

Note: Using this function, you have the possibility to adjust the characteristics of ArCon within a wide range to suit your own requirements. After installation of ArCon, some standard settings are already defined, but these might not necessarily meet with your requirements. After a period of getting to know ArCon, you should review these settings again as described.

THE ELEMENT WALL

Using the wall function, you can quickly and easily construct your floor plan. It is possible with the help of a dialog box   to change the wall options, such as dimensions, texture and display, in accordance with your requirements. Additionally, it is possible to enter seven different wall types as standard inter-project defaults. Through having various input possibilities for walls and the additional benefit of construction aids, such as the grid, guides and the rule, you will very soon be able to construct accurately scaled plans. *However; first make sure that the grid is switched on.*

DEFINE WALL TYPE

In the vertical toolbar you will find the ▐ button for the wall function. The button is an option switch, indicated by the black triangle in the bottom right corner of the button. By clicking and holding down the left mouse button and dragging the mouse into the view window, a selection of wall types will appear. Information on the individual types will be displayed at the bottom left of the screen. Move the mouse pointer onto the required wall type while holding down the left mouse button and then release the mouse button. The selected wall type now appears in the toolbar. You access the dialog box for changing the values by clicking with the right mouse button on

▐ or by choosing **Walls...** from the **Options** menu. By saving in the dialog box using **Make default** you can permanently store the values you use most frequently. If you change the values for a selected wall type without saving them as default, these values will only be valid for your current work. By selecting and then double-clicking on a wall, you can also make changes to the wall using the dialog box that appears.

When you have selected a wall type, ArCon shows a selection of various insertion possibilities in a second vertical toolbar (the "how" toolbar). After clicking on one of these buttons with the right mouse button, a dialog box will appear. Here you can enter the values appertaining to the various inputs. These are similar to the options for guides: the angle to the reference line for the selection of ⟋ and the distribution ratio for

⟋. The offset to a parallel for
⟋ is entered via a dialog box during positioning.

If you wish to cancel a wall insertion procedure, press the **Esc** key.

PLACING WALLS

CHANGING THE WALL REFERENCE POINT

After the start position of a wall has been set, a colored cross marks the current reference point for the wall. Swapping between the wall axis and both long sides is achieved by pressing **Ctrl + W** –: the entire wall will be shifted.

If only the points of an end of the wall are to be shifted, then press **Ctrl + Q** – for the start of the wall and **Ctrl + E** – for the end of the wall.

⬜ INSERTING MULTIPLE WALLS

With this command you set up the walls as a polygon, i.e. the first point clicked on is the starting point of the first wall section, the second point is the end point of the first wall section and at the same time the starting point of the second wall section, etc.

▨ INSERTING SINGLE WALLS

Enter the starting point and the end point for each individual wall.

☒ INSERTING A WALL VERTICAL TO A REFERENCE LINE

If you click with the left mouse button on a wall or a guide, this becomes the starting point of wall lying vertically to this reference line, the end point of which is determined by the second point entered.

If you press the **Shift** key while clicking on the first entry point, ArCon will draw a guide vertical to the selected reference line. This guide can be moved as required along the reference line (also outside of it). If you enter the second point without pressing **Shift**, then this determines the starting point on the reference line. The third entry point determines the end point on the guide.

If you enter the second point also with the **Shift** key pressed, this enables the position of the guide vertical to the reference line to be fixed. The third and fourth entry points determine the start and end points of the wall. Both points are situated on the guide, however they do not need to be connected any longer to the reference line.

☒ INSERTING A WALL AT A FIXED ANGLE TO A REFERENCE LINE

With this command you can construct a wall at any desired angle to the reference line you have selected. The required angle can be entered in the Wall data dialog box.

The various insertion methods using the **Shift** key function are exactly as for the system described above for constructing a vertical wall.

▨ INSERTING A WALL PARALLEL TO A REFERENCE LINE

Click on a wall or a guide with the left mouse button. A guide will appear which can be moved parallel to

this reference line. The second and third points of clicking determine the start and end points on the guide.

If the guide is to be fixed at a certain offset to the reference line, then press the **Shift** key while performing the second click. The guide is now fixed and on this, the start and end points of the wall are determined by the third and fourth points clicked.

INSERTING A PARALLEL WALL AT A FIXED OFFSET TO A REFERENCE LINE

With this command you can construct a wall parallel reference line you have selected. After the second click, the Offset for parallel guides dialog box appears, in which you can define an offset. The various insertion methods using the **Shift** key function are exactly as for the system described above for constructing parallel walls.

INSERTING A WALL MIDWAY BETWEEN TWO POINTS

You click on two entry points, between which the wall is to be constructed vertically with a certain distribution ratio. You define the default value for the distribution ratio in the Wall data dialog box. If you click on the first two points without the **Shift** key, then the start point of the wall will lie between these two points. The third point determines the length and direction of the wall.

If you click on the second point with the **Shift** key pressed, a guide will be drawn vertically to the points with the selected distribution ratio, on which the position and length of the wall are determined by the third and fourth points clicked on. These last two points do not need to be on the guide, they can be any two points within the plan. They will be projected vertically onto the guide by ArCon.

SHADING

By clicking on this button you can the switch wall shading on or off.

SHIFTING A WALL

To shift a wall, whether entirely or only at the ends, the wall must first be selected. You do this by activating Selection Mode with ⌨ and clicking again on the wall. When you select a wall, not only will the entire wall be marked red, but also the side of the wall on which you clicked will be marked with a thick red line. If you then double-click the wall, you can change the properties of this marked wall side individually.

To shift the entire wall, click on it, keep the left mouse button pressed and then move the wall by moving the mouse. When the wall has reached the desired position, release the mouse button.

To shift the end of a wall (to lengthen or shorten the wall) press the **Ctrl** key when clicking the end of the wall. While keeping the mouse button pressed, lengthen or shorten the wall as you wish and then release the mouse button when the desired position has been reached.

If you shift a wall and snap to grid is active, the corner of the wall that will act as the snapping point is that which was closest to the mouse pointer on moving the wall. For example, if you have clicked close to the left upper corner of the wall, then you will basically be moving the whole wall, and you can then determine the new position for the left upper corner by snapping it to the grid. If you wish to use one of the other four corners of the wall as snap points, you can do this by pressing Ctrl-W. The other corners of the wall will then be selected in turn to be used as snap points. Which of the fours is selected is indicated, as usual, by a small red mark.

If when commencing to move a wall you hold down the **Ctrl** key, then the behavior on moving is completely different from that of free shifting without the use of the **Ctrl** key. If you have clicked close to a free head end of a wall, you can move this free end, which means that you can change the length of the wall. A free head end is an end which as not attached to any other wall. If the wall is inserted between two other walls (similar to the case of the cross-bar in the letter H), then you can move the wall within the two existing walls. It is irrelevant whether the two walls are parallel. If they are not parallel, the length of the wall to be moved will be adjusted automatically (like shifting the cross-bar in the letter A). Finally, you can also rotate the wall about one end as long as the other end of the wall is not joined to any other wall. To do this, you click in the proximity of the free head end while pressing the **Ctrl** key. This time, however, not with the left, but with the right mouse button. Finally you will be able to rotate the wall (with the right mouse button pressed) around the other end without changing its length. If you also want to change the length during rotation, then press the left button together with the right mouse button. (If you find this latter procedure too complicated – after all, you need to press Ctrl, the left and the right mouse buttons together - then simply delete the wall and construct it again.)

DELETING A WALL

You select the required wall by activating Selection Mode by clicking on with the left mouse button and then clicking on the wall. The selected object will be shown in red on the screen. When you press the **Del** key, the selected object will be deleted.

If you want to delete all walls in the display, you can do this using the **Delete all walls** command.

THE WALLS DIALOG BOX

You access the walls dialog box as for all dialog boxes for elements in the Construction Mode either by double-clicking on a wall, by right-clicking on the wall-button ▐▌ or by choosing **Walls...** in the **Options** menu. This then refers to all surfaces of a wall.

When you open a dialog box for the walls of an existing wall, then the function of the dialog box is modified. When you double-click, you are able to select not only a wall, but also a complete wall surface. This wall surface will be marked in heavy red.

In this way you can pre-define the type of material, for example, for all surfaces of walls to be newly constructed: In the case of existing walls, you can change the material of a specific wall surface.

WALL TYPE

Here the text is displayed describing the wall type you have selected. If you with change an existing wall using this dialog box, then the button for the wall type will be displayed as an option switch. In this case, the wall type can be changed in the dialog box by clicking on the button and, while holding down the left mouse button, dragging the mouse pointer to the desired wall type and releasing the mouse button again.

DIMENSIONS

The option Thickness

In this area the wall thickness can be entered or changed.

The option Length

It is not possible to enter the wall length before inserting the wall and this option field is therefore grayed out. The length of a wall can only be entered afterwards and only if at least one free wall end exists. An isolated wall shrinks or expands in both directions, a wall joined at the head only in the direction of the free end.

The button Set initial values sets the thickness of the wall to its originally defined value.

SURFACES

The option Color

If you wish to select a color, click the button **define...**. A color palette is displayed in which you can either select one of the colors offered or mix your own color together by selecting **Define colors**.

In Design Mode, it is not possible to change the texture when a color has been defined. However, the wall texture in Construction Mode can be changed at any time.

The option Texture

The wall is covered with the texture shown in the drop-down list below. If you wish to choose a different texture, click on the **browse...** button. You are then presented with a standard dialog box from which you can select a texture.

The option Mix color and texture

Below the drop-down list for textures you will find a check box. Check this box if you wish to combine color and texture. For example, if you choose black stripes on a white background and combine this with a blue color, then you will get black stripes on a blue background.

Size of texture

For most textures the standard sizes are predefined in the texture catalogs. The field for original size is grayed out if no texture size has been defined. The standard texture size is 100x100 cm, i.e., if you place a certain pattern on a wall 3 m long and 2 m high, it will be reproduced 6 times. If the pattern is to appear only once on this wall, then the grid must be changed to 300x200 cm. Click on the check box **Original size**, the original texture size will be reinstated.

You can enter a value for rotation in the **Rotation** field. The texture will then be displayed with this rotation angle.

Using the check box **Copy from the wall below** you can copy wall properties for the walls of new stories.

The final check box **invisible in top view / perspective view** you control the visibility of a wall surface or a wall. This facility is advantageous when walking around projects. You can then look into rooms in a way analogous to looking into a doll's house.

DOORS

The door function provides you with the possibility to insert various kinds of doors into existing walls. You can choose from a wide variety of door shapes in the program. The size of the door opening, the direction of opening and textures can be easily changed using a dialog box. You will find a description of the dialog boxes at a later point in this chapter. Using the various types of input described in the following, you will be able quickly and easily insert doors that fit perfectly. Additional aids that can be used are the grid, guides and the rule function.

SELECT DOOR TYPE

You will find the button for the door function in the vertical toolbar. The button is an option switch. You access the dialog box for changing doors by clicking with the right mouse button on the button

 or you choose **Doors** from the **Options** menu. If you change the values for a specific door, these remain valid only for the current door insertion procedure. By selecting and then double-clicking a door, its values can subsequently be changed in the dialog box.

When you have selected a wall type, ArCon shows a selection of various insertion possibilities in a second vertical toolbar (the "how" toolbar). After clicking on one of these buttons with the right mouse button, a dialog box will appear. Here you can enter the values appertaining to the various inputs, the offset to the reference point and the distribution ratio.

If you wish to cancel door insertion procedure , press the **Esc** key.

PLACING DOORS

CHANGING THE REFERENCE POINT OF A DOOR

A door has three reference points, which are marked by colored crosses. You can change the reference point by pressing **Ctrl + W**. Depending on your requirements, it can be situated on the corner points of the door (left, right) or at the center point.

FREELY PLACING A DOOR

If you have selected this entry option, you can place the door directly in the desired position using its reference point. Move your mouse pointer to this position and click with the left mouse button on the required position. The door can only be inserted in a wall, whereby the reference point can lie on a guide or another snap point.

PLACING A DOOR WITH OFFSET TO A REFERENCE POINT

You click on a reference point (not necessarily on the wall) and as a second point the approximate position of the door on the chosen wall. The offset of the reference point to the reference point of the door is then entered in the dialog box that appears. If the reference point is not on a wall, but on a grid or a guide, for example, then ArCon will project the starting point vertically onto the chosen wall. If when clicking on the second entry point you also press the **Ctrl** key, the dialog box requesting input of the offset value will be suppressed. The previously entered value or the default value for calculating the door position will be used.

DOOR BETWEEN TWO POINTS

With this method of placing doors, you click on two points on the wall, between which the door will be inserted with a certain distribution ratio. If the first two entry points are not on the wall, then a third point is necessary, with which you identify the wall. In this case, the two entry points will be projected vertically onto the wall. The previously entered value for the distribution ratio or the default value will be used for calculating the door position.

DOOR OPTIONS

As for all element options, you access the <u>Door options</u> dialog box by double-clicking on an existing door or by right-clicking on the doors button, or by choosing **Doors...** from the **Options** menu

Regardless of the type of door whose options you wish to change, you are always presented with the same dialog box.

In the area Dimensions you can the enter the width and the height of the door, its angle of opening and, in the case of double-winged doors. the angle of opening of both doors. In the area Hanging you enter information on whether the door opens inwards or outwards and whether it is hung on the left or the right. In the area textures you can change the textures used for the frame, the left wing and, in the case of doubled-winged doors, the right wing. Finally, in the area Wings you can determine the type of door wing, or wings in the case of doubled-winged doors. You change the type of door wing by entering a new type in the selection list. All changes, also those for the opening angle and the door wings, will be updated immediately in the <u>preview window</u>. Click on the button **Make default** if you want your changes to be used in future for all newly inserted doors.

MOVING DOORS

Select the door by clicking on with the left mouse button and then clicking on the door. The selected door will be shown in red on the screen. Leave the mouse pointer on the door and press the left mouse button. While the button is being held down, the door can be moved on the wall by moving the mouse.

OVERLAPS WITH OTHER DOORS AND WINDOWS

When you insert windows and doors into a wall and a window or a door already exists at the position in which the element is to be placed, a dialog box appears to make you aware of this situation.

If you check the box **Do not display this message again** in this dialog box, you will not be informed of such overlaps in the future. It can often happen that, although in the plan view you think that windows will overlap, this is in fact not the case, as they can be at different heights, for example. In such cases the dialog box will not be displayed. To be exact, it appears whenever openings of windows and/or doors cut across one another. A similar dialog box will also appear if you place a roof on a story that already contains windows and doors, which when overhanging the walls would partially or completely obliterate windows and doors. You can decide in this dialog box whether the windows or doors should be removed automatically or whether you wish to remove them manually.

DELETING A DOOR

Select the required door by clicking on with the left mouse button and then clicking on the door. The selected door will be shown on the screen in red. On pressing the **Del** key on the keyboard, the selected door will be deleted. If you wish to delete all doors in the display, you can do this choosing **Delete all** – **doors** in the **Edit** menu.

WINDOWS

ArCon provides you with the possibility of selecting from a wide variety of windows. This includes on the one hand windows in free construction, which are computed again specially for the application (as is always the case for staircases), and on the other hand, windows that are loaded from disk, for which you can only change the sizes and certain surface characteristics, but not the geometry.

Loaded windows are in principle nothing other than objects for which you can make appropriate changes. The advantage of the loaded windows is that they are very detailed, for example, windows with stucco. However, the disadvantage is that they are relatively inflexible to handle.

It is for this reason that the freely definable window exists. Various settings can be made for these in order to adapt them to your individual requirements. You access both of these types with the same option switch.

In the current version of ArCon the first two are freely definable, the others are loaded windows. You can identify these by the special file symbols around the window types.

Note: By virtue of a special feature in the ArCon software, it is possible to extend the windows function without making changes in the program, that is, without changing to another version. This allows the use of extension modules for freely definable windows as well as for loaded windows. Ask your software dealer about the extension modules that are available.

DEFINE WINDOW TYPE

You will find the button for the window function on the vertical toolbar. The button is an option switch, indicated by the black corner at the bottom right. By holding down the left mouse button and dragging the mouse pointer into the view a selection of different window types will appear. Information on the individual types is shown in the bottom left of the screen.

To access the dialog box for changing the values, click with the right mouse button on or choose **Window...** from the **Options** menu. By saving in the dialog box using **Make default** you can permanently store the values you use most frequently. If you change the values for a selected window type without saving them as default, these values will only be valid for your current work. By selecting and then double-clicking on a window, you can also make changes to the window using the dialog box that appears.

When you have selected a window type, ArCon shows a selection of various insertion possibilities in a second vertical toolbar (the "how" toolbar). After clicking on one of these buttons with the right mouse button, the same dialog box will appear for each field. Here you can enter the required values, for example, for the distribution ratio for the type .

If you wish to cancel the window insertion procedure, press the **Esc** key.

PLACING WINDOWS

You insert windows by placing the window within an existing wall after you have chosen the window type, if required, using the option switch. ArCon then automatically cuts the required opening in the relevant wall. How you place the window in detail depends on the entry you have chosen in the ''how'' toolbar.

Independent of this entry is whether you position the center axis, the left or the right edge of the window. You can switch between these three alternative using the **Ctrl**+**W** key.

CHANGING THE REFERENCE POINT OF A WINDOW

A window has three reference points, which are marked by colored crosses. You can change the reference point by pressing **Ctrl + W**. Depending on your requirements, it can be situated on the corner points of the window (left, right) or at the center point.

FREELY PLACING A WINDOW

If you have selected this entry option, you can place the window directly in the desired position using its reference point. Move your mouse pointer to this position and click with the left mouse button on the required position. The window can only be inserted in a wall, whereby the reference point can lie on a guide or another snap point.

PLACING A WINDOW WITH OFFSET TO A REFERENCE POINT

You click on a reference point (not necessarily on the wall) and as a second point the approximate position of the window on the chosen wall. The offset of the reference point to the reference point of the window is then entered in the dialog box that appears. (this procedure is identical to the insertion of doors using).

If the reference point is not on a wall, but on a grid or a guide, for example, then ArCon will project the starting point vertically onto the chosen wall. If when clicking on the second entry point you also press the **Ctrl** key, the dialog box requesting input of the offset value will be suppressed. The previously entered value or the default value for calculating the window position will be used.

WINDOW BETWEEN TWO POINTS

With this method of placing windows, you click on two points on the wall, between which the window will be inserted with a certain distribution ratio. If the first two entry points are not on the wall, then a third point is necessary, with which you identify the wall. In this case, the two entry points will be projected vertically onto the wall. The previously entered value for the distribution ratio or the default value will be used for calculating the window position.

WINDOW OPTIONS

As for all element options, you access the <u>Window options</u> dialog box by double-clicking on an existing door or by right-clicking on the <u>Windows</u> button, or by choosing **Windows...** from the **Options** menu. Depending on the type of window, you are presented with three different dialog boxes: one type for the two freely definable windows 🔲🔲, and a dialog box which is identical for all loadable windows.

OPTIONS FOR FREELY DEFINABLE WINDOWS (TYPE 1)

The dialog box is divided into the three areas <u>Dimensions of opening</u>, <u>Type of opening</u> and <u>Textures</u>. The sketch below indicates the various values:

```
        Width

             Upper reach

    H
    e
    i
    g
    h
    t

    Lower reach

    Parapet height
```
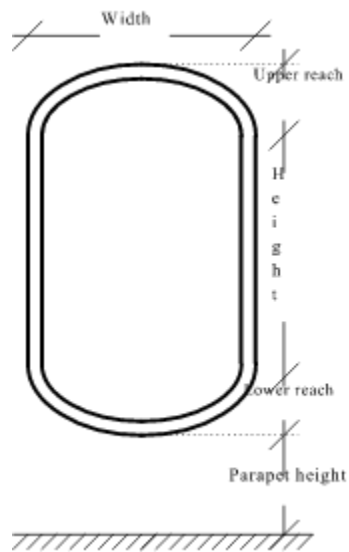
DIMENSIONS OF OPENING

If you enter a non-zero value for <u>Lower reach</u>, no window sills will be used for this window.

<u>Note</u>: If you enter zero for the height and you enter the same value for <u>Upper reach</u> and <u>Lower reach</u>, i.e., equal to half of the width, then you can produce round windows.

TYPE OF OPENING

In the area <u>Type of opening</u> you state whether the window is to be left or right hung and whether it is to open inwards or outwards.

<u>Note</u>: ArCon automatically recognizes where "outside" is for a wall.

TEXTURES

In the area <u>Textures</u> you can define the textures that are to be used for the <u>Frame</u> and for the internal and external window sills. If you select <u>none</u>, the corresponding elements will appear untextured.

You should always use the **Preview** button if you have made changes in the area <u>Dimensions of opening</u>.

When working in this dialog box, ArCon does not update the preview window while changes are being made.

OPTIONS FOR FREELY DEFINABLE WINDOWS (TYPE 2)

In this dialog box you not only have the possibility to change the shape of the window within a wide range, but you can also equip the window internals with posts and locks. As for all other windows, you can also define the textures for the frame and both window sills. And finally, it is possible to enter the cross-sectional dimensions of the frame.   Thanks to the preview window it is much simpler to change certain values and to see the result of the changes directly on the screen. For orientation you can refer to the above explanations regarding input for Type 1.

OPTIONS FOR LOADABLE WINDOWS

This dialog box is in principle a subset of the data entry possibilities for freely definable windows. However, in contrast to these, the frame width, for example, also changes when you change the overall width of a loadable window. As no new input elements exist in this dialog box, a detailed description will be dispensed with. If necessary, you can read the description of the two freely definable window types above.

MOVING WINDOWS

Select the window by clicking on with the left mouse button to activate Selection Mode and then clicking on the window. The selected object will be shown on the screen in red. Leave the mouse pointer on the door and press the left mouse button. While the button is being held down, the window can be moved on the wall by moving the mouse.

By pressing Ctrl-W when moving a window, the left or right edge of the window will be moved instead of the center. Thus, with the help of the snap to grid   feature, you can the reposition the window according to your requirements.

DELETING A WINDOW

Select the window by clicking on with the left mouse button to activate Selection Mode and then clicking on the window. The selected object will be shown on the screen in red. On pressing the **Del** key on the keyboard, the selected window will be deleted. If you wish to delete all windows in the display, you can do this choosing **Delete all** – **windows** in the **Edit** menu.

CHIMNEY STACKS AND SUPPORTS

Using the chimney stack and support function, you can quickly and easily insert chimney stacks and supports into your floor plans. It is possible with the help of appropriate dialog boxes to change the options such as dimensions and texture according to your requirements. Apart from this, various types can be entered as standard types to be used in other projects. By using the construction aids such as the grid, guides and the rule you will very soon be able to insert accurately dimensioned chimney stacks into your plans.

DEFINE TYPE

In the vertical toolbar you will find the button [buttons] or

[buttons] for the chimney stack or support function. Using the option switch, ArCon provides you with chimney stacks with and without additional ventilation shaft. In the case of supports, you have the choice between rectangular and round supports. To access the dialog box for changing the default values, click with the right mouse button on the button
[buttons] or
[buttons] or choose **Chimney stack...** or **Supports...** from the **Options** menu. You will find the description of the dialog boxes at the end of this section. By clicking on the button **Make default** you can permanently store the values you use most frequently.

If you change the values for a selected type without saving them as default, these values will only be valid for your current work. By selecting and then double-clicking on a chimney stack or a support, you can also make changes to the individual element using the dialog box that appears.

PLACING CHIMNEY STACKS AND SUPPORTS

After clicking on the appropriate button [buttons] or in the vertical toolbar, you can place your chimney stack or support in the floor planThe aids you have at your disposal are the grid, guides and the rule. The reference point of the chimney stack can be changed with **Ctrl+W**. Possible reference points are the four corner points and the chimney stack center. The reference point is marked with a red cross.

MOVING CHIMNEY STACKS AND SUPPORTS

To move a particular element it must first be selected. This is done by clicking on [icon] and then clicking on the element. The element will be shown on the screen in red.

To move the element, click on it, keep the left mouse button pressed and then move it by moving the mouse. When the element at the desired position, release the mouse button. As is the case for placing an element, the reference point for moving can be altered by pressing **Ctrl+W**.

DELETING CHIMNEY STACKS AND SUPPORTS

Select the desired element by clicking on [icon] with the left mouse button and then clicking on the element. The selected element will be shown on the screen in red. When you press the **Del** key, the element will be deleted.

If you wish to delete all doors in the display, you can do this choosing **Delete all** − **chimney stacks** or **Delete all** − **supports** in the **Edit** menu.

THE CHIMNEY STACK DIALOG BOX AND THE SUPPORT DIALOG BOX

You open these dialog boxes by clicking with the right mouse button on or

 or by selecting **Chimney stack...** or **Support...** from the **Options** menu. You can modify an existing element by first selecting it and then double-clicking it with the left mouse button.

CHIMNEY STACK TYPE / SUPPORT TYPE

The text describing the type of chimney stack or support you have selected is displayed in this area. If you modify an existing element using this dialog box, then the button for the element will be presented in addition as an option switch. In this case, you can change the type in the dialog box by clicking on the button, moving the mouse pointer onto the required type while holding down the left mouse button and then releasing the mouse button again.

DIMENSIONS

The options Width and Depth

The cross-sectional dimensions (width and depth) can be entered or later amended in these areas. Because supports are always symmetrical, only the thickness can be changed for these.

The option Height

This input defines the height of the chimney stack. By selecting the option **to the ceiling**, the height will be adjusted automatically to the story height.

STAIRCASES

ArCon provides the following staircase functions: single-flight staircases include the straight staircase, the quarter-turn spiral staircase and the circular staircase, double-flight staircases include the L-landing staircase and the U-landing staircase. All staircases can be either solid or timber construction. After you have selected a staircase type and clicked on the requisite number of entry points, the associated dialog box for entering the values appears.

DEFINE STAIRCASE TYPE

You will find the option switch for the staircase function in the vertical toolbar. The button is an option switch, indicated by the black corner at the bottom right.

After selecting a staircase and positioning the mouse in the data input area, a mouse pointer with a staircase contour appears, the size of which indicates the approximate size of the staircase. After you have positioned the staircase (click 3 times), ArCon automatically opens the dialog box for entering the staircase values.

To position the staircase you must provide three points. The first determines the position of the bottom step, the second the direction and length of the entrance flight and the third the direction and length of the exit flight. The staircase will be calculated and displayed using these entry points.

STRAIGHT STAIRCASE

Supply the entry points in accordance with the following sketch. The values can be corrected in the dialog box. The correction causes the entry points to be moved as shown below.

If the flight is lengthened or shortened, the position of the top step will be moved. Point 1 remains fixed. If the staircase width is changed, point 3 will be moved.

L-LANDING STAIRCASE

Supply the entry points in accordance with the following sketch. The values can be corrected in the dialog box. The correction causes the entry points to be moved as shown below.
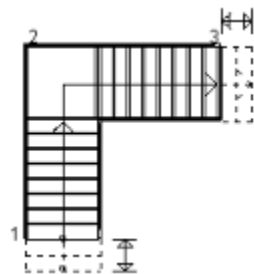
If you change the number of steps or the width of the entrance flight, the positions of the bottom and top steps will be moved. Point 2 (landing) remains fixed. If the staircase width is change, the staircase will

move in the direction of point 3.

U-LANDING STAIRCASE

Supply the entry points in accordance with the following sketch. The values can be corrected in the dialog box. The correction causes the entry points to be moved as shown below.
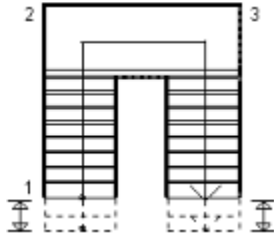
The landing depth is equal to the flight width of the staircase. If you change the flight width, then the landing depth will change automatically and therefore also the landing width in most cases. Movements take place in the direction of points 1 and 3. Point 2 (back of the landing) remains fixed. The number of steps for the entrance flight and exit flight can be set as required. The landing width can be altered independently of the flight width.

L-TURN STAIRCASE

Supply the entry points in accordance with the following sketch. The values can be corrected in the dialog box. The correction causes the entry points to be moved as shown below.
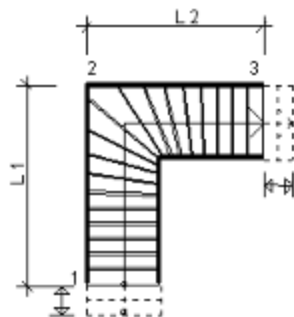
The length of the entrance flight (L1) is kept at a fixed size with reference to point 2. If you enter a fixed step depth, the position of the top step (point 3) will be moved. On entering the exit flight length (L2), the appropriate top step position will be calculated and adjusted. If the staircase width is altered, the staircase will be shifted in the direction of point 1.

CIRCULAR STAIRCASE

Supply the entry points in accordance with the following sketch. The values can be corrected in the dialog box. The correction causes the entry points to be moved as shown below.
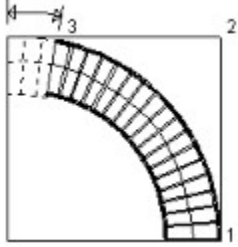
Starting point 1 is the only unalterable point. Otherwise you have a wide variety of alternatives for the circular staircase. The flight width is shifted to the inside, unless you change the external radius. By entering the angle of curvature you determine the direction of the entrance flight and the exit flight. A value of up to 360 degrees can be entered.

DELETE STAIRCASE

Mark the required staircase by activating the selection mode with the left mouse button and then clicking on the staircase. The marked staircase will be displayed in red on the screen. It can be deleted by pressing the **Del** key.

If a staircase is moved, the required opening in the ceiling of the current floor will be created automatically. If you now select a staircase, the opening will normally be selected first. By clicking once again, you will select the staircase instead of the opening. You can delete the opening and the staircase independently of one another.

If you wish to delete all staircases in the display, you can do this by choosing **Delete all - Staircases** in the **Edit menu**.

AUTOMATICALLY CREATED CEILING OPENINGS

If you have moved a staircase, ArCon automatically creates an opening in the ceiling of the current floor. You can edit this opening afterwards by dealing with it in the same way as you would for an opening created using the button .

DESCRIPTION OF THE STAIRCASE DIALOG BOXES

All staircase dialog boxes open automatically after you have entered the three points for insertion of the staircase. The values established on entry of the points are shown in the dialog box and can be changed here. You can alter an existing staircase by first selecting the staircase and then double-clicking with the left mouse button. All dimensions in the staircases dialog boxes use the unit cm, regardless of the General Settings in ArCon .

GEOMETRY

The flight width

For the straight staircase, the flight width is determined by the third entry point. For the other four staircase types, a standard value is initially used for the flight width. You enter the flight width required as a numeric value in the appropriate entry field of the dialog box.
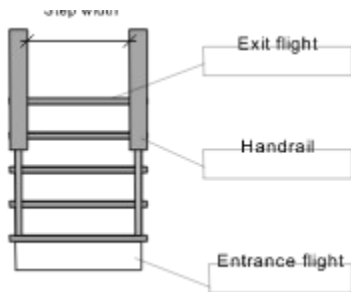
The steps

Here you enter the required number of the steps or, in the case of double-flight staircases, the number of steps of the first and second flights.
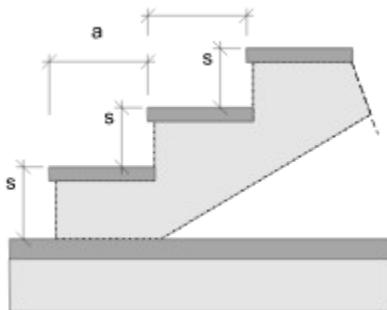
a = Step depth   (29 cm)*

s = Step height   (17 cm)*

Step size = a + 2 * s

Optimal step size = 63 cm

*) Optimal values for domestic situation

The step depth

Here you enter the required step depth. Changes in the step depth result in changes in the staircase length (see sketch of the staircase type description).

The landing width

In the case of double-flight staircases, the landing width is normally equal to the flight width. For a U-landing, the value can be altered in the dialog box.

The external radius

The external radius of the circular staircase is calculated from the three entry points, however, it can be later changed to meet your requirements. Changes in the flight width have no influence on the external radius, only on the internal radius.

The angle of circumference

This determines the angle between the entrance flight and the exit flight.

The following three values are grayed out in the dialog box, as they are calculated from the upper dimensions.

The story height

The story height is the vertical height difference between the finished floor of one story and the finished floor of the story above.

The step height

This is the quotient resulting from the story height and the number of steps.

The step size

The step size or step size rule describes the step proportions of a staircase. The step size for staircases according to DIN 18065 is 59 to 65 cm, and results from the addition of two step heights and one step depth.

Optimal proportions

As the staircase is inserted using the dimentions exactly as given, it can happen that it runs at a very shallow or very steep angle. If required, the proportions of the staircase can be recalculated using the button **Optimal proportions**. This computation takes account of the step size rule as well as the minimum and maximum values for height and depth in accordance with DIN 18065. The length of the staircase will be recalculated using the optimal step sizes being strived for, whereby the dimensions can change depending on the staircase type .

BALUSTRADE

Using the first two check boxes you can select whether a balustrade is to be shown on the <u>Right</u>, <u>Left</u> or on both sides (both check boxes checked). The balustrade will normally be shown with rectangular-section posts. If you check the box **Round posts**, ArCon will display round balustrade posts.

TEXTURES

This input field consists of three or four individual drop-down lists. If you wish to select different textures, click on **Browse...**. You are presented with a dialog box in which you can select a new texture.

The texture data for **timber staircases** includes information for the **string**, **step** and **rungs**, whereby the texture for the string will also be used for the handrail and the posts.

For **concrete staircases** you can enter various textures for **steps**, **covering**, **rungs** and **handrail**, whereby the texture of the handrail will also be entered for the posts.

ROOF

With this command you have the possibility to place a gabled roof, a shed roof, a hip-roof, a false hip-roof or any combination of these roof types on any polygonal floor plan.

To place a roof on your floor plan, you should first create a create a roof story . If you put your roof on the same story, ArCon will continue the walls of the current story into the roof surface.

Using the **Roof settings** dialog box , it is possible to make basic adjustments and to save these as default values. Three different types of input are available.

ACTIVATE ROOF FUNCTION

By clicking on the button ![icon] in the horizontal toolbar, the display of the roof is switched on and off in **Construction Mode** as well as in **Design Mode**. If no roof yet exists, this button is grayed out.

You will find the button for the roof function ![icon] in the vertical toolbar. To access the dialog box for changing the roof settings, click with the right mouse button on
![icon] (dialog box).
By saving using the **Make default** function in the dialog box, you can permanently store the values you use most frequently. These values are used as basic values, and are shown in the **Roof editor** after you have entered a roof polygon. You will then be able to change these values in the **Roof editor**.

SELECT ROOF INSERTION TYPE

After you have clicked on the button in the left vertical toolbar, ArCon displays a selection of insertion possibilities in a second vertical toolbar (the "how" toolbar).

◻ INSERTING A RECTANGULAR ROOF CONTOUR

Using this insertion type, you can insert a roof with a rectangular plan view regardless of the geometry of the floor plan. Two points on the screen must be clicked on which describe the diagonal. After the first click, the plan view of the roof will be displayed together with a "rubber band". After the second click, the **Roof editor** dialog box appears.

◻ AUTOMATIC INSERTION OF A ROOF CONTOUR

To insert a roof automatically, proceed as follows: after you have clicked on the appropriate button, point with the mouse pointer to the edge of the external wall which represents the roof shape you require. The roof shape appears on the screen as a red dotted line, and the moment you press the left mouse button, the **Roof editor** dialog box appears

◻ INSERTING A ROOF AS A POLYGON

By entering the roof as a polygon, you have the possibility to freely design the shape of the roof, i.e., to depart from the existing wall structure. This method is needed if the outlines of the eaves and the floor plan are different, e.g., in the case of bays, dormer windows, above terraces, etc.

To enter the polygon, click on the desired corner points in order. You end the input by pressing the **Esc** key or by clicking again on the starting point of the polygon.

If a roof with the same contour already exists, ArCon will inform you of this and you can cancel the operation.

DELETING A ROOF

Select the roof by clicking on ⬚ with the left mouse button and then clicking on the roof. The selected roof will be shown on the screen in red. On pressing the **Del** key the selected roof will be deleted.

Because ArCon always selects the smallest element positioned under the mouse pointer when using the ⬚ button, it will frequently occur that you do not select the roof with the first click, but the floor and ceiling of a room, for example. In this case, simply continue to click until the roof is marked in red and then press the **Del** key. This also applies, by the way,, if you want to make changes to a roof.

ROOF SETTINGS DIALOG BOX

This dialog box is opened by clicking with the right mouse button on ■. General values for the roof frame are to be found here which in this dialog box you can also save for use in other projects using the **Make default** option. Any values deviating from standard for individual roofs you change using the **Roof editor** .

In deviation to most dialog boxes in ArCon, this dialog box *always* uses the unit cm, regardless of the general project settings .

ROOF SURFACES

The options Angle, Overhang, Apron height and Eave height

Here you enter the numeric values for the **slope** of the roof, the **roof overhang** and the **apron height**. The **eave height** is calculated automatically from the supplied values for apron height and roof overhang, and is therefore grayed out in this input field. In the **Roof editor** dialog box   on the **surfaces** tab, it is possible for individual roof surfaces to make settings for the angles, overhangs and eave heights which differ from the standard settings made here.
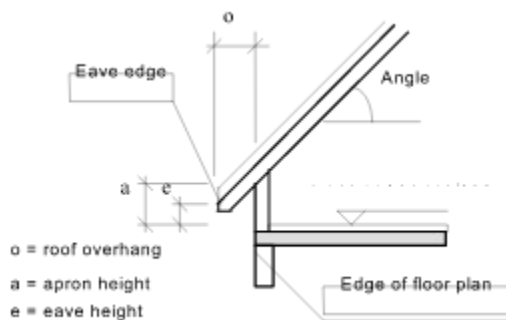
Construction heights

The term **roof construction** includes the constructional elements (e.g. rafters) and the roof sub-construction (e.g. battens, lining).

The **roof covering** includes everything that lies on top of the roof construction – shuttering, insulation, battens, roofing tiles. The information you are in the process of entering as preliminary values can later be changed in the **Roof editor** dialog box   on the **General** tab.
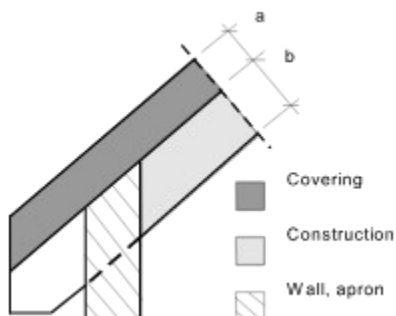
a = Covering (shuttering, insulation, battens, tiles)

b = Constructional height (rafter thickness, shuttering, plasterboard)

ROOF SURROUND

In this area you can define the way in which eaves, ridges, valleys and verges are displayed.

Eaves

Here you define the way in which the eave section is displayed, whether without or **with roof gutter,** without or **with cornice box**. The display of the eaves can be changed on the **Surrounds** tab in the **Roof editor**. The gutter diameter is initially set at a standard value, but it can be changed in the **Roof editor** on the **General** tab.

Ridges/verges

Entries in the option fields allow you to choose whether the ridges and verges of your building are shown **with ridge stones** or **with rectangular beams**.

The display with rectangular beams can be used for example when drawing winter gardens. If you click on this radio button, the input fields for **width** and **height** are no longer grayed out, and you can enter the dimensions as required. These settings can be changed again at any time on the **Surrounds** tab in the **Roof editor**.

TEXTURES

This area consists of four single-line drop-down lists. If you choose a different texture for the covering, the internal space, the cornice box or the rectangular beam, click on **Browse...**. You are presented with a dialog box, in which you select the texture.

The textures for the covering and the internal space can also be changed on the **surfaces** tab in the **Roof editor**, the textures for the cornice box and the rectangular beams on the **General** tab.

The Covering drop-down list

The upper surface of the roof will be displayed with the texture selected in this drop-down list.

The Interior space drop-down list

If you look under the roof, the shuttering of the interior space will be displayed with the texture selected here.

The Cornice box drop-down list

If you have checked this check box, the cornice box and the open area in your drawing will be displayed with the texture selected here.

The Rectangular beams drop-down list

If you have checked this check box, the rectangular beams in your drawing will be displayed with the texture selected here.

ROOF EDITOR DIALOG BOX

You access the **Roof editor** dialog box after entering the final point when placing a new roof   or if you have clicked on the button   and then double-clicked on a selected roof.

In this dialog box you see three selection tabs at the top left: **surfaces**, **Surrounds** and **General**. When you click on a tab, the contents of the dialog box change and the fields belonging to the specific items as described above are displayed. You can switch between the different tabs as often as you like.

Through the use of the **Roof editor** you can change the entire roof form by entering values for the individual roof surfaces different from the standard roof settings. You can insert gables, change the roof slope, alter the height of the eaves, thereby creating a false hip-roof, for example.

The **Roof editor** uses the unit cm for all dimensions.

THE SURFACES TAB

Roof slope

ArCon provides four radio buttons for selecting the roof slope: **gable end (90 degrees), slope 38 degrees, slope 45 degrees** and **define slope.**

When you choose the radio button define slope, the input field below it will be activated, in which you can enter the required slope (from 1-179 degrees).

Overhang

In this input field you can change the roof overhang, whereby the eave height of the roof remains constant.

Eave height

Here you change the eave height and thereby create gables or false hip-roofs, for example.

Apron height

If the eave height is changed in the upper field, the apron height of the building will also automatically change for these roof surfaces. This value is therefore shown here for information purposes, but is grayed out.

Textures

In these drop-down lists, the texture for the roof covering and the interior of the entire roof can be changed.

If you wish to choose a different texture for the covering or the interior, then click on **Browse...**. You are presented with a dialog box, in which you can select the texture.

SURROUNDS TAB

Eaves

In these two check boxes you completely change the way in which the eave section is displayed, whether **with gutter** or without, whether **with cornice box** or without for the entire roof.

Ridges and verges

In these two data input areas you can change the type for ridges and verges by activating or deactivating the radio buttons. In both cases you can choose between ridge stones and rectangular beams.

Rectangular cross-section

If in the above selection you chose the radio button for display with rectangular beam, here you enter the required width and height. Otherwise these values will be grayed out.

GENERAL TAB

Construction

In both of these input fields it is possible to change the predefined values for the roof settings for the entire roof. **Construction** refers to the constructional elements of the roof (e.g. the rafters) as well as the roof sub-construction (e.g. battens, lining). The **Covering** refers to everything that lies above the roof construction, such as shuttering, insulation, battens and roofing tiles.

Note: You can enter the value 0 for **Construction**. In this case, the roof will receive no interior structure.

Gutter diameter

The gutter diameter, which is initally set to a standard value, can be changed here.

Textures

The texture for the **cornice box** and the **rectangular beams** can be entered in these drop-down lists. If display of an element is not switched on , the associated drop-down list is grayed out. Textures are selected as described for textures on the **surfaces** tab.

Editing individual roof surfaces

To enable a specific roof surface to be edited, the possibility exists to address individual surfaces. Two buttons displaying arrows exist for this purpose, located above the preview window after the information **Floor plan pages**. Using these arrows you can swap between the roof surfaces from left to right by clicking on the corresponding arrow.

If you have checked the check box **Animated rotation**, the arrow buttons cause the project to automatically rotate by 90o in the corresponding direction.

If the **Show all details** check box right above the preview window is unchecked, you can recognize which is the current roof surface by the fact that the floor plan has a green background and the associated roof surface is shown with texture. In the case of gable-end walls, you will then only see the green floor plan page in the preview window. If you check the **Show all details** check box, ArCon will apply the texture to all roof surfaces in the preview window and will also display gutters, cornice box, ridges, valleys and verges in accordance with your entries.

FLOOR PANELS

Normally you don't need to worry about laying ceilings yourself, as ArCon automatically recognizes when a room is enclosed and then inserts the appropriate ceiling itself. You have the possibility, however, to define floor panels yourself in order to construct a terrace, for example. For this, you use the ⌐ button in **Construction Mode**.

The floor panel to be inserted will always be inserted at the height at which other ceilings of the *current story* are situated. To enter a floor panel, you proceed as follows:

Fist select the floor panel with the ⌐ button. Following this, select one of the two input selections

⌐ or

◻ from the "how" toolbar. You enter rectangular floor panels using the

◻ button; input is analogous to inserting rectangular roof plan views .

Using the button ⌐ you insert floor panels with any desired contour. Insertion is identical with the definition of roof polygons .

OPTIONS FOR FLOOR PANELS

- As for all elements inserted in Construction Mode there are two possibilities for setting the options for floor panels: Either by right-clicking on the button ⌐ or by selecting an existing floor panel using the button

⌖   and then double-clicking on the floor panel. You are then presented with the current **Options**-dialog box for this particular floor panel. Because this dialog box for floor panels is almost identical with the dialog box for floor and ceiling, it will be described in a separate section .

CEILING OPENINGS

The ▢ button exists in order to cut openings in automatically inserted ceilings and floors. Incidentally, such openings will be generated automatically when you place a staircase in the current story. After defining a staircase, the automatically generated opening is no different from an opening manually generated by clicking on this button. In contrast to all other elements in the Construction Mode, you cannot define properties for an opening. As a facing for the opening, ArCon uses the floor material from the upper surface of the unfinished floor to the upper surface of the finished floor, for the rest it uses the ceiling material.

Two possibilities exist for inserting a ceiling opening. Insertion as a rectangle ▢ and insertion as a polygon

▢. Both insertion possibilities are identical with the corresponding insertion possibilities for roofs. You will find a more detailed description in that place. .

FLOORS AND CEILINGS

FLOOR AND CEILING DIALOG BOX

You access this dialog box by choosing Floors/ceilings... from the Options menu. You can obtain the settings for an existing room by selecting the appropriate element and then double-clicking on it with the left mouse button. The dialog box applies in the same way also to the <u>settings for floor panels</u>. They differ in the number of tabs. <u>Floor</u> and <u>Ceiling</u> in the one case correspond with <u>Lower surface</u>, <u>Upper surface</u> and <u>Edge</u>) in the other.

SURFACE

The option Color

If you want to paint your ceiling a simple color, click on the button **Define...**. A color palette will be displayed in which you can either choose from one of the basic colors offered or mix your own color together by selecting **Define colors**.

The option Texture

The texture shown in the drop-down list will be applied to the element. If there is no suitable texture in the list, click on the button **Browse...**. You are presented with a standard dialog box in which you can choose a suitable texture from the entire texture catalog.

The option Mix color and texture

Use this option in order to be able to combine the settings made under Color and Texture. For example, if you choose black stripes on a white background and combine this with a blue color, then you will get black stripes on a blue background.

Texture sizes

For most textures, i.e., images (*.BMP files), the size is pre-defined in the texture catalog. If this is not the case, then the option **Original size** is grayed out. The standard value for a texture size is 100x100 cm, i.e., if you "paste" a certain texture on a surface 3 m long and 2 m wide, the texture will be displayed six times. If the texture is to appear only once on this surface, the settings for **width** and **height** of the texture must be adjusted. If you click on the check box **Original size**, the original texture size will be re-instated.

You can enter a value for rotation in the **Rotation** field. The texture will then be displayed with this rotation angle. Using rotation, you have the possibility, for example, to lay the floor tilers in your bathroom diagonally.

DEFINITION OF MATERIALS FOR FLOORS, CEILINGS AND FLOOR PANELS

You can enter the materials to be used for floors and ceilings and for floor panels in the following dialog box:

 Using these three (or two) tabs, you select the area for which you wish to determine the color and texture. Each tab has entry fields for color and texture, a check box **Mix color and texture** and an area **Texture size**. If for **Color** you click on the **Define...** button, you can change the color as required. However, this color will only be used if you select **None** in the **Texture** entry field or you check the check box **Mix color and texture**.

If you choose **None** for the texture, the color will be used as defined – if you select a texture of any kind and check **Mix color and texture**, the result will be a mixture of the color and the texture. The texture appears as it would if you viewed it through a glass color filter, whereby the color of the filter is the color selected. If you have not checked **Mix color and texture**, but you have selected a texture, the color information will be ignored.

In the area **Texture size** you can enter information on how the texture on floors, ceilings or floor panel is to be "pasted". If you check the check box **Original size**, the external measurements used for the texture will be those stored with the texture itself.

Note: In the case of self-defined textures, it can happen that no original size – or an incorrect original size – is entered. If non is entered, the check box **Original size** will be grayed out. The values defined in the areas **width** and **height** will then be used. If your self-defined texture contains size information which is unusable (for example, because the scanner cannot know how large the wallpaper from which you have made a scan really is) you can then deactivate **Original size** and enter your own width and height information for the texture.

And last, but not least, by entering a value for **Rotation**, you can cause the texture to be applied at an angle instead of being straight. This enables you to have diagonally laid tiles on the bathroom floor, for example.

If you wish to permanently store the information entered in the dialog boxes, i.e., use them the next time you start ArCon, click on the button **Make default**.

LABELING

With the text function you can label your floor plans using various fonts, colors and text sizes. The options are set up in the **Text** dialog box.

Note that the labeling is linked to the <u>current story</u> . Therefore you can enter different labeling for the different stories.

LABELING ON/OFF

By clicking this button in the upper horizontal toolbar you have the possibility to turn the labeling on the screen on or off. Labeling must be switched on in order to enter text, as the button for text entry is otherwise grayed out.

ENTERING TEXT

Click on a point on the screen at the position where text entry is to begin. ArCon opens a dialog box in which you enter the desired text.

TEXT INPUT WINDOW

Here you enter the text. The text can be spaced over several lines by pressing **Enter**.

Beneath the text field you will find the button **Define type...**. If you click on this button, ArCon will open the **Type** dialog box in which you can make the required settings.

You can pre-define the text type in advance for all new text entries by right-clicking on the button . A dialog box then appears in which you enter the text type. When you close the dialog box by clicking on **OK**, ArCon will ask if these settings are to be used as defaults. If you confirm this by clicking on **OK**, the settings made will be retained after exiting ArCon.

MOVING LABELING

Select the text to be moved by clicking on and then clicking on the text. The selected text will be marked red. After clicking again, the text can be moved to any position while holding down the mouse button. While the text is selected, you can turn it in 90-degree steps by right-clicking on it.

DELETING LABELING

When you press the **Del** key, the selected text will be deleted. If you the wish to delete the entire labeling on the display, you can do this by choosing **Delete all** - **Labeling** in the **Edit** menu.

DIMENSIONS

With the dimensions function, you can apply both individual and series dimensions to your floor plans. You can define the selection criteria for this in the <u>Dimensions dialog box</u> . A special dialog box exists for series dimensions which you access by right-clicking on the "how" toolbar while entering the dimensions.

DIMENSIONS ON/OFF

By clicking this button in the upper horizontal toolbar you have the possibility to switch the display of dimensions on the screen on or off. Dimensions must be switched on for the entry of dimensions to be possible, as the button on the left vertical toolbar is otherwise grayed out.

SELECT DIMENSIONS DISPLAY

Using this option switch you can place the dimensions above, below or in the center of the dimension line and select either strokes or circles to mark the ends of the dimension lines. Information on the individual types is shown at the bottom left of the screen. In the second vertical toolbar you can now select between the two different types of dimension.

INDIVIDUAL DIMENSIONS

For these you need three entry points. The start and end positions of the measurement line and the position relative to the item to be measured. Assistance for positioning on the screen will be provided by a red cross. Check that the required snapping options   have been set.

CATENATED DIMENSIONING

For this type of dimensioning, ArCon takes into consideration all guides, axes, edges and openings that are checked in the dialog box which appears upon right-clicking on the ''how'' toolbar when dimensioning entry is selected.

With the first two entry points you defined an axis through the floor plan. All activated points of intersection that lie on this axis are included in the dimensions series. The third entry point describes the exact position of the measurement line, as for individual dimensions.

MOVING THE POSITION OF THE DIMENSION LINE

Select the dimension line to be moved by clicking on with the left mouse button and then clicking on the dimension line. The dimension line is marked red. A selected dimension line can be "grabbed" and moved at three points.

- Click near to the dimension line itself. In this way, you can move the dimension line in parallel.

- The two points between which the actual dimensions are to be made, i.e., the two points entered first when entering the dimensions, can be later moved. For this purpose, two red squares are used to mark these points. If you position the mouse pointer on these squares, You will be able to move them. Note that when a dimension is moved, the measured value is adjusted automatically. In general, dimensioning will be moved automatically if the element on which the dimension line "hangs", is also moved.

DELETING DIMENSIONS

Select the dimensioning to be deleted as described above. When the **Del** key is pressed, the selected object will be deleted. If you wish to delete all dimensioning in the display, you can do this by choosing **Delete all** - dimensioning in the **Edit** menu.

DIMENSIONING DIALOG BOX

The dialog box is opened by clicking with the right mouse button on the button or by choosing **Dimensions...** in the **Options** menu.

You can also open this dialog box by double-clicking on an existing measurement. You are then able to change the settings for this dimension.

NUMBER OF DECIMAL PLACES

Three radio buttons are provided allowing you to select either one, two or three places of decimal.

DIMENSIONING OPTIONS DIALOG BOX

You access this dialog box by right-clicking one of the buttons or

 in the "how" toolbar.

In the dialog box you enter which intersections with constructional elements are to be used when inserting series dimensions. This can include intersections with <u>guides</u>, <u>wall axes</u>, <u>wall faces</u> or <u>openings</u> and <u>floor panels</u>.

WORKING IN DESIGN MODE

In ArCon's Design Mode you furnish your home. For this purpose, in addition to the upper horizontal toolbar, you are provided with a second horizontal toolbar with which you can make specific settings for the current window, as well as a vertical toolbar with which you can perform certain actions on selected objects. In the following section we begin by describing all buttons on the second toolbar. The condition of these buttons applies to the current window. Therefore, if you are working with several windows, the buttons can change when switching between two windows. It is thus possible, for example, to work in the top view in one window and at the same time to work in the perspective view in another. When objects are changed, they are updated in all windows which enables you, for example, to check directly in the perspective view the results of an action carried out in the 2D view.

If you have furnished your home in the Design Mode and then change back to the Construction Mode to make additions or modifications, by clicking on you can switch the display of the furnishings on or off.

VIEWS

In Design Mode you have three different ways of displaying your plan. These are the 2D view ⊠, the top view

⊠ and the perspective view
🏠. If you are working with several windows at the same time, you can choose different views in each of the different windows.

⊠ PLAN VIEW

The appearance of the plan view differs only in a few details from that shown in <u>Construction Mode</u> . Here you can see all walls and constructional elements as if you were in the construction view. The only difference: the elements of the current story are also grayed out, as you cannot alter them in Design Mode. On the other hand, elements of furniture are shown as line drawings in black. In contrast to the two other types of view, selected objects in the plan view are marked with a red rectangle. In the other two view types, marking of selected items is done using the <u>selection frame</u>. This view type is highly suited to line objects up with one another or to enable them to be accurately positioned. Naturally, height positioning of objects is somewhat more difficult in this respect. However, because objects automatically fall downwards, in most cases you do not need to worry about the height.

If you wish to furnish you home, you should not "forget" that these views exist. Sometimes it is easier to work in this view type than in the perspective, for example.

◆ TOP VIEW

In the top view you see the same thing as in the plan view, except that everything is in color, i.e. you see all surface properties of floors and furnishing items. In the top view, only ever the current story is displayed. Contrasting to the plan view, the top view is a three-dimensional view, even if you can't see the third dimension (the height) directly. You can, however, when placing objects enter the height using the right mouse button. This display type provides the advantages of the plan view combined with the possibility to place objects in terms of height, although this is not very easy. In most cases you will merely notice that an object disappears under a table, for example, when you move it. This is an indication that the object is placed at an incorrect height.

In contrast to the plan view, the top view can also be calculated using ray tracing .

 PERSPECTIVE VIEW

The perspective view is *the* view in ArCon. In this view you can the walk around the building, place objects at will and just "do your own thing". The perspective view has the advantage that you here it is easily possible to enter object heights and that in this view you obtain a very good spatial impression of your home. However, it does have the disadvantage that placing objects in terms of depth is somewhat more difficult, so that this is better done in the top view or in the plan view. The perspective view is the only view type in which you can wander through your home. For this purpose, and only in the perspective view, the button appears in the second horizontal toolbar. As also in the top view, calculations of shadows etc. with the help of the <u>ray tracing</u> can also be performed in the perspective view.

SELECT VIEW TYPE

With this option switch you select one of four different view types in which your project is to appear in the view window. The button appears only in the view types top view and perspective view. This button does not appear in the plan view.

The view function includes an option switch indicated by the black corner at the bottom right in the button. By dragging the mouse with the left mouse button pressed into the view window, you can select the required view type in the sub-menu displayed by moving the mouse pointer to one of the view types and then releasing the mouse button. Information on the individual view types is shown in the status line at the bottom of the screen. The required view type then appears in the button the toolbar.

After you have selected a view type, the view will be modified immediately in your current window. The various view types are briefly described in the following.

DISPLAY AS WIRE MODEL

This view type shows only the contours of the item and the contours of walls, windows and doors. The colors for these contours correspond approximately to those of the object being displayed. For example, if you have a blue sofa as wire model, then its contours will be seen as blue lines.

For generally working on your project, the **wire model** is the fastest of the four view types.

DISPLAY IN COLOR WITHOUT TEXTURE

In this view type, the program uses a uniform color for every surface. If a texture has been applied to the surface (catalog), then the color it will be given will be the average value of all texture colors on its surface. For example, if you have displayed a blue sofa with a light- and dark-blue pattern, the surfaces of the sofa will be shown in a uniform mid-blue color.

The view type **Colored without texture** is a little slower than the **wire model**, but considerably faster than the type **Colored with texture**.

DISPLAY COLORED WITH TEXTURE (AVERAGE QUALITY) AND COLORED WITHOUT TEXTURE (HIGH QUALITY)

These two view types show the object with its defined textures. The blue sofa in this case would be shown with the light- and dark-blue pattern.

Using these colored view types you can produce views which come as close as possible to reality.

One difference is to be found in the quality of the two view types. In this way, the colors on large wall surfaces in **Colored with texture (average quality)** may not be evenly distributed, whereas no difference is found with the objects. However, this difference will only become noticeable if you have switched to night view by clicking on .

A further difference is in the display speed, whereby the latter types cannot be as fast as the two types mentioned first on account of the high to extremely high computational power required. If you are using an MMX computer , there will be no difference in display speed between the two view types **Colored with texture (high quality)** and **Colored with texture (average quality)**. In this case, you should in any case use the view type **Colored with texture (high quality)**, to achieve the best possible quality for your views.

⚡ RAY TRACING

Try not to be put off by the terminology. Ray tracing in ArCon basically means clicking on a button and waiting for the results. Before going into detail, first a few introductory words on the subject of ray tracing.

Ray tracing is a method with which the lighting conditions in a scene can be fairly accurately simulated on the computer. In contrast to the "normal" illumination and representation in ArCon, here you can also simulate shadows, reflection and refraction. The disadvantage of ray tracing compared with the "normal" representation is the considerably greater computational time required. Whereas the normal display is so fast that you can walk around your home in an almost seamless series of images, the calculations required for a ray tracing-image can take several minutes or even hours. However, the highly realistic representation of the scene more than makes up for this disadvantage.

Because ray tracing simulated the lighting effects very precisely, the placing and brightness of the light sources in the scene play a very important role. Just as for normal photography, you can create special atmospheric effects through the positioning of light sources. But you can also over- or underexpose your image by using too few or too many light sources, or lighting that is too bright or too weak. This requires a certain amount of experience to get it right, but you will quickly gain this experience thanks to ArCon's simple operation. Don't be afraid when producing a ray tracing image to site lamps in positions where you may not otherwise need them – this is exactly what the photographer does in the studio in order to improve the overall effect of a scene.

OVER- AND UNDER-ILLUMINATION IN *ARCON*

In normal photography, if you are not careful, you can easily over- or underexpose a scene. To prevent this from happening in ArCon, you should observe the following notes: for technical reasons, ArCon will not display textured surfaces brighter than the brightness of the original texture. Therefore, if you use a mid-gray texture, you will never see these textured surfaces brighter than mid-gray – regardless of the number of light sources you use in your scene. If you then place a chair on this mid-gray surface, it may happen that in spite of "removing" the light sources from which the chair casts shadows, the surface is still over-illuminated. What then happens is that you do not see the shadows, as the surface is still over-illuminated, also in the shadows. To avoid this effect, proceed as follows.

In the normal view, right-click on the button ⬛. The brightness control that appears in the following dialog box must now be adjusted so that the scene at the current level of illumination just begins to get darker. For the gray surface given as an example, this means that it just starts to become a slightly darker shade of gray. It is easy to make the fine adjustment using the preview button. When you close the dialog box by clicking on **OK**, you can assume that the illumination conditions are now optimally set. Now start the ray tracer by clicking on the button

⚡ and you will also see the expected shadows on the gray surface.

RAY TRACING ITSELF

After you have set up the optimal illumination for your scene and click on the button ⚡, ArCon will start by producing a rough ray tracing computation of the scene followed by a series of calculations increasing in detail. This step-by-step approach to producing an accurate result has the advantage that you can interrupt the ray tracing procedure at an early stage in order to adjust the brightness setting or to re-position the objects in your scene. If you are satisfied with the result, just wait until the image has been calculated completely. Depending on the resolution and complexity of the scene, this can take anything from a few seconds to several hours. By complexity of the scene we mean the number of light sources and objects you use, and particularly the number of these objects that are transparent or reflective with

reference to the visible surface of your image.

Moreover, surfaces that require very high computational times are those which are illuminated by very many light sources and do not lie in the shadows.

SPECIAL SETTINGS FOR RAY TRACING

Apart from the settings for light sources mentioned above, you also have the possibility to make certain other settings for ray tracing. These are made in the dialog box which you obtain after right-clicking on the ⬛ button.

This is divided into the two options **Ray tracing** and **Pure Phong shading**, whereby ray tracing has several sub-areas. Phong shading is a term derived from computer graphics which was introduced in the seventies by a man named Bui Tuong Phong. It is in principle the same as ray tracing with regard to the computation of illumination, however it does not take into consideration such effects as shadows, reflections or refraction. In contrast to the normal representation, with Phong shading, illumination calculations are performed for every pixel that you see on the screen.

In the normal screen representation, which uses so-called Gouraud shading, the illumination conditions are only calculated at the corners of a surface and then uniformly distributed over the surface. The mathematician would refer to this as bilinear interpolation. This uniform distribution of Gouraud shading has the disadvantage that lighting effects which occur within a surface are incorrectly displayed. Therefore, if you place a lamp on a relatively large floor consisting of only one single surface, the lighting conditions will only be calculated at the four corners of the surface and the bright spot under the lamp in the middle of the surface cannot be seen. Phong shading, however, computes the lighting conditions for every pixel, with the results that you will be able to see the bright spot.

The advantage of Phong shading compared with Gouraud shading is therefore the improved computation of the illumination distribution. The disadvantage compared with ray tracing is that shadows, reflections and refraction are not taken into consideration. Pure Phong shading requires less computational time than ray tracing, but more than for the normal display using Gouraud shading.

If you choose **ray tracing** in the dialog box, you have the further possibility to choose ray tracing with shadows, with reflections and/or with refraction. You can switch off each the individual types to achieve special effects or simply to reduce computation time.

As already mentioned in the introduction to ray tracing, calculations for shadows or for surfaces which do not lie in the shadows and are illuminated by many lamps are very demanding on computing power. To keep computation times to a minimum, we have included two different methods for the computation of shadows that you can use. The first is the exact computation of shadows, the second is not quite exact – but considerably faster. The important difference between these two is that in the faster version no check is made on whether the walls of a room cast shadows in this room. This is normally correct: If you imagine a rectangular room; you will never see shadows of the walls in the room itself.

However, this can lead to errors if the room is L-shaped, for example. If a lamp is situated in one leg of the L, a real possibility exists that a wall in the other leg of the L will cast shadows. If you choose **fast** for the computation of shadows, you will not see these shadows – if you choose **exact**, you will see them.

RAY TRACING OF ILLUMINATION SWITCHED ON OR OFF

In ArCon, by clicking on the button you have the possibility to switch the lights in your scene on, or to select standard daylight illumination. This daylight illumination corresponds with sunlight. A scene in real life is illuminated during the day through light from the window; in spite of this, you will not see a sharp outline of the light from the window on your walls, but there will be an overall brightness in the whole room.

This effect of indirect illumination, which results from the fact that the light entering through the window is scattered back and forth from the individual surfaces in your scene and, in the final result, illuminates the whole scene, is very difficult to simulate with ray tracing. Although methods do exist, such as so-called radiosity, with which such effects can be realistically simulated, these methods are very demanding on memory and computational power – for this reason they have not (yet) been implemented in this version of ArCon.

For you this means that the brightness of a scene is brought about only by means of direct illumination through light sources. In the case of daylight illumination, you would therefore only see a bright spot in the room, i.e., the spot directly illuminated by "the sun". This is, of course, very unsatisfactory, as you would like to see the rest of the scene as well. For this reason we have simply taken steps to prevent the walls from casting shadows during computation of ray tracing scenes, so that the sun shines seeming unobstructed through the walls (and also through the windows and doors, by the way). However, this does not mean that your furniture cannot cast shadows on walls or on other items of furniture. The best thing is if you experiment a little with ray tracing in the day view.

RAY TRACING–SAVING AND PRINTING IMAGES

Starting on   you will find a general description of the procedure to be followed if you wish to <u>save an image</u> or print it. As a reminder: you enter in the appropriate options dialog box whether the image is to be computed using ray tracing. Therefore, if you save an image and have selected **Ray tracing** for this, the ray tracer will be activated for saving the image to allow the image to be computed.

Depending on the other options entered for the saving, such as <u>Dimensions</u>, <u>Oversampling</u>, etc., it can sometimes take a very long time before the result is actually saved, as the image must be computed again for saving. Therefore, if you have chosen a resolution of 2000 x 1500 pixels, added to this <u>16 times</u> oversampling and then also ray tracing, then you can probably forget about using your computer for next weekend. So when you say **ray tracer**, you should first think carefully about the settings you make.

If you need a fairly high resolution for a high quality printout, we recommend the following settings: resolution ca. 1500 x 1500, depending on the edge ratio of the image, <u>4 times</u> oversampling and <u>edge filter</u>. On a 90 MHz Pentium and a scene of normal complexity, you can expect to use the result the next morning if you start the save the evening before.

WALKING AROUND PROJECTS

By clicking in the <u>perspective view</u> of Design Mode, the **Walkabout** function is activated. In the view is then no longer the normal mouse pointer, but, depending on the position in the view window, a mouse pointer in the form of

Direction arrows, (e.g.), when you walk,

or rotation symbols (e.g.), if you are turning round on the spot.

The arrows indicate the direction you are going in. You begin your tour by pressing the left mouse button.

Depending on the position of the mouse pointer, you can move in the following directions:

•   **forwards** and **backwards**

•   **to the left** and **to the right**

•   **to the front left** and **to the front right**

•   **turn left** and **turn right**

When you press the left mouse button within this view, you begin to walk around your project. The speed at which you carry out the tour depends on the position of the mouse pointer in the view window. The closer the mouse pointer gets to the center of the window, the slower you will move. At the center of your project, the mouse pointer is replaced by the following symbol:

If while holding down the left mouse button you move towards an edge of your view window, you will walk through your project, the closer you get to the edge the faster you will get. If the mouse pointer approaches the upper edge of your view window, for example, your movement will become faster and faster. This applies equally to all other directions.
You obtain a further increase in speed if, in addition to the possibilities described above, you press the **Ctrl** key. You will become even faster if you press the **Ctrl+Shift** keys together. If you release the left mouse button, you will remain stationary at the current position in your project. If you press the mouse button again, your tour will continue. The **Walkabout** function is terminated by clicking any toolbar button and the button will automatically return to the non-depressed position.

Using the **Walkabout** function requires a little practice which you can best obtain by walking around a simple room.

The view type of your project (e.g., as wire-frame model or colored without texture) during walkabouts can be selected in the **General settings** dialog box. You access this dialog box by choosing **Program - General...** in the **Options** menu.

BRIGHTNESS

DAY AND NIGHT VIEW

This function is only active in the top view   and in the <u>perspective view</u>   and when at the same time you are in one of the colored <u>view types</u> .

By clicking with the left mouse button on the   button, you can switch between day and night view. During the day, your project will be illuminated at a pre-defined brightness which you can set in the <u>Brightness dialog box</u> . In the day view, lamps in the project have no influence on the brightness of the view.

On the other hand, in the night view, your project can only be illuminated by lamps that are accessible and which are also <u>switched on</u> . All rooms in which no light sources are present will appear dark.

BRIGHTNESS DIALOG BOX

You obtain this dialog box by clicking with the right mouse button on the button or by choosing **Brightness...** from the **Options** menu.

THE SLIDE CONTROL

With this **slide control** you can adjust the numeric value for brightness by dragging the control, and thus set the intensity of illumination for your project either darker (<1.0) or brighter (>1.0).

The current setting will be shown at the input field at the bottom left, where the value can also be entered directly via the keyboard. If the numeric value is less than 1, your project will be appear increasingly darker as the value gets less.

You can check the light intensity entered by clicking on the **Preview** button. The values entered will then be accepted directly and transferred to the project.

ONE STORY UP ⬆ OR
⬇ DOWN ("ELEVATOR")
⬆ ONE STORY UP

When you click on this button, you move the view of your project up by one story. By pressing the **Ctrl** key, your project will be moved dynamically when you click on ⬆.

This button is only present in the perspective view. In the other <u>view types</u> it is not included .

⬇ ONE STORY DOWN

When you click on this button, you move the view of your project down by one story. By pressing the **Ctrl** key, your project will be moved dynamically when you click on ⬇.

This button is only present in the view type <u>perspective</u> . It is not included in the other view types.

ADJUSTING THE PERSPECTIVE VIEW

Two possibilities exist in the perspective view to change the position of the observer and the point towards which the observer is looking. One of these is the **Walkabout** , in which you change your position in a sort of interactive way; the other is to make the adjustment via the following dialog box.

You obtain this dialog box by right-clicking on the Observation button . The appropriate settings are made in the three areas of the dialog box **Position of the observer**, **Viewpoint** and **other information**. The Position of the observer and the viewpoint can be defined with the mouse by clicking on the relevant button. After this, the dialog box disappears briefly and you can select both positions with the aid of the 3D mouse.

In contrast to the x- and y co-ordinates, you can also enter the numeric height of the observer or of the viewpoint. For this, you can either enter the height relative to the floor, or even the absolute height. Input to **Height above floor** is only possible if the position of the observer or of the viewpoint is in a room – otherwise this field is grayed out.

OTHER DATA

In the area **other information** you can also change the **Head inclination** and the **Field of view**. **Head inclination** corresponds in principle to a nodding of the head on the part of the observer. For this you can either use the slide control or enter a numeric value in the field. Note that when using head inclination, the height of the viewpoint changes, as you are then looking further up or further down.

Changing the **Field of view** corresponds in principle to changing the lens on a camera. You can choose between wide-angle and telephoto views of any desired value – whereby **narrow** corresponds to a telephoto lens, **wide** to a wide-angle lens. You can also enter the field of view directly in degrees, i.e., a numeric value.

Last, but not least, you can also adjust the visible depth of field. For technical reasons, ArCon cannot display everything that lies before the observer in the perspective view; the depth of field is limited. If you choose **Automatically determine visible depth of field,** ArCon will set the values such that you can generally see your complete plan – i.e., everything that begins in front of you and reaching up to the end of the plan. However, if you choose **Use the following values for visible depth of field**, you can define the visible range from and up to which your plan can be seen by the observer. You can thus cut "slices" out of your plan which you then see – everything before and after this is invisible. To check the data entered, you can click on the **Preview** button before you close the dialog by clicking on **OK**.

Note: While you are defining the position of the observer or the viewpoint with the mouse, you can cancel the input by pressing the **Esc** key. The dialog box will then re-appear; but the position of the observer and of the viewpoint will not have changed.

VIEWING

Using this button it is possible to view your project from all sides in the three different <u>views of the Design Mode</u> .

The function of this button is very different from the others, which you can either click on or press down. The difference lies in the position on which you press them. If you press the button at the left side, the left arrow will turn red. This applies also to pressing the right, up and down arrows.

In the perspective view, the image changes such that you are always looking at the same point, however you are moving in accordance with the arrow button pressed. In the plan view and top view, actuating this switch causes your view to "scroll".

The viewpoint from which you wish to look at your project can be defined in the **Viewing** dialog box and changed again at any time. You obtain this dialog box by clicking with the right mouse button on or by choosing **Viewing...** from the **Options** menu.

▣ THE TEXTURES AND OBJECTS CATALOG

In ArCon's Design Mode, you have a large number of materials, textures and objects at your disposal which cover the whole area of furnishing, e.g. for the bathroom or kitchen. To assist in the management of this large number of textures and objects, they have been grouped together and arranged in a Textures and Objects Catalog.

The Textures and Objects Catalog is activated or deactivated by clicking on ▣ or by choosing **Textures and Objects Catalog** in the **View** menu.

The Textures and Objects Catalog is in its form and function very similar to the Windows 95 Explorer.

The Catalog can be positioned anywhere on the screen as an independent window, separately from ArCon's main window, or it can be "docked" in ArCon's main window. You switch between these two possibilities by choosing **Dock catalog in window** in the **View** menu. If the Catalog is "docked" in the main window, you can choose the position for the Catalog at the left, right, upper or lower edge of the main ArCon window by moving its title bar.

The functions of the **Textures and Objects Catalogs** will be described briefly in the following.

AREAS OF THE TEXTURES AND OBJECTS CATALOG

TITLE BAR

This displays the name of the application (Catalog). The title bar also contains the usual Windows 95 facilities

- for minimizing

- for maximizing and closing.

MENU BAR

The menu bar contains the menus

- Catalog, View and Help. Catalog allows selection of the individual index catalogs for objects, textures, loaded textures and materials, to then transfer these into the Catalog.

- The menu item View is provided for switching the toolbar and the Detail List on and off. With the latter you are given more detailed information on the objects or textures, e.g. manufacturer, article number., price and filename of the object.

- You can obtain specific information on the various items via Help.

TOOLBAR

If the **toolbar** is switched on, you can execute the **menu bar** commands directly by clicking with the left mouse button on the appropriate toolbar button.

DIRECTORY TREE

In the left column of the Textures and Objects Catalog below the menu bar is the **Directory tree**, containing the directory structures used by ArCon, in which the Catalogs of objects, textures and materials are arranged.

Note: When you see the Catalog for the first time – after starting ArCon – the directory tree is "minimized". Thus you see very little of it. To enlarge the area, drag the thin bar next to the toolbar to the right while holding down the left mouse button. In this way you are free to set the partition between the directory tree and the contents area according to your requirements.

With the button you move to the next higher folder in the directory structure.

CONTENTS AREA

In the right column is the **Contents area**, in which the contents of the current textures and objects folder are displayed.

ArCon automatically saves all size information of the Textures and Objects Catalog on exiting from the program, so that when you restart ArCon, the Catalog appears in the same position and there is no need for you to move it around each time.

You have the possibility to store groups of objects, such as a complete dining room suite, in the Textures and Objects Catalog as a user-defined group, in order to <u>define your own furniture catalogs</u>.

OBJECTS IN THE CATALOG

ArCon provides a large stock of furnishings for your home. This comprises of more than 1,.000 objects, such as bathroom, kitchen and living room furniture. To assist in the management of this large number of objects, they have been grouped together and arranged in the **Objects** directory of the Textures and Objects Catalog.

This directory consists of several sub-directories, the Object catalogs (e.g. bathroom, kitchen, living room, etc.), which in turn also contain catalogs or individual objects (e.g. cupboards, tables, chairs).

These Object catalogs and individual objects are illustrated as graphics in the contents area of the Catalog, giving you an optical impression of the objects to be placed. Catalogs appear on a yellow background, objects - i.e., the items you can place - on a gray background.

LOADING OBJECTS

By clicking with the left mouse button on the **Objects** directory, the <u>directory tree</u> of the Catalog displays all sub-directories, such as hall, bathroom, office, etc., and loads these into the <u>contents area</u>. In the directory tree you open the sub-directories by clicking with the left mouse button, while in the contents area of the Catalog you open these folders by double-clicking on them.

If any other sub-directories (e.g. in the case of <u>Office</u> the folders <u>Desk</u>, <u>Chair</u>, <u>Cupboard</u> etc.) exist, open these in order for the Catalog to display the individual objects in this folder. If a sub-directory contains a large number of individual objects, a dialog box will appear in which the current list of loaded objects is displayed and constantly updated.

To prevent all individual objects from loading, you can terminate the loading operation by clicking on **Cancel**. The contents area of the Catalog will show only the objects that have already been loaded.

With the button you move to the next higher folder in the directory structure. You change to the last-used object folder by clicking on the

 button or via the **menu bar**, in which you choose the **Objects** command.
Via the button **Details**, the Catalog displays the object folder and the individual objects as small preview windows in the contents area. You can obtain further information on the individual objects with regard to manufacture, article number, price and filename.

The current version of ArCon contains no manufacturer-specific objects, but "fantasy furniture". For this reason, the information on manufacturer, article number and price is currently "Unknown". In the case of manufacturer-specific additional modules for ArCon, the corresponding information will be filled with real values.

SELECT OBJECTS

An individual object in an open folder in the contents area is selected by clicking on it with the left mouse button. This object will then be highlighted in color to differentiate it from the other objects in this folder.

Just as textures can be dragged from the Catalog into your view using drag and drop, using drag and drop you can also drag objects into an ArCon view. The precise way in which objects are then placed in the view is described in the section placing objects and groups.

OBJECT VIEWER DIALOG BOX

You obtain this dialog box by double-clicking on an object (here, for example, the "Laptop") in the contents area of the Catalog. The dialog box is split into two main areas.

In the upper area, information is provided on the Manufacturer, Order No. and Price for the current object. This area is currently not used by ArCon. In further versions, complete manufacturers' catalogs with all necessary information will be displayed in the dialog box. ArCon then will use information from dealer catalogs further in order to produce order lists or price lists for the objects placed in a project.

In the lower area is the preview window, in which you can view the selected object from all sides, enlarged or reduced, however you wish.

In addition to these functions, in ArCon you also have the possibility to produce user-defined groups of objects which reoccur. For example, you can define a dining room suite consisting of six chairs, an oval table with table decoration and a matching ceiling lamp as an object group "Dining room" and store it in the Catalog using drag and drop. This swaps around the "source" and the "target": the current view is the source of the group – the Catalog the target.

Loading such object groups from the Catalog is performed in the same way as loading the individual objects. Saving user-defined groups ...

TEXTURES IN THE CATALOG

The textures in the <u>Textures and Objects Catalog</u>   used in ArCon are surface structures such as carpets, wallpapers, etc. Textures can be understood on the one hand to be the appearance of textile materials (e.g. as used in the manufacture of furniture) or similar coverings, and on the other hand (in the case of computer graphics), images which are ''pasted'' onto three-dimensional objects. Using these images, structures can be simulated which are akin to natural structures.

The use of textures has a particular significance in ArCon. They allow the creation of a high degree of reality, but without the geometry of the objects becoming too complex.

All these textures are stored in the directory textures of the Catalog and are displayed in the contents area.

With textures you can design and change the surface structures of your project at the flick of the wrist. You can lay carpets or wood block on your floors, paper or panel your walls and ceilings, fit doors and windows of spruce or pine, choose curtains in a wide variety of fabrics and colors to match your furniture. There are no limits on your freedom as a designer. You can switch and swap textures to your heart's content.

If the textures offered by ArCon are not enough for you, you of course have the possibility to produce your own textures. The format of these textures (images) is that of Windows bitmap files (BMP files), which you can create using Photoshop or any other Windows drawing program. such as Paint.

Loading, **Selecting, Swapping** and **Placing** textures will be described briefly in the following.

LOADING TEXTURES

By clicking with the left mouse button on the textures folder or on the ▣ button on the <u>toolbar</u>, the entire texture directory will be loaded into the contents area of the Catalog. The various textures are sorted in various separate sub-directories. Therefore, before you actually see the textures, you must first choose a corresponding sub-directory.

Note: As for the object sub-directories, the texture-sub-directories are also displayed in the form of a picture.

If you are loading a large number of textures from a directory, a dialog box will appear in which the current list of loaded textures is displayed. To prevent all individual textures from loading, you can terminate the loading operation by clicking on **Cancel**. The contents area of the Catalog will show only the textures that have already been loaded.

Via the button ▣ **loaded textures**, the Catalog only shows the textures that you are already using or have once used in your project. This has the advantage that you are not always forced to load the entire texture catalog. In the **loaded textures** there is a ''special texture'' with which you can delete textures used in your project. This **Deletion texture** is applied just as you would apply any other texture.

Via the **Details** button, the Catalog displays the textures in the contents area of the Catalog as small preview windows and also provides you with further information, such as the width and height the textures.

SELECTING TEXTURES

When one of the texture catalogs has been opened and loaded in the Catalog, you choose a texture by clicking on it with the left mouse button. The chosen texture after being selected is highlighted in color to differentiate it from the other textures in the contents area of the Catalog.

APPLYING AND REPLACING TEXTURES

With the left mouse button pressed, drag the selected texture into the view window of your project. If the mouse pointer is situated above an area in which a texture can be applied or replaced (e.g. a wall), the mouse pointer changes its appearance to indicate ''textures can be applied or replaced here''.

On releasing the mouse button, the corresponding surface of the wall will change and you have, for example, redecorated the wall. In this way you can completely alter the appearance of your entire project. This procedure of applying and replacing textures can be applied equally to almost all areas and objects in your project. For example, you can also change the covering material of your armchairs and sofas in this way.

However, there are also objects for which it is not possible to apply or replace textures. This was planned in this way in the construction.

DELETING TEXTURES

You delete existing textures by dragging the **Delete texture** from the **loaded textures** over the object. In this operation, the texture is not replaced by a new one, but deleted.

USER-DEFINED TEXTURES

You can transfer your own images to ArCon to be use as textures. The following should be observed in this respect:

- Textures are stored internally with a maximum resolution of 256 x 256 pixels. So even if you load images which have a higher resolution, these will first be re-computed for reduction to this lower resolution.

- Textures are stored in the program using color index. This means that 8 bits will be used for each pixel of a texture. If you load a TrueColor image, it will first be converted to an 8-bit color index image.

- In ArCon it is not possible to load compressed Windows bitmap files. Attempting this could lead to an appropriate error message being displayed.

- Your PC has a limited amount of memory. If you use very many textures, it is possible that you will not have enough memory or that Windows will swap part of the program to the hard disk (in a swap file).

MATERIALS IN THE CATALOG

By assigning material characteristics, you have the possibility to define certain texture structures and properties for your objects. This enable you to alter gloss effects and reflections which crop up in the views, particularly in the case of ray tracing .

LOADING MATERIALS

By clicking with the left mouse button on the **Materials** folder, the 🖌 button on the toolbar or via the **Materials Menu bar-** you load the entire materials index into the contents area of the Catalog.

SELECTING AND APPLYING MATERIALS

You choose a material by clicking on it with the left mouse button in the contents area of the Catalog. The chosen material after being selected is highlighted in color to differentiate it from the other materials.

With the left mouse button pressed, drag the selected material into the view window of your project. If the mouse pointer has reached an area in which a material can be applied or replaced, the mouse pointer changes its appearance to indicate "materials can be applied or replaced here".

On releasing the mouse button, the surface properties of the object will change. This has now been assigned to a material.

In contrast to textures, which you can apply differently for all objects in your scene, when materials are changed, all similar objects will be change together. For example, if you have two identical washbasins in your bathroom and apply a different material to one of the two washbasins, the other washbasin will change as well.

OBJECTS AND GROUPS

PLACING OBJECTS AND OBJECT GROUPS

Placing of these items differs slightly, depending on which of the two possibilities you have used to select your objects and groups.

Placing of these items furthermore depends on which of the three view types you are currently in. In the following, the placing of objects and groups is described in dependence on the view type and the means of selecting the items.

In the plan view , the mouse pointer has the form and functions of the 2D mouse pointer as for the Construction Mode , while in the top view   and in the perspective , the mouse pointer uses the forms and functions of the 3D mouse pointer. Detailed information on the 3D mouse...

PLAN VIEW

 If you have selected an object or an object group via the Objects and Textures Catalog , drag it with the left mouse button pressed into your project. When you release the left mouse button, the item will be placed.

The mouse pointer changes its form from an arrow to a cross as soon as you drag it into the view window in order to place the object. The selected object will not be displayed as long as the mouse pointer is moving over the view window. Only after placing of the object will it be displayed in a selection frame as a selected object.

If you have selected an object or an object group via the **Furnishings** menu, drag it into your project without pressing a mouse button. By clicking on the left mouse button, the position for the item is confirmed and the item placed.

When placing the item, the collision detection function becomes available by pressing the **Ctrl** key. Using collision detection, you can prevent individual items from interfering with one another.

TOP VIEW

 In this view type, the mouse pointer has the full function of the 3D mouse. You can place your objects in the x, y and z directions. Detailed information on the 3D mouse...

Loading using the Catalog

If you have selected an object or an object group using the **Objects and Textures Catalog** , you can drag it into your project while holding down the left mouse button. With the left mouse button alone you place the object in the x and y directions, whereas you can place the object in the x and z directions by pressing the left and right mouse buttons together. When you release the left mouse button, the object will be placed.

The mouse pointer can be seen in the view from above as a red "cross". The selected object will not be displayed as long as the mouse pointer is moving over the view window. Only after the object has been placed will it be displayed in a selection frame as a selected object.

Loading via the menu

If you have selected an object or an object group via the **Furnishings** menu, you can drag it into your project without pressing a mouse button. You then place the object in the x and y directions, whereas by pressing the right mouse button alone, you place the object in the x and z directions. By clicking on the left mouse button, the position of the object is confirmed and the object is placed.

The selected object will be displayed immediately in the view window, and after placing will be shown in a selection frame.

When placing the item, the collision detection function becomes available by pressing the **Ctrl** key. Using collision detection, you can prevent individual items from interfering with one another.

🏠 PERSPECTIVE

In this view type, the mouse pointer, as in the top view, has the full functions of the 3D mouse. You can place your objects in the x, y and z directions. Detailed information on the 3D mouse...

The motion and function of the 3D mouse in the room in combination with the left and the right mouse button depends on the settings made under **Movement while holding down the right mouse button** in the **General settings** dialog box. You access this dialog box by choosing **General...** from the **Options** – **Program** menu. more detailed information on these settings...

In the perspective view, the 3D mouse is displayed as a spatial cross-wire (six-fold arrow) with a "shadow streamer".

Loading using the Catalog

If you have selected an object or an object group using the **Objects and Textures Catalog** , you can drag it into your project while holding down the left mouse button.

Depending on the settings made in the **General settings** dialog box, there are considerable differences between placing objects by pressing the left mouse button alone and pressing the left and right mouse buttons together. If you release the left mouse button, the object will be placed.

Loading via the menu

If you have selected an object or an object group via the **Furnishings** menu, you can drag it into your project without pressing a mouse button. By clicking on the left mouse button, the position of the object is confirmed and the object is placed. The left mouse button has no other function. With the right mouse button you control the depth.

The selected object will be displayed immediately in the view window, and after placing will be shown in a selection frame.

When placing the item, you can use the collision detection function by pressing the **Ctrl** key.

SELECTING AND DESELECTING OBJECTS

All objects that you wish to edit in any way whatsoever must first be selected. The process of selecting is identical in all three view types of the Design Mode. It applies both to objects and object groups. Only the selection frames differ   in appearance from one another.

SELECTING AND DESELECTING ONLY ONE OBJECT

You can select one object by clicking with the left mouse button above or in the required object. The selected object will be displayed in a selection frame. You deselect an object by selecting a different object or by clicking at a position where there is no object.

SELECTING AND DESELECTING SEVERAL OBJECTS

You can **select** several objects by holding down the **Shift** *key* and with the left mouse button clicking on the objects one after the other. If you click again on a selected object while the **Shift** key is still pressed, it will be deselected.

SELECTING ALL OBJECTS

You **select** all objects by clicking with the left mouse button on or by choosing **Select all** from the **Edit** menu.

MOVING OBJECTS AND OBJECT GROUPS

Only selected objects and object groups can be moved. The nature of the movement differs slightly for the three types of view . The selection frames have different types display. While you are moving objects or groups, the associated selection frame is temporarily switched off. The form and function of the mouse pointer depends on the view type you are currently in.

To prevent the individual objects from submerging into one another or moving an object into a wall, press the **Ctrl** *key* during movement of the object over the groups. This will switch on collision detection. The object can now be placed directly next to another object or directly at the wall.

MOVING OBJECTS AND OBJECT GROUPS WHEN THE GRID IS SWITCHED ON

If in **Design Mode** the button ⊞ is depressed, moved objects snap to position just as elements laid in **Construction Mode**. This is valid also in the perspective view, where the objects then snap to the grid not only in width and depth, but also in the height.

Note: The grid is not displayed in the top view and in the perspective view, even if it is switched on.

⊠ MOVING IN THE PLAN VIEW

 The selected objects and object groups are surrounded by a black selection frame. The objects can only be moved in the x and y directions. The mouse pointer has the function of a 2D mouse pointer.

⊠ MOVING IN THE TOP VIEW

Moving in (x)width and (y)depth

Move the mouse pointer into the selection frame of the object or the group and with left mouse button pressed move the object or the object group. When you release the mouse button, the object will be placed at the new position.

The selected objects and groups can only be moved in the x and y direction. Moving in the z direction by only pressing the left mouse button is not possible.

Moving in (x)width and (z)height

Move the mouse pointer into the selection frame of the object or the object group and with the left and right mouse button pressed, move the object or the object group. After releasing the mouse buttons, the object will be placed at the new position.

The selected objects and groups cannot be moved in the x and z direction. Movement in the y direction with the left and right mouse button together is not possible.

⌂ MOVEMENT IN THE PERSPECTIVE

In this view type the 3D mouse has the appearance of a shadow streamer. Because of the shadow streamer of the mouse pointer under the selection frame, the association is shown between the floor level of the story and the object or group to be moved..

You can use this shadow streamer to estimate the position on which the object   will ʻʻlandÓ after releasing the left mouse button, assuming that Object dropping has been switched on for this object.

In the **General settings** dialog box you can additionally influence the direction of motion when moving objects with right mouse button held down

Moving by (x)width, (y)depth and (z)height

The motion and function of the 3D mouse in the room in combination with the left and the right mouse button depends on the settings made under **Movement while holding down the right mouse button** in the **General settings** dialog box. You access this dialog box by choosing **General...** from the **Options** – **Program** menu. more detailed information on these settings...

Note: To simplify the movement of objects, it can be useful to load a second view in the main window. The first window then shows, for example, the plan view or the top view, and the second window the perspective view.

In the plan view or the top view, it is quite simple to move objects in the x or y direction, whereas in the perspective view it is easier to move them in the z direction.

LOADING AND SAVING OBJECTS

Apart from the management of objects and object groups using the Textures and Objects Catalog, these objects can also be managed via the menus. If you choose **Load object...** or **Save object...** from the **Furnishings** menu, an appropriate dialog box will appear for the command. These dialog boxes are described in more detail in the following sections.

DIALOG BOX SAVE OBJECT

You are presented with this dialog box if you choose **Save object...** from the **Furnishings** menu. This command is only active for a selected object. If no object is selected or if several objects are selected, this command is grayed out and without function.

The dialog box that appears is the standard Windows 95 dialog box for saving files.

DIALOG BOX LOAD OBJECT

You are presented with this dialog box if you choose **Load object...** from the **Furnishings** menu.

The only difference between this dialog box and a normal Windows 95 dialog box for loading files is the preview window. In this preview window you can view an object before actually loading it into ArCon. For this to be possible, a valid ArCon object file (file extension **aco**) must be selected.

Note: If there are several ArCon objects in a row in the file list – and you have marked one of these objects – you can quickly obtain a preview of the other objects by using the cursor keys **Up arrow** or **Down arrow**.

DIALOG BOX OBJECT SETTINGS

This dialog box appears after double-clicking with the left mouse button on an object. This object can be, but need not necessarily be <u>selected</u>.

All objects possess predefined properties, such as appearance on the one hand, and on the other hand properties you cannot see directly. Using this dialog box you change the properties of the object. For example, you can change the behavior of an object on placing it or change information concerning the light source of lamps.

In the upper area of the dialog box you will find the name of the object. Situated below this to the left is the area with the editable properties and to the right the area with the <u>preview window</u>.

DIMENSIONS

In this area are the current dimensions such as **length (x), width (y)** and **height (z)** as numeric values. You can increment and decrement these values in steps by clicking on the arrow buttons or by clicking in the input field and then entering the values via the keyboard.

Disproportionate resizing

If you check the check box **disproportionate resizing**, the dimensions of the object have no direct relationship to one another and can be changed completely independently. In this way, you can change the **length** of the object, for example, and the **width** and **height** remain at the set values. In contrast to this, when this check box remains unchecked, the dimensions of the object are interdependent. If one value changes, the other two will also change in the same ratio. The proportions of the object remain unchanged.

You can also change the size of your object interactively using the <u>selection frame</u>. The appearance and function of the selection frame differ depending on the setting for **disproportionate resizing**.

Mirroring

If the check box **mirror** is checked, the object will be mirrored about its central axis. This function is identical with clicking on the button .

HEIGHT

If you check **calculate height (**'**after free fall'),** objects in your project fall automatically. If this function is activated, then **height above floor** is grayed out and has no function.

This function is not active for all objects. It is undesirable for certain objects that they fall to the floor (e.g. radiators). In the case of these objects, this check box is grayed out and you can using the function **height above floor** to enter the height of the object numerically. If the field is grayed out, however, the actual height of the object above the upper surface of the floor is noted here. If, for example, a cup is standing on a table 80 cm high, the height for the cup will be stated as 80 cm.

If you have not checked **calculate height ('after free fall')**, then you can enter a numeric value in **height above floor** at which the object is to be placed. In this way, washbasins, taps and radiators, etc. can be installed at an exact height from the floor.

LIGHT SOURCE

This area is only active for lamps, otherwise it is grayed out and without function. Here you have the possibility to optimize and adjust a light source and its intensity. You can control the range of the light beam, the brightness of the lamp, choose the color of its bulb or switch the lamp off completely.

All settings made in this area influence the appearance of your project only in the <u>night view</u> .

Slide control: Beam range

The **Beam range** controls the size of the light beam. The larger you make the **Beam range**, the further the light source radiates into the scene.

Slide control: Intensity

When you move this control, you change the brightness of the lamp. The brighter you set the slide control, the more contrast is contained in the shadows of the objects which are illuminated by this lamp.

It is however particularly important when computing <u>ray tracing-images</u> that you do not set the intensity of light sources too high, as this would result in <u>over-illumination</u>.

Color

Using this function you can determine the color of a lamp.

After clicking on the **Define...** button, the standard **Colors** dialog box opens.

By setting a **Color** you can mix various lighting effects using lights of different colors. The colors of the individual lamps intermingle seamlessly and interesting effects result when <u>ray tracing</u> .

The check box: causes shadows when ray tracing

If the option **causes shadows when ray tracing** is active, every object that is illuminated by this lamp will cast shadows. The contrast of the shadow depends on the setting of the slide controls **Range** and **Intensity**.

With this setting you can achieve interesting ray tracing effects for objects which are illuminated by several lamps.

The check box: switched on

This check box can be compared with the function of a light switch. The lamp is either switched on or switched off, and in the switched off condition has no influence on the illumination of your project in the

night view . This function is identical with the button when the lamp is selected in Design Mode.

With this function you can specifically switch individual lamps of an object on and off to test the various effects on the illumination of your project.

USER-DEFINED GROUPS

In ArCon you have the possibility to define groups of individual objects in order to be able to use them again or to store them in catalogs for use in other projects. This gives you fast access to frequently used combinations of objects. In this way, you save the time you would otherwise need for repeated bringing together of individual objects for the same group.

You can thus define and save a complete combination of individual objects, e.g., a complete dining corner with a table, chairs, ceiling light and table decoration.

PUTTING GROUPS TOGETHER

All individual objects which you wish to group together in your project must first be selected and grouped.

To select several objects, hold down the **Shift** key and click in turn on the objects that you wish to place into a group. Now click with the left mouse button on ⊞ or choose **Group** from the **Edit** menu. The selected objects are then grouped together in a selection frame. By clicking on

⊞ or choosing **Ungroup** from the **Edit** menu you can reverse the grouping. You will find more detailed information on grouping on page.

In the associated Group settings dialog box you then enter a name for the group. You will find more detailed information on the dialog box on.

SAVING AND LOADING GROUPS

If you wish to save an object group that you have produced for later use or use a saved object group again, Choose **Save group...** or **Load group...**.from the **Furnishings** menu. You can also drag the object group into a folder of the object index in the Textures and Objects Catalog.

If you choose the route of the **Furnishings** menu by choosing the **Save group...** or **Load group...** option, the relevant dialog box will open.

After you have loaded and placed a group, the <u>selection frame</u> will appear around the group. These groups have the same properties and can be edited as for all other objects.

To delete a saved group, first select the file in one of the dialog box by clicking on the filename under which the group was saved. The selected file will be deleted from the dialog box by pressing the **Del** key.

Group settings dialog box

If you have grouped together several objects or even groups to a group or to a super-group by selecting and then grouping them, by double-clicking on one of the objects in this group, you can make settings for the whole group. The following dialog box will appear.

This dialog box is almost identical with the <u>Object settings dialog box</u> . In this section only the differences will be described, for the similarities, please read the section Object settings.

At the very top of the dialog box an input field is displayed in which you can give the group a name. The default name is **<Unnamed group>.** The other entries in the dialog box refer not just to one individual object, as for the object settings, but to all objects together.

The area **Dimensions**, for example, does not describe the size of one object in this group, but the size of the entire group in terms of width, length and height. If you enter information on the light sources, this will be applied to all lamps present in this group.

Naming groups

In contrast with objects, for which a name is permanently stored in the objects themselves, groups have no pre-defined name. You can enter this name in the upper data entry field of the dialog box. You will see your group name on the one hand when you click on the group again, and on the other hand when you drag the group into the <u>Catalog</u>   using drag and drop.

COLLISION DETECTION

In principle you can place an object or object groups, with the exception of **<u>automatic falling</u>**, at any position in the project. It should therefore be possible to place an armchair in a cupboard, although this would appear rather dubious, of course.

To prevent this from happening, you can use so-called collision detection. With this method, internal computations are made when objects and object groups are moved to check whether they would collide with any other objects that have already been placed.

As collision detection requires a relatively large amount of computer time, and it would be rather awkward to move a cupboard from one room to another by pushing it through the door, collision detection is generally switched off. You can activate collision detection by pressing the **Ctrl** key.

While you are pressing this key, an object can only be moved in the free room. This means that when you come too close to the cupboard with the armchair, further movement in this direction is prevented.

Collision detection is also very suitable for placing objects in the plan view   or in the top view

 .

This method is very useful when putting together cupboards consisting of several individual elements. To do this, select a cupboard unit that has already been placed in the room and while holding down the **Ctrl** key drag it against a wall until it cannot be moved any further. The cupboard unit is now situated as close to the wall as possible. Proceed now with a second cupboard unit in exactly the same way as the first, however, drag this cupboard unit against the other until it cannot be moved any further. The cupboard units are now situated directly next to one another. It may be necessary to move the last-placed cupboard unit a little closer to the wall. To do this, simply push the cupboard unit towards the wall while holding down the **Ctrl** key until it cannot be pushed any further.. Both cupboard units are now situated as close to one another and as close to the wall as possible. Any number of objects (e.g., cupboard units) can be arranged next to each other without them intertwining.

You can compare this procedure with moving furniture around in a room. The main difference is that the result of moving the furniture can be seen on the screen— without the involvement of large amounts of physical effort.

THE SELECTION FRAME

If an object is selected, it is shown in the **plan view** with a black frame and in the top view or **perspective** view surrounded by a transparent frame. In ArCon's Design Mode, you can edit objects only if they have been selected in this way.

Depending on the view you are currently in, the display of the selection frames varies.

▨ PLAN VIEW

In the plan view, the selected objects or object groups are shown red with a black selection frame which encloses these objects. In the corners of this frame, or, depending on the setting for distortion, also at the sides, small black squares with which you can distort the object uniformly. To do this, place the mouse pointer onto one of the squares and drag the object with left mouse button pressed. The right mouse button has no function in this view and therefore also no influence on the selection frame.

If distortion is not permitted (Object settings dialog box), then it is only possible to uniformly resize the object in width, depth and height.

By double-clicking on the selected object or the object group, the dialog box Object settings   or Group settings will be opened. In this box you can activate distortion. The selection frame now shows eight squares: Four in the corners and another four in the middle of the edges of the selection frame. With these squares either the width and height or depth and height of the object can be changed.

▨ TOP VIEW AND
▨ PERSPECTIVE VIEW

 If you are in one of these view types, the selected objects or object groups will be enclosed in a three-dimensional selection frame. The edges and corners as well as the surface centers of this frame are highlighted in color. These colored markings mean that you can alter (distort) the selection frame in its dimensions.

Colored marking of the selection frame:

red corners	alter all three dimensions
	(width, height and depth).
	The diagonally opposite
	corner remains unchanged.
green edges	alter two dimensions
	(width + height, width + depth
	or height + depth).

	The diagonally opposite
	side remains unaltered.
blue ball segment	at center of the selection surfaces
	alter one dimension
	(width or height or depth).
	The opposite surface
	(side) remains unaltered.

If the mouse pointer is situated above one of the colored marks, its shape changes to a cross. You can then perform the distortions by dragging with the mouse pointer with left mouse button pressed.

If distortion is not permitted, then you can the only uniformly resize the object in width, depth and height at the red corners. The blue hemispheres are then missing on the surfaces in the selection frame and the green edges have no function.

By opening the **Object settings** dialog box, you can activate distortion as described in the previous section. The blue hemispheres on the selection frame surfaces are then displayed. All corners, edges and surfaces then have the functions described above.

You can reset all of the changes you make to the objects and object groups to their initial settings using the command **Reset initial values** in the Object settings dialog box.

WORKING WITH THE VERTICAL TOOLBAR IN DESIGN MODE

With the functions described in the following you can alter the position of objects already <u>placed</u> and <u>selected</u>. They apply equally to individual objects and to object groups in the <u>plan view</u> , in the top view and in the <u>perspective view</u> . You cannot make a direct change to the dimensions of these objects with these functions.

⊞ SELECT ALL

Each object in your project which is to be edited in any way must first be marked with a selection frame (selected).

By clicking with the left mouse button on ⊞ or choosing **Select all** from the **Edit** menu, you can select all objects and object groups. Every object in your project will be selected and enclosed by its own selection frame.

Please note that this really does select absolutely every object and object group, therefore also those in stories set to invisible .

GROUPING

By clicking with the left mouse button on ⊞ or by choosing **Group** from the **Edit** menu, you can join all individual selected objects and object groups together into a group. The individual selection frames will be replaced by a large selection frame which encloses all objects.

You treat such a group as if   it were a single object; i.e. you can, for example, move, copy   or delete   all objects in this group at once.
Groups of frequently required objects can be saved as user-defined groups in the Textures and Objects Catalog. In this way you can define your own Catalogs in which you can store and manage frequently required objects or object groups. The **Furnishings** menu also provides for this purpose the commands **Save group**   and **Load group** .

⊞ UNGROUPING

With the function **Ungroup** you can return an existing <u>grouping</u> back to the individual objects or to the individual object groups. This menu item is only active if an object group is present among the selected objects.

Ungrouping is performed by clicking with the left mouse button on ⊞ or by choosing **Ungroup** from the **Edit** menu.

⊞ COPYING

This function is only active for selected objects and object groups. If no selected objects or groups are present, this button has no function.

You copy the selected objects or object groups by clicking with the left mouse button on ⊞ or by selecting **Copy** from the **Edit** menu. The newly copied object is always displayed with the selection frame and can therefore be further used as an original for copying. In the <u>Copy</u> dialog box, you can define the position in your project where the copy is to be deposited (front, back, right or left with reference to the selection frame).

The copied objects have the same properties as the original, which you can change in the <u>Object settings</u> dialog box or using the <u>selection frame</u>.

COPY DIALOG BOX

You access this dialog box by clicking with the right mouse button on the button ⊞. In the area **Positioning**, you now select the direction in which the object is to be copied with reference to the selection frame.

☒ DELETING

This function is only active for selected objects and object groups. If no selected objects or groups are present, the button is grayed out and has no function.

You delete the selected objects and object groups by clicking with the left mouse button on ☒ or by choosing **Delete** from the **Edit** menu or pressing the **Del** key.

In the **Delete** dialog box, you can set whether in the case of several selected objects or object groups additional confirmation by means of a "precautionary message" is required.

DELETE DIALOG BOX

This dialog box is opened by clicking with the right mouse button on the button or by choosing **Delete...** from the **Options** menu.

If you check the box **by more than one 3D object,** an additional dialog box is opened if deleting several selected objects or object groups with which you have the possibility to prevent deletion of each individual object or group.

CONFIRM DELETE DIALOG BOX

This dialog box is automatically opened when, as described above, you have checked **for several 3D objects** and execute the **Delete** command. If you are only deleting one object, this dialog box does not appear.

The object name of the individual object or the individual object group appears in the dialog box. You can now confirm the delete command with **Yes** or with the **Enter** key, prevent further requests for confirmation with **Delete all** and delete all selected objects immediately or, by entering **No**, omit individual objects without deleting them. You quit the dialog box with the **Cancel** button or the **Esc** key, whereby you must note the fact that all objects or groups confirmed with **Yes** up to that point will be deleted.

ROTATION

This function is active only when one or several <u>objects or object groups are selected</u> . If no objects are selected, this button is grayed out and has no function.

The selected objects and object groups are rotated by clicking with the left mouse button on the **Rotate** button or by choosing **Rotate by...**from the **Edit** menu.

You have the possibility to rotate the objects and object groups by 90°, -90°, 45°, -45°, 30° and -30°.

Using the <u>option switch</u> you can also choose the option **Free rotation**. This special form of rotation allows you to turn the object in infinitely variable steps by any desired angle. If this option has been selected, a slide control appears in the vertical toolbar with which you can set the angle of rotation to any desired value. If the new angle is to your liking, you confirm this by clicking on the left mouse button. The object remains in the new position and the slide control is removed from the screen. You can also cancel the free rotation setting by pressing **Esc**.

All objects and object groups rotate around their center, i.e., around the vertical central axis of the <u>selection frame</u>. Positive angles mean rotation in a clockwise direction and negative angles rotation in a counter-clockwise direction.

⚠ MIRRORING OBJECTS AND GROUPS

This function is only active if one or several <u>objects or object groups are selected</u> . If no objects are selected, this button is grayed out and has no function.

The selected objects and object groups are mirrored by clicking with the left mouse button on ⚠ or by choosing **Mirror** from the **Edit** menu.

All objects are mirrored around their center axis, i.e. the sides of the objects are swapped over. In objects of an object group, not only are the sides exchanged, but also the position of the objects relative to one another.

ALIGNMENT

These functions are active only if at least two <u>objects or object groups are selected</u> . If only one object or no object is selected, this button is grayed out and has no function.

The selected objects and object groups are aligned by clicking with the left mouse button on the **Alignment** option switch or by choosing **Alignment** from the **Edit** menu.

Using the **Alignment** command on the menu bar, the alignment type currently shown on the option switch will be executed. Via the menu bar you have no influence on the settings for the alignment type.

You have following possibilities to change the relative position of objects and object groups:

- align objects and object groups to the **left** or **right**

- align objects and object groups **horizontally centered** or **horizontally equidistant**

- align objects and object groups to **top/rear** or **bottom/front**

- align objects and object groups to **top/bottom (front/back) centered** or **top/bottom (front/back) equidistant**

- align objects and object groups **in height** or **on the floor**

- align objects and object groups **in height centered** or **in height equidistant**

The use of the terms **left**, **right**, **front**, **back**, **top**, **bottom** in the items above will appear on first sight somewhat confusing; for this reason, a few explanations will now follow.

- In the 2D views, i.e., the plan view and the top view, the terms **left**, **right**, **top** and **bottom** are clear. You refer directly to the image that you see. Although alignment in the **z** direction is also possible in these views, you will hardly ever use it as you are not able to observe the effect.

- For the perspective view, the specification **left** and **right** is also oriented on your screen (this depends on whether you view your scene **from the back** or **from the front**). The specifications **to the back** and **to the front** are relative to your position – therefore   if you have selected to the back, the objects will always be aligned "away from you" (this is independent of the direction from which you are looking into your scene). The specifications on z direction always describe the direction vertically to the floor, i.e., upwards in your plan (but not necessarily on your screen).

If you have selected at least three objects or object groups, you can move these such that they are all spaced at the same distance from one another in one particular direction. If you select four objects, for example, and then choose the button **horizontal equidistant (in x)**, then the first and the last (the fourth) objects will remain in the same position. The objects in between will be moved to the left and to the right until the resulting distance between the individual objects is identical.

Alignment of objects and object groups requires a little practice. Try out the individual functions provided by ArCon using a simple example.

🔆 LAMPS ON/OFF

This button is active only when you have selected one or several self-illuminating objects (standard lamp, ceilings, table lamps, etc.). If no lamps are <u>selected</u>   or there are none at all in your project, this button is grayed out and has no function.

You can switch lamps on or off by clicking with the left mouse button on 🔆 or by choosing **Lamps on/off** from the **Edit** menu.

If you then switch to <u>night view</u> with 🌙 , then all rooms with their objects will be illuminated by these lamps. However, if you are in the day view , the button **Lamps on/off** has no influence on the appearance of the rooms in your project.

The brightness of the lamps is adjusted via the dialog box **<u>Brightness</u>**.

OPTIMAL COLOR PALETTE

This button appears only if you are operating Windows in color index mode; i.e., Windows uses only 256 colors or fewer. When Windows is operating in **High Color** or **True Colo**r mode, this button will not be shown.

If you are operating Windows in color index mode, ArCon reduces the colors for the computed images before displaying them. The method used, so-called dithering, is similar to the screening of images for a newspaper. It has the advantage that the computation is very quick. The result is that your images may appear somewhat grainy.

You are given the possibility by clicking on to compute the optimal color palette for a colored view. It is thus possible to achieve an acceptable output in terms of color quality, in spite of the 256 or fewer colors.

However, your current view will only be temporarily optimized. All other views and Windows application will appear "more colorful", as their color palettes no longer match the display.
You also have the possibility to use an optimal color palette when you save colored views to a file . This reduces the hard disk space required for saving an image by a factor of 3 with almost no loss in quality.

SPECIAL

Two features of ArCon will be described in the following section which you will only need to use if you have certain types of hardware connected to the PC on which you are running ArCon.

One special feature the ability to transmit ArCon-projects via e-mail using the mb-Mail Assistant, the other is the use of processors with MMX technology. Even if you have never used e-mail before, the term will certainly not be unfamiliar to you. With the help of the mb-Mail Assistant integrated in ArCon you can send ArCon projects to anywhere in the world, e.g. to your architect if you are building a house, or to a potential client if you are an estate agent. The use of MMX processors will probably possible from January 1997, when these processors will be generally available. ArCon already contains special code for these processors, by means of which a considerable increase in display speed can be achieved.

THE MB MAIL ASSISTANT

The Assistant assists you in transmitting your ArCon-project via e-mail. In order to be able to send e-mails, you need access to the Internet and have Microsoft Exchange correctly installed on your computer. You call up the mb-Mail Assistant by choosing **Send** from the **File** menu. Apart from sending your current project, you can also attach an accompanying letter to your e-mail or even draft a new letter from within the Assistant. To use this function, Microsoft Word for Windows 7.0 must be installed on your system. Operation of the Mail Assistant is divided into the five steps described in the following.

STEP 1 OF 5

This is merely an introductory window in which no input is required. Click on **Continue** to proceed with Step 2 of 5 or exit the Mail Assistant with **Cancel**.

STEP 2 OF 5

Here you select whether you wish to attach an accompanying letter to your project. If so, you check the box **Attach letter** and choose one of the options described in the following. If you do not intend to attach an accompanying letter, click on **Continue** to proceed with Step 5 of 5 or exit the Mail Assistant using the **Cancel** button.

THE OPTION ATTACH EXISTING FILE

If you select this option, a valid document name must be present in the **Name** field to be able to proceed. You have the possibility to enter this directly via the keyboard or to choose a filename with the help of a standard dialog box by clicking on the button **Browse...**. When you have entered a valid filename, you proceed to Step 5 of 5 by clicking on **Continue**.

THE OPTION PRODUCE NEW FILE

If you have selected this option, the **Continue** button will take you to Step 3 of 5. Please note that this option is only possible if Microsoft Word for Windows 7.0 is installed on your system.

STEP 3 OF 5

Here you select a document template with which Word for Windows is to be started. You can choose

between the Word Normal template and five **mb**-templates. Furthermore, you also decide on the ultimate name for your document in this step. You can enter this by clicking directly on the input field or enter it in a standard dialog box by clicking on the button **Change**.

Please note that you must save your accompanying letter in Word for Windows with the same document name as the one entered here. The Mail Assistant will otherwise not be able to recognize it.

STEP 4 OF 5

No input is required in this step. Information is merely displayed briefly explaining the further procedure. Once you have read the message, click on **Continue** and Word will be started automatically. When you have written and saved your accompanying letter, you must leave Word for Windows and will then be taken to Step 5 of 5. To correct the entries you made previously, click on the button **Back** and you will be returned to Step 3 of 5. By clicking on **Cancel** you can cancel the entire procedure and return to ArCon.

STEP 5 OF 5

In this step you are shown once again the files that are to be sent. These include the name   of your project file and, assuming you are attaching an accompanying letter, the corresponding document file name. If this information is correct, click on **Send**. This will start Microsoft Exchange and the documents displayed will be automatically attached to a new e-mail. Finally, you only need then to enter the e-mail address and your project will be sent as an e-mail by clicking on **Send**.

RUNNING ARCON ON PROCESSORS WITH MMX TECHNOLOGY

First introduced to the public in the spring of 1996, Intel's MMX technology has created the possibility to vastly increase the computational speed of three-dimensional graphics on standard processors. ArCon supports these latest-generation processors. Therefore, if you have installed a processor with MMX support in your computer, this will be used by ArCon. If you do not have an MMX processor, the relevant processor instructions will not be used.

The only difference that you will see when using an MMX processor is the speed advantage. This will be particularly noticeable when walking around your home. You can even determine whether the MMX processor instruction set is to be used for a certain view. If such a processor is installed in your computer, a button with the MMX symbol will appear at the far right of the second horizontal toolbar in the Design Mode.

If this button is depressed, ArCon will use MMX instructions, otherwise it will not. You can therefore decide for yourself whether the display should appear quickly or slowly and you can get an idea of the actual difference in speed produced from the use of an MMX processor. Please note that the MMX ability of your processor will only be used when images are computed in High Color mode. However, if you are using 32 bits per pixel, no MMX support is provided in the present version of ArCon.

Even when using MMX, the same premise applies: the smaller the images in the walkabout, the faster they will be generated on the screen. In contrast to image generation without MMX, however, it is practically irrelevant whether you use the view type or the view type

. Because
 produces the better results, you should always select this view type when using MMX processors.

WINDOWS

Placing of windows in ArCon conforms with the procedure used in Windows 95.

STANDARD DIALOG BOXES

The dialog boxes Load, Save, Print, Printer setup conform with the standard dialog boxes of Windows 95.

STANDARD DIALOG BOXES WITH PREVIEW FIELD

The dialog boxes for loading objects and loading texture have been updated to include a <u>preview window</u> to make selection simpler.

APPENDIX

KEY ASSIGNMENTS IN ARCON

Apart from the keys mentioned in the following table, you can also use the keys or key combinations you will find next to the menu items in the individual menus.

<u>Function keys</u>

F1	Help
F3	In the Construction Mode, temporary deactivation of snapping up until the next mouse click
F5	In the Construction Mode with the rule on: Switching between raised and lowered rule
F6	In the Construction Mode with the rule on: Switching between rule edge below and rule edge on top
F7	In the Construction Mode with the rule on: Parallel shift of the rule
F8	In the Construction Mode with rule on: Rotate rule by a relative angle
F9	In the Construction Mode with rule on: Rotate rule vertically to current direction
F10	In the Construction Mode with rule on: Set rule to horizontal position

Zoomen

Key **0**   Corresponds with the function **Show all**

Key **1**   Shift image section to bottom left

Key **2**   Shift image section down

Key **3**   Shift image section to bottom right

Key **4**   Shift image section left

Key **6**   Shift image section right

Key **7**   Shift image section to top left

Key **8**   Shift image section up

Key **9**   Shift image section to top right

Key **+**   Image section enlarged centrally

Key **-**   Image section reduced centrally

Key *****   Image section enlarged centrally around the

                 current mouse pointer position

Key **/**   Image section reduced centrally around the

                 current mouse pointer position

Cursor keys

In entry fields of dialog boxes

Arrow up   Increment value by 1

Arrow down Decrement value by 1

Page up   Increment value by 10

Page down Decrement value by 10

In all views, with the exception of the perspective view, both in the Construction Mode and in the Design Mode the cursor keys have the same function as the keys 4, 8, 2 and 6 on the numeric pad

In the perspective view, the cursor keys correspond with the four directions on the button .

<u>Special keys in the Construction Mode</u>

Ctrl-W   Swapping reference points of elements

                      or swapping between wall axis entry / left wall side entry/

                      right wall side entry

Ctrl-Q   Swapping between wall axis left / right wall side

                      for beginning of a wall just inserted

Ctrl-E   as Ctrl-Q or Ctrl-E, but for end of the wall just inserted

Ctrl-F   select next possible snap point

Special significance of the Ctrl and Shift keys

Ctrl

1. Prevents dialog boxes from opening

   in the Construction Mode

2. Extended input on moving walls

3. Moving objects in the Design Mode:

   Collision detection

4. During walkabout in the Design Mode:

   speeds up by a factor of 4

Shift

1. When inserting elements in the

   Construction Mode: extended input

2. During walkabout in the Design Mode:

   speeds up by a factor of 4

3. Selection of several objects

Ctrl/Shift

1. During walkabout in the Design Mode:

   speeds up by a factor of 4