Spaces Macro v1.1

(for DataCAD[1])

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Whilst it is free (or because of this), I would like and expect that if you can think of any improvements or spot any bugs (or even spelling or formatting errors in the documentation) that you would let me know. Your feedback will help with future development of the macro.

I do ask users to register the software. A nag screen will appear occasionally prompting you to register and providing a link to the registration page. You can prevent this nag screen reappearing by either clicking on the registration link or checking the 'Do not show this message again' checkbox on the nag screen before cancelling out of it. There is no compulsion to register (and it is easy enough to stop the nag screen without actually registering), but registration is free and will allow me to assess how many people are using the software (so I know whether it is worthwhile further developing the macro). If you register it will also allow me to email you specifically about this macro if required (e.g. when a new version with bug fixes and/or increased functionality is available). Registering the macro signifies your agreement to receive such emails.

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[1] DataCAD is a registered trademark of DATACAD LLC

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1. General Description

This macro is compatible with DataCAD version 17 onwards. It will allow you to create and report on spaces.

Each space is defined by a polyline(s)[2] and is assigned a user configurable label which can display information from both standard fields (such as the room number, name etc.), as well as from fields which the user can define themselves. Space details can be included in report(s) in the drawing, and can also be exported to or imported from Excel files[3].

Labels can be automatically updated when you modify a space in the macro or when you return to the macro after modifying spaces outside of the macro. In addition, a smaller SpaceRefresh macro is provided which can be used to quickly updated labels after spaces have been modified outside of the main Spaces macro.

Reports can be automatically updated whenever you add a new space, or refreshed with updated details of changed/deleted spaces when required (or optionally whenever the macro is invoked).

Spaces can be categorised, with new spaces able to inherit default properties (e.g. fill colour) from the category they are assigned to.

1.1 Compatibility, Cautions and Limitations

Although this macro has predominantly been tested with DataCAD version 21, I expect that it is fully compatible with versions back to DataCAD 17. It is *not* compatible with Spirit.

The macro *may* work with some earlier versions of DataCAD.

[2] The macro can produce polylines at either the Wall Surface, the Wall Center, or both. See section 7.8.1 for further information on this.

[3] You need to have Microsoft Excel installed on your computer to use the Excel Import/Export features.

2 Quick Start Guide

2.1 Create Your First Space

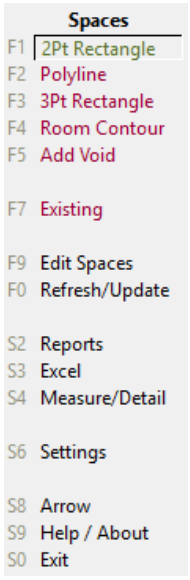


Fig 1 – Main Menu

When you invoke the macro you will see the main menu shown in Fig.1 at left. Select F1 2Pt Rectangle if it is not enabled[4].

Left click in the drawing area to select the first corner of a new space, and then drag out a rectangle and click on opposite corner to define the space rectangle. The Space Properties form will be displayed.

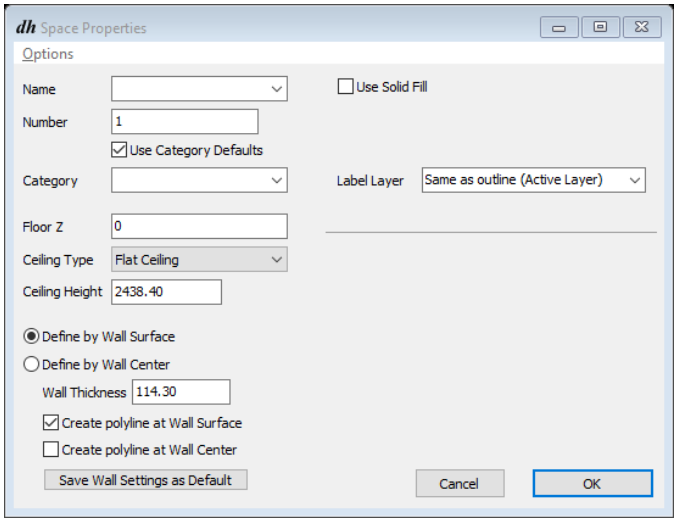


Fig 2 – Space Properties form

Type a name for your space into the Name field.

Optionally, tab to the Number field and change the default number.

Optionally, tab to the Category field and type in the name of a Category that you would like to assign this space to.

Complete any other optional fields that you wish to change, then press the <Enter> key to create the space[5].

Fig 3 – The Created Space

The space is shown in Fig 3 at left. It was created with a default label (the default text size and the units used for size and area in the label will depend on your current DataCAD Text Size and Scale Type settings).

[4] F1 2Pt Rectangle will be enabled by default the first time you use the macro. If you have used the macro previously other settings may have been saved. Throughout this Quick Start Guide I assume this is the first time the macro is being used, so you may need to change some of the settings if other non-default values have been previously saved.

[5] You can press the <Enter> key from most fields to finish input and create the space (you do not need to tab down to the OK button or use the mouse to click the button … although of course you can do that). Likewise, pressing <Esc> from any field has the same effect as clicking the Cancel button.

2.2 Change the Default Label Layout

Select S6 Settings from the macro's main menu to invoke the Settings form shown below. If necessary, click the 'Labels' tab to make it active.

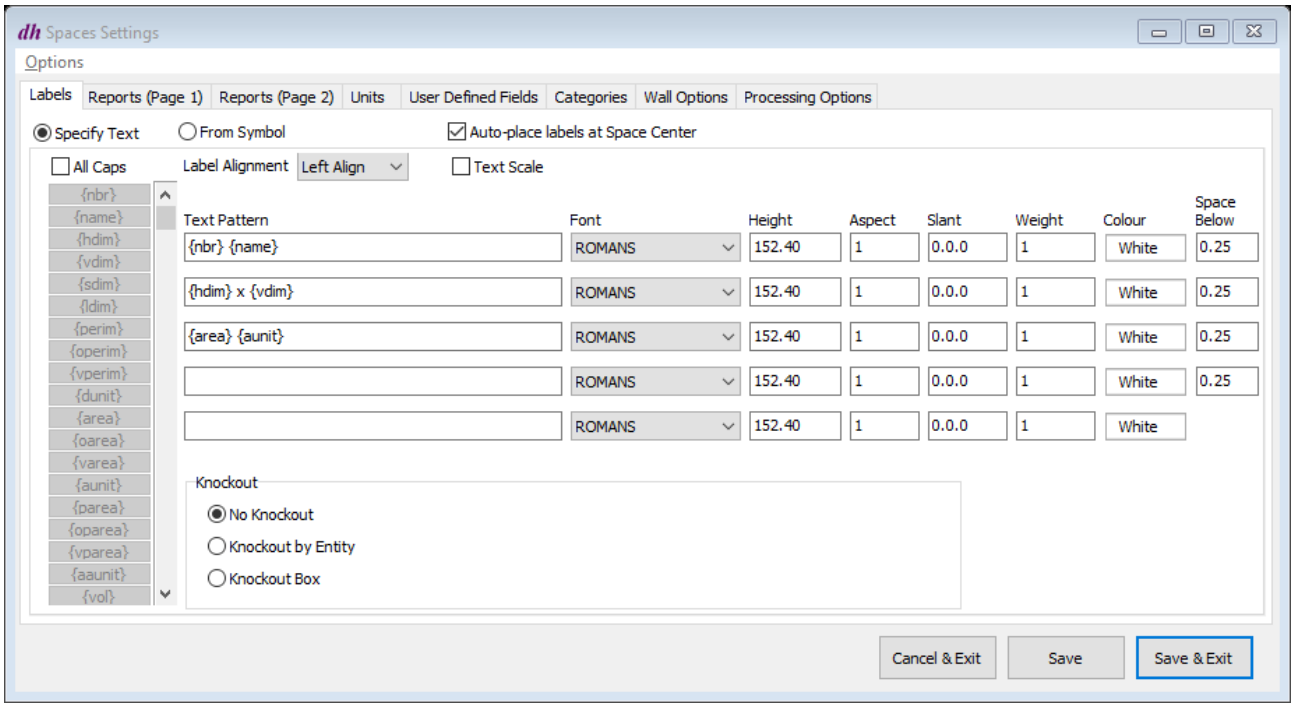


Fig 4 – Labels tab of the Spaces Settings form

The Text Pattern fields use 'tags' in curly braces to represent data fields. The available tags are shown on the buttons down the left side of the form.

Place your cursor in the first 'Text Pattern' field. Most of the tag buttons will now be enabled and can be used to add tags to the specified pattern.

You will see that the current text pattern entries correspond to the label of the space created in the previous step (section 2.1).

Make some changes to the text patterns. If a tag is inserted in upper case then the corresponding data will be inserted in upper case (checking the 'All Caps' checkbox near the top left of the form will change the buttons to be in upper case).

For the example I am changing Line 1 to '{nbr} – {NAME}', I'm leaving Line 2 & 3 unchanged, and adding a 4th line 'Perimeter: {perim}'.

Also make some changes to the text characteristics.

For the example I have changed the Line 1 font to be 'DataCAD (TTF)' and the height of Line 1 to 200 (my drawing has a millimetre scale type).
I've also changed the colour to Red, Brown, Yellow and Green for Lines 1 to 4 respectively, and in addition I've changed the Label Alignment to 'Center Align'.

Having made all the required changes press the <Enter> key (or click on the 'Save & Exit' button) to save the changes.

Select F0 Refresh/Update from the main menu to display the Refresh/Update menu.

Options F3 Update All Lbl , F4 Update Area Lbl and F5 Update One Lbl on the Refresh/Update menu can be used to an update a label(s) using the current text and pattern settings[6]. Select one of these options (and select an area or individual space if you selected F4 or F5 respectively). The label will be updated using the new settings:

Fig 5 – The space with updated label

The units used for dimensions and areas are based on the Scale Type setting in DataCAD. In Fig 5 the room dimensions and perimeter are displayed in millimetres and the area is displayed in square meters. If you are using an imperial scale then the dimensions will correspond to your actual scale type setting and the area will be in square feet.

You can change the units used on the 'Units' tab of the Spaces Settings form (S6 on the main menu – refer to section 7.5)

2.3 Creating and Using Custom Fields and Categories

2.3.1 Create a Custom Field

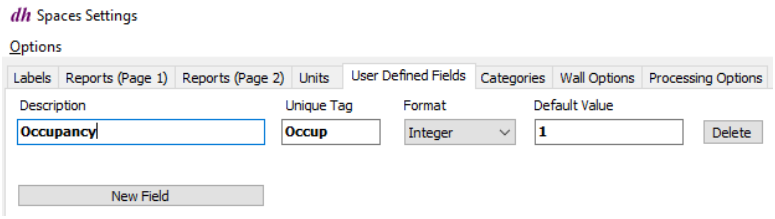


Fig 6 – User Defined Fields tab

Invoke the Spaces Settings form by selecting S6 Settings from the main menu, then go to the 'User Defined Fields' tab.

Click the 'New Field' button and a row of fields will appear as shown in Fig 6.

Enter details of your field according to the following rules:

Description is free format text up to 30 characters long

Unique Tag can be up to 6 characters long and defines the tag you will use to include this field in labels or reports. Ideally this will be an abbreviation that you will readily recognise. Do not use curly braces and do not use all capital letters.

Format can be any of the values in the drop-down list (Text, Integer, Decimal Number or Angle)

The Default Value will be used for new spaces unless you select something else, and it will also be used for any spaces that may have been created before you defined this field.

Press the 'Save' button and then go to the 'Categories' tab.

2.3.2 Create Categories

If you don't have any existing categories then the Category tab will show just a single empty input field.

Key in a name for your Category (I'm using 'Store Rooms' for the example shown in the screen shots) and then press the 'Add' button.

A number of fields will be shown below the input field. Click on the 'Solid Fill' checkbox to select it. A 'Fill Clr' button will appear. Click on the button to invoke DataCAD's Colour Picker and select a suitable colour (the colour

[6] F1 Refresh All Lbl can be used to refresh labels using the original text and pattern settings if a space has changed (this should not normally be necessary if the 'Auto Recalc Labels' setting is enabled in the Processing Options settings)

of the button will change to indicate the colour you have selected).

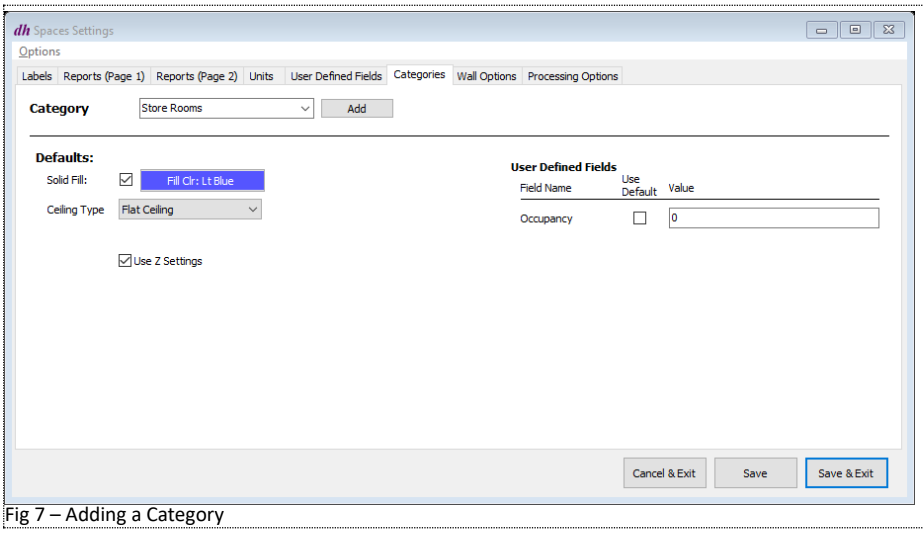


Fig 7 – Adding a Category

Note: DataCAD's Colour Picker allows you to choose one of the 255 colours from the active Colour Palette.
You can also choose a custom fill colour that is not in the Palette. To do so click on the Options menu at the top of the Space Settings form and select the 'Custom Fill Colours' option from that menu[7]. Now when you click on the 'Fill Clr' button a standard Windows Colour Picker will display.

Leave the Ceiling Type as 'Flat Ceiling' (it is the only option available in this version). If you want the ceiling of the space to be always a fixed distance above z-base then you can enter a height in the 'Ceiling Height' field. If you prefer to have the ceiling height determined by the z-hite setting at the time you create a space click on the 'Use Z Settings' checkbox as I have done in the screen in Fig 7.

You should see the field you just created listed on the right side of the Category tab. If you are happy for your category to use the default value then leave the 'Use Default' checkbox checked, otherwise uncheck the box and enter a default value for this category (I have entered 0 in the screen illustrated above).

Before you leave the Settings form have a look at some of the other tabs. If you want to change the units used for dimensions or areas you can do so on the 'Units' tab.

Once you are happy with all your settings, press the <Enter> key (or click on the 'Save & Exit' button).

2.3.3 Creating Spaces with a Category

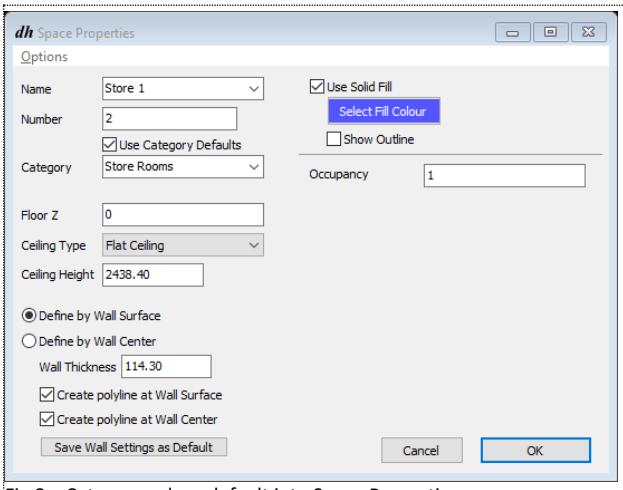


Fig 8 – Category values default into Space Properties

Return to the macro Main Menu and create another space (use F2 Polyline or F3 3Pt Rectangle options if you wish to create an irregular shaped room or a room that is not parallel to the x-axis).

When the 'Space Properties' form is displayed:
- Key in the required name
- The number will default based on an increment from the previous space but you can change it if you wish
- Leave the 'Use Category Defaults' box checked
- Select the category created in the previous step from the drop down list for Category.

As soon as you select the Category the Solid Fill settings and any User Defined fields will default based on the values you set up for the category.

Press <Enter> (or click the 'OK' button) to finish creating the space.

[7] The 'Custom Fill Colours' option determines which colour picker is displayed. It has no effect on already selected colours.

2.4 Reports

Select S2 Reports from the main menu. The Reports menu will be displayed.

2.4.1 Summary Report

Select S8 Summary Rpt from the Reports menu. The Summary Report form shown at right will be displayed.
Change the Category Selection to 'Uncategorised'. Details of the first space we created (in section 2.1) will be displayed (because we did not assign a category to it).
The drop down list for Category should also include an entry for the Category you created in section 2.3.2. Select this entry and details of the space created in section 2.3.3 will be shown.
If you created both spaces on the same active layer (and if that is still the active layer) then changing to the 'On Layers' or 'Active Layer' tabs will not cause any change. If the spaces are on different layers (or not on the active layer) then you would notice appropriate changes as you change tabs.

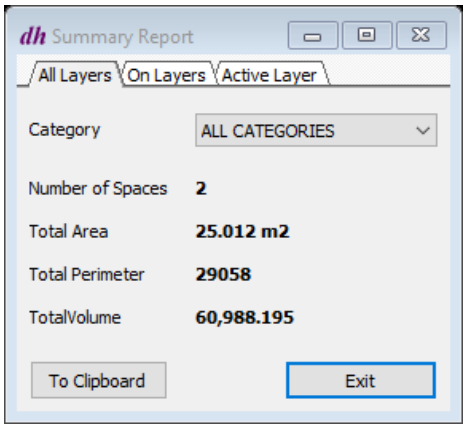


Fig 9 – Summary Report

Note that the summary report is not placed onto the drawing. If you click the 'To Clipboard' button the details will be copied to the Windows Clipboard and can be pasted into the drawing (or any other document or spreadsheet) if required.

2.4.2 Create a Detail Report

On the Reports menu try the various selection options (the selected spaces will be highlighted as you select each option): F1 Active Layer will select all spaces on the currently active layer, F2 On Layers selects all spaces on 'On' layers, F3 All Layers will report on all spaces (including layers that are currently off), and F4 Area(s) allows you to include and or exclude spaces by selecting rectangular areas..

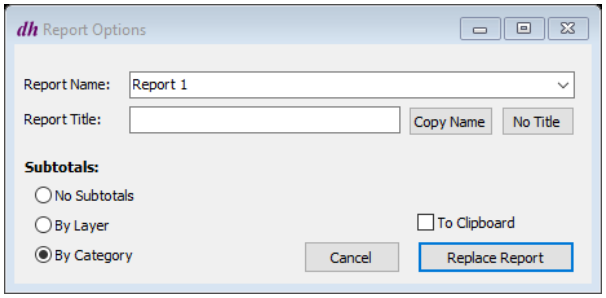


Fig 10 - Report Options

Select F2 On Layers, then press F8 Create Report.

The Report Options form shown in Fig 10 will be displayed. Each Report is given a unique name. The name cannot be blank, but you can change it from the default if you wish.

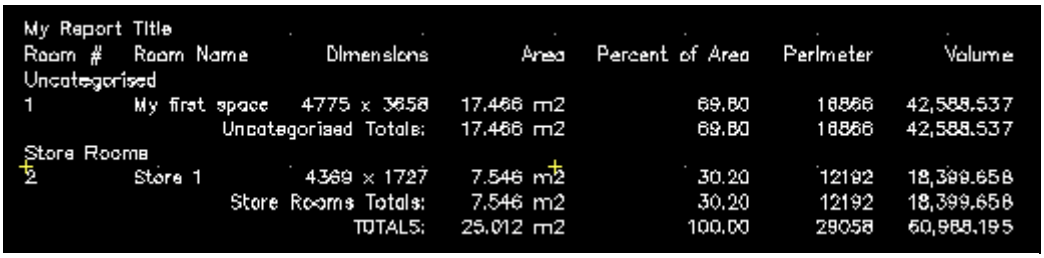
The Report Title it will be placed at the top of the report if it is not blank. You can leave it blank, copy the Report Name, or enter a different value as desired.

Select the 'By Category' radio button to produce sub-totals by Category.

The report will always be placed on the drawing. Check the 'To Clipboard' checkbox if you would like it to also be copied to the Windows Clipboard.

Click the 'Create New Report' button to create the report. A rectangle showing the size of the report will be attached to your cursor. Drag it to the required position and left click to place the report on your drawing.

The report will be added to the drawing. The report based on the 2 spaces I created (in steps 2.1 and 2.3.3) is shown in Fig 11 below:



My Report Title

Room #	Room Name	Dimensions	Area	Percent of Area	Perimeter	Volume
Uncategorised						
1	My first space	4775 x 3658	17.466 m2	69.80	16866	42,588.537
	Uncategorised Totals:		17.466 m2	69.80	16866	42,588.537
Store Rooms						
2	Store 1	4369 x 1727	7.546 m2	30.20	12192	18,399.658
	Store Rooms Totals:		7.546 m2	30.20	12192	18,399.658
	TOTALS:		25.012 m2	100.00	29058	60,988.195

Fig 11 - A basic report

The report is produced using a default layout and the current text settings.
We will update this in the next step.

2.4.3 Change Detail Report Format & Layout

Select S6 Settings to invoke the settings form, and then go to the 'Reports (Page 1)' tab. The settings on this tab control the data that is included in each column of the report as well as the left/right/center alignment of the columns. The data layout uses the same tags as the label layout you used in Section 2.2 and you will notice that the current (default) layout matches the report we created in the previous step.

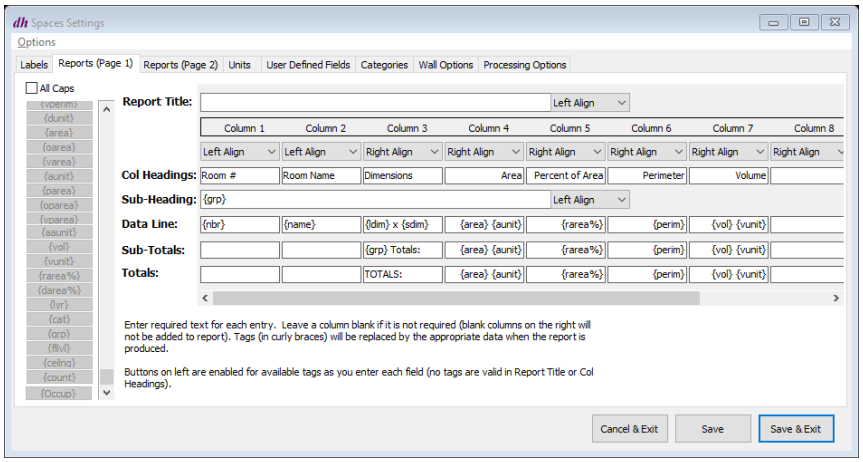


Fig 12 - Reports Data Layout

As you place your cursor in each field the available tag buttons on the left side of the form are enabled.

You may need to scroll down or resize the form to see all the available tag buttons.

At the bottom of the buttons you will see one that corresponds to the custom field that we added in section 2.3.1.

We are going to insert a column to display this new field.

Click on the heading text that says 'Column 5'. A popup menu will display as shown in Fig 13. Select 'Insert' from this menu: The data in columns 5, 6, and 7 will be moved to columns 6, 7, & 8 respectively.

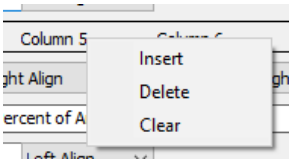


Fig 13 - Column Menu

Type an appropriate entry into the Col Heading field for Column 5, then move your cursor to the Data Line field for this column. The tag button for your custom field will be enabled. Click it to add the tag in this field.

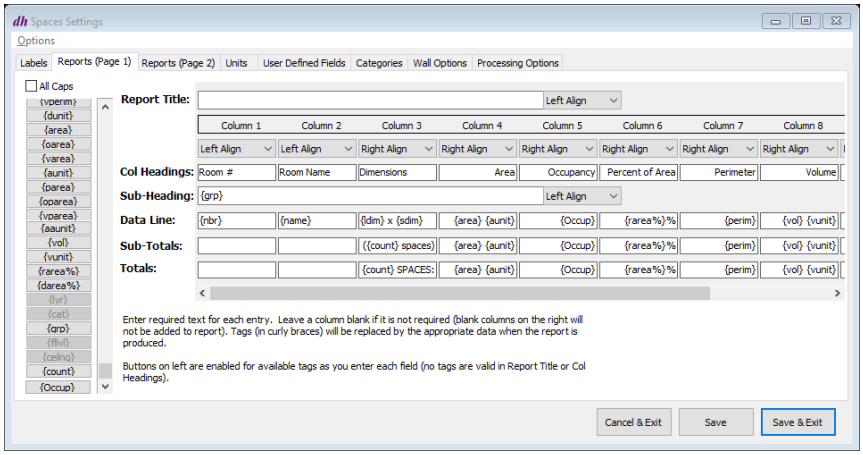


Fig 14 - Report Layout with column inserted and some other changes

Move your cursor to the Sub-Totals field for Column 5. If you chose 'Text' format for your custom field in section 2.3.1 then the tag button for your field will be disabled. If you chose one of the other formats then click the tag button to add it to the Sub-Totals field for this column, then move to the Totals field and do the same.

Make any other desired changes to the layout. In the example I have added a

percent symbol after the tags in column 6. I have also added a '{count}' tag to column 3 for Sub-Totals and Totals (you cannot see the full text in Fig 13, but I have changed column 3 for the Sub-Totals to '{grp} Totals ({count} spaces):' and for Totals I have changed it to 'TOTALS FOR {count} SPACES:').

Move to the 'Reports (Page 2)' tab. This tab is used to specify the font[8] and text style for each type of report line. On this tab you can also specify a specific layer to create reports on, and whether to draw lines around the report columns and rows.

Make any required changes to the font and style of each line. The 'Space Above' and 'Space Below'[9] settings control the spacing between lines (they are specified as a multiple of the text size for the line and you may need to experiment a bit as the results can vary quite a bit depending on the font).

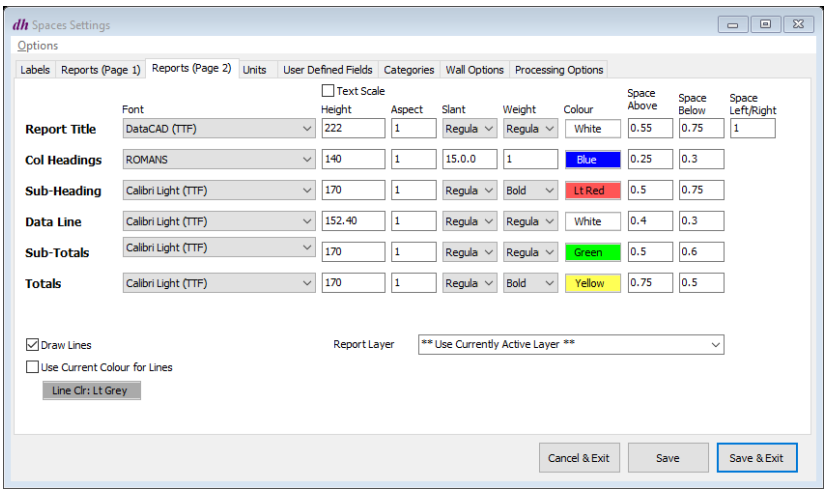


Fig 15 - Reports (Page 2) after I have made some changes

'Space Left/Right' specifies the spacing between columns[10] specified as a multiple of the Report Title text size.

If you wish the macro to draw lines between the columns and rows check the 'Draw Lines' checkbox. The 'Use Current Colour for Lines' checkbox and 'Line Clr' button will then be visible and you can set these as required.

In the example I have also changed the Dimensions Units for Reports from 'Current Scale Type' to 'Millimeter' so that commas will be inserted in the numbers (the macro's millimeter scale type will include commas, but DataCAD's millimeter scale type does not).

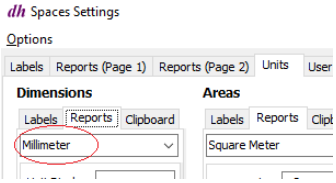


Fig 16 - Dimension Units Setting

Once you have made all your required changes to the settings, press the 'Save & Exit' button. When you have returned to the Report Menu, select F9 Rebuild All. The existing report will be replaced using your new settings. The report produced with the settings I have shown in the examples is shown below:

My First Report

Room #	Room Name	Dimensions	Area	Occupancy	Percent of Area	Perimeter	Volume
Uncategorised							
1	My first space	4,775 x 3,658	17.466 m2	1	69.80%	16,866	42,588.537
	Uncategorised Totals (1 spaces):		17.466 m2	1	69.80%	16,866	42,588.537
Store Rooms							
2	Store 1	4,369 x 1,727	7.546 m2	0	30.20%	12,192	18,399.658
	Store Rooms Totals (1 spaces):		7.546 m2	0	30.20%	12,192	18,399.658
	TOTALS FOR 2 SPACES:		25.012 m2	1	100.00%	29,058	60,988.195

Fig 17 - Report Produced with updated format settings

[8] Note that fonts are displayed in alphabetic order in the drop-down lists. You can choose to have either TTF or SHX fonts listed first by clicking the 'Options' menu at the very top left of the form, then choose the 'Font Order' option.

[9] The space between rows will be the sum of the 'Space Below' for the row above and the 'Space Above' for the row below. It may seem superfluous to specify this in 2 parts, but if lines are drawn between rows then the position of the line is determined by these induvial values.

[10] The space between columns will be double the Space Left/Right setting. If lines are drawn between the columns then the line will be positioned by the Space Left/Right setting from the text on either side.

2.4.4 Updating Reports

Create another Space, then go to the Reports menu (S2 from the main menu) and select F8 Create Report *without selecting any spaces (i.e. do not select any of the* F1 *through* F4 *options)*.

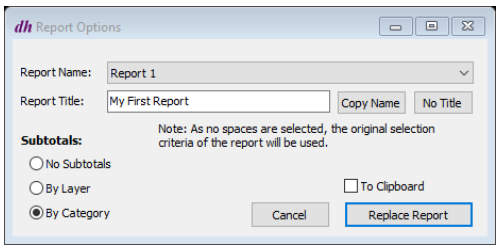


Fig 18 - Report Options with no selection made

The Report Options form will be displayed as shown in Fig 18. Ensure the correct report is selected (if you have created multiple reports) and then press the 'Replace Report' button.

The existing report will be replaced with one that includes the newly created space. You could also have selected F9 Rebuild All to update the report and it would have had the same effect (since you only have 1 report).

Invoke the Settings form (S6 from either the main menu or the Reports menu) and go to the 'Processing Options' tab.

Check the 'Add to Reports when adding spaces' checkbox as shown in Fig 19 then Save & Exit.

Create another space. The report will now be automatically updated as soon as the space is created.

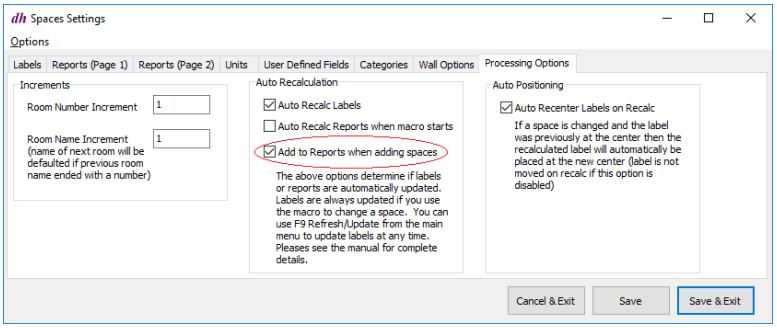


Fig 19 - Processing Options

The updating of the report in these circumstances works because we specified to report 'On Layers' when we create the report in section 2.4.2, and because we are adding spaces to one of the layers that was on at the time we created it. If we had chosen 'All Layers' then spaces added to any layer would be updated to the report, and if we had chosen 'Active Layer' then only spaces added to the layer that was current at the time would be added.

If we had selected spaces by Area for the report then new spaces will NOT be added to it unless we do a new selection for the report (i.e. specify a selection on the Reports menu, then select F8 Create Report and select the existing report in the Report Options dialog).

2.5 Excel Interface

The macro can export data directly to an Excel[11] Spreadsheet, or import space definitions from an Excel spreadsheet. Excel is automatically invoked for these functions (you can NOT use this functionality unless Excel is installed on the same computer that is running DataCAD).

Select S3 Excel from the main menu to access the Excel Menu.

2.5.1 Exporting to Excel

The Excel functionality is quite separate from the report functionality, and a different method is used to map data to the spreadsheet columns and to select the spaces to export.

[11] Excel is a registered trademark of Microsoft Corporation

You can specify a different data map each time you export, but it is recommended that you create a default mapping as shown below. You can then then use the default or change it each time you do an export.

2.5.1.1 Excel Defaults

Select S8 Defaults from the macro's Excel menu. A form will be displayed with the following options:

Template File.

This field is optional. It is used to specify a template file that will be used as the basis of export. You could use the template file for example to specify column widths or formats, or to include fixed data such as column headings in them file.

Rows to leave above exported data.

You can enter a non-zero number here to specify the spreadsheet row where the exported data will start. For example, if you specified a template file that had headings in row 1 the you could specify to leave 1 row above the exported data (if you specified zero then the headings would be overwritten by the exported data).

Column Mapping.

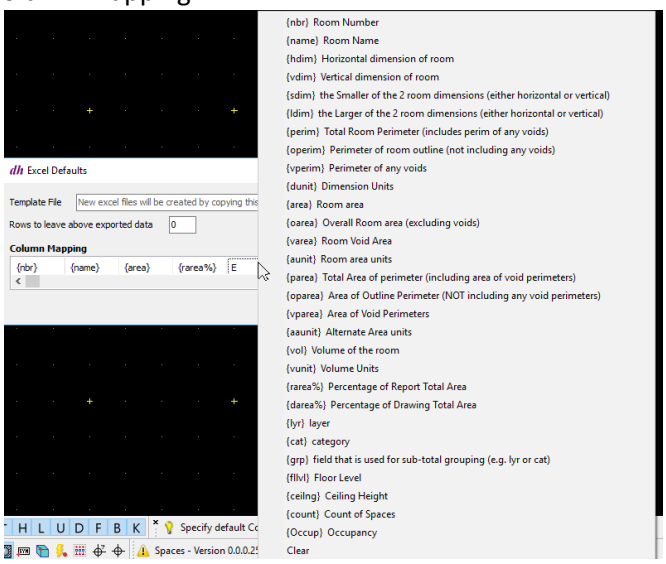


Fig 20 - Column Mapping

Each data field used by the macro can be mapped to a spreadsheet column. For each column that you wish to export data to ('A', 'B', 'C' etc.), click on the column and a menu will display from which you can choose the data field that will be mapped to that column.
This is illustrated in Fig 20 where I have specified fields for the first 4 columns ('A' – 'D') and the menu is showing for column 'E'.

Once you are happy with the column mapping click on the 'OK' button.

2.5.1.2 Process the Export

Select F3 Export from the macro's Excel menu. The form shown in Fig 21 will be displayed.

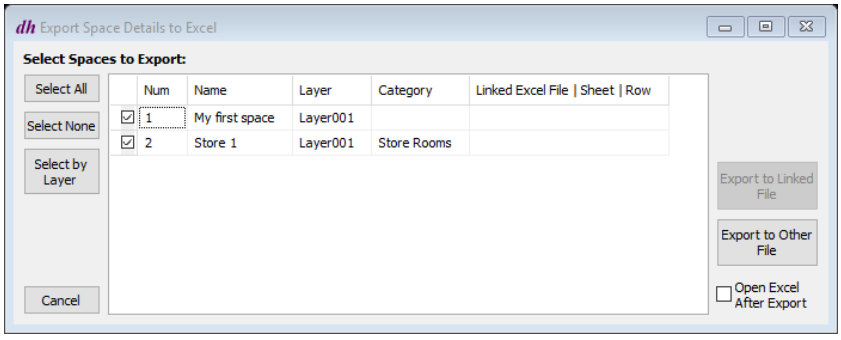


Fig 21 - Excel Export Form

All rooms will be selected for export by default (as indicated by the checkboxes at the start of each line).

You can check/uncheck each line individually if required or use one of the 'Select All', 'Select None', 'Select by Layer' buttons.

Check the 'Open Excel After Export' checkbox and then click the 'Export to Other File' button.

You will be prompted to specify the name and location of the file to export to. This can be either an existing or new file. Enter appropriate details then then click the 'Open' button.

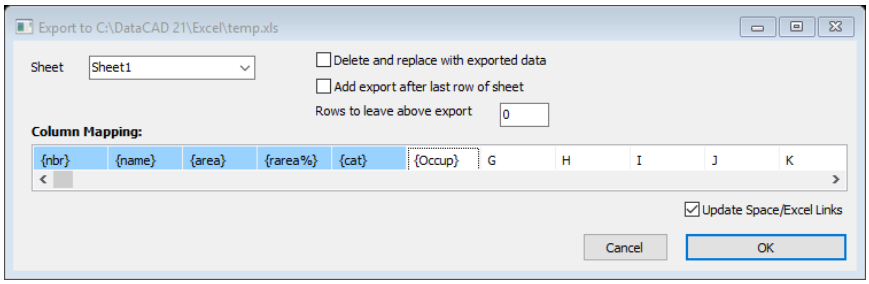


Fig 22 - Column Mapping Form

A column mapping form will be displayed with entries based on the defaults that you set up in section 2.5.1.1.
You can change any of the values as required for this particular export. For the example I am adding 2 additional mappings: {Cat} for column E, and {Occup} for column F.

Check the 'Update Space/Excel Links' checkbox and then click the 'OK' button. There may be a small delay, but an Excel window will open on your computer with the specified export file. Note that Spaces macro does not attempt to format the spreadsheet, so you may need to adjust column widths and the like (you can specify a default template file to add formatting – see section 2.5.1.1 above) .

Units used for distances, areas and volumes in the spreadsheet will be the units specified for the Clipboard in the macro settings, but number formatting specified for the clipboard is not used for the Excel Export (for the clipboard the macro exports everything as text, but when exporting to Excel numeric values are exported as numbers and it is up to you to apply the appropriate formatting such as rounding or the number of decimal places in the Excel spreadsheet).

As we checked the 'Update Space/Excel Links' checkbox, the selected spaces are now linked to the spreadsheet. You can see this by again selecting F3 Export from the macro's Excel menu. You will see that the last column on the form now has details of the linked spreadsheet as shown below:

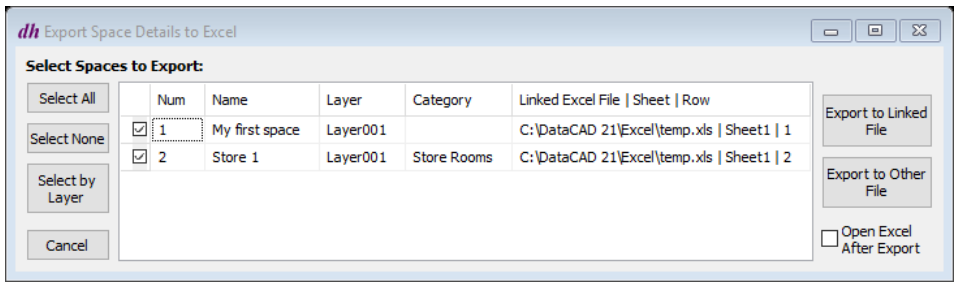


Fig 23 - Export Form showing Linked File information

The last column now shows the Spreadsheet file name, the sheet name, and the row to which this space's data has been exported.

The 'Export to Linked File' button is now also enabled.

Selecting the 'Export to Linked File' button will automatically update the appropriate spreadsheet cells without the need for you to specify the file name etc. This works even if selected spaces are linked to different files.

2.5.2 Importing From Excel

The macro can also Import space definitions from an Excel Spreadsheet.

An example of a spreadsheet you could import from is the file 'SpacesExample.xlsx' which is included in the zip file you installed the macro from. We will use this example in the exercise below:

Select F1 Import from the macro's Excel menu. A file open dialog will be displayed. Navigate to your macros folder, select the 'SpacesExample.xlsx' file, and then click the 'Open' button. The macro will display a form similar to that shown in Fig 24 below.

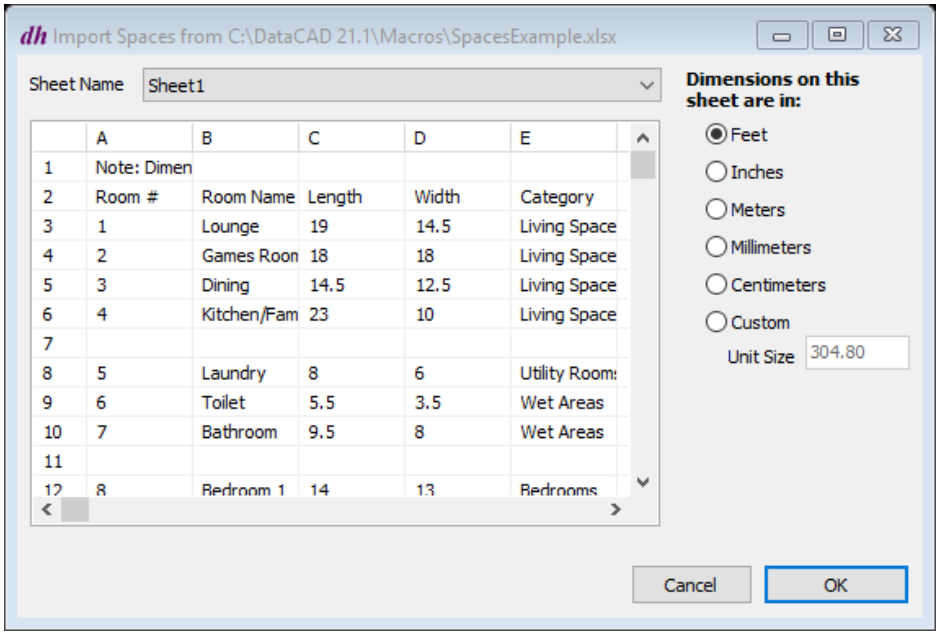


Fig 24 - Excel Import Selection Form

The dimensions in the example spreadsheet are in feet, so it is important that you select the 'Feet' radio button (regardless of the scale type used in your drawing).

You will also need to specify column mapping. Do this by clicking on the column headings ('A', 'B', 'C' etc.) and choosing the appropriate field from the pop-up menu. In addition to the fields that are available for import, the pop-up menu contains fields that you can specify for export to the spreadsheet. Fig 25 shows the form after I have specified some column mappings.

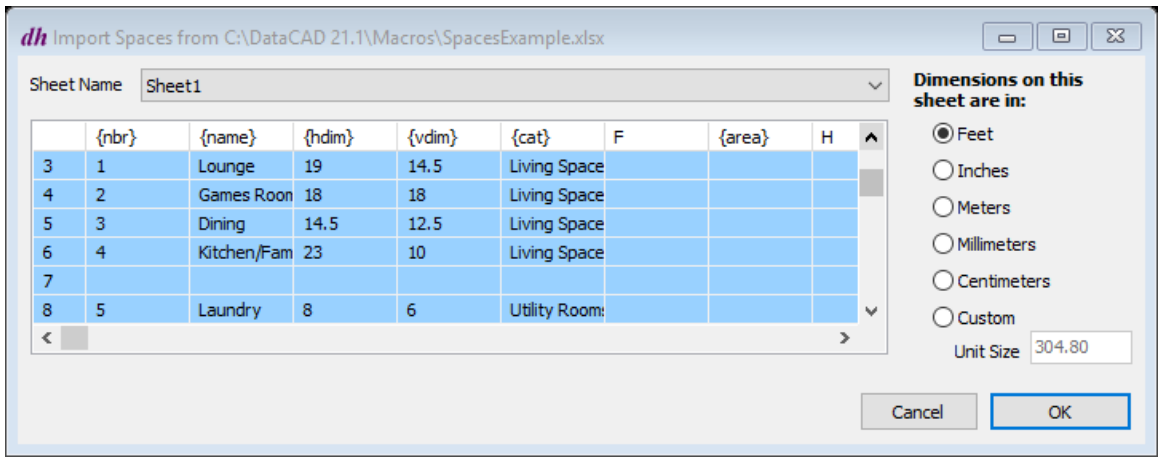


Fig 25 - Excel Import Selection Form with Column Mapping specified and spaces selected

The final step before processing the import is to select the spaces you wish to include. Click on the first row you wish to include, and then Shift/Click on the last row. The selected rows will be highlighted as shown in Fig 25. You can include blank rows or rows with other data in the selection as the macro will ignore any selected rows without valid data when doing the import.

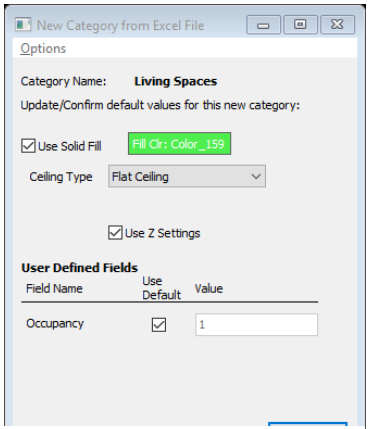


Fig 26 – Import Category Information

Press the 'OK' button to import the selected spaces into your drawing.

As this spreadsheet contains a column that is mapped to the Category field, the macro will ask you to enter some details for each new category.

Once all the required category information is entered, the spaces will be created in a straight line starting at the bottom left of your DataCAD drawing window. You can then move the spaces around to arrange them as you want.

3 The Main Menu

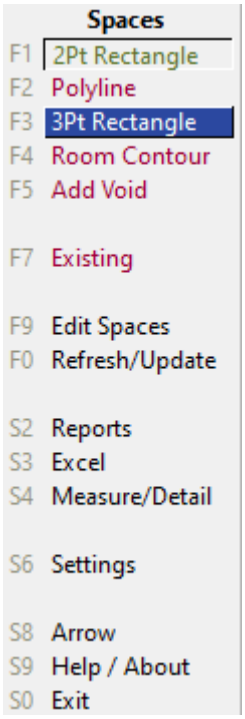


Fig 27 - Main Menu

The main menu is displayed when you first invoke the macro. The various options available are explained below

3.1 Input Modes

The options on the F1 through F7 function keys are mutually exclusive. The option selected determines what happens when you select a point in the drawing:

3.1.1 2Pt Rectangle

Select this option to define new rectangular spaces by selecting 2 diagonally opposite points.

3.1.2 Polyline

Select this option to define spaces using the standard DataCAD Polyline interface. This can include curved as well as straight sides. (Note that this standard interface includes 'Closed' and 'Covered' options – you can select or unselect these options but they have no effect on the space created.)

3.1.3 3Pt Rectangle

This option allows you to create a rectangle or parallelogram space by defining the first side by selecting 2 points, and then selecting a point to define the space corner that is opposite the second point selected.

The 3Pt Rectangle option is primarily useful for defining rectangular spaces that are not parallel to the axis. After defining the first side the snap grid angle is rotated to be parallel to that side (it is reset to the original angle after you complete the space or if you cancel the space entry).

3.1.4 Room Contour

This option allows you to create a space from existing 2d lines on your drawing. The idea is that you can click on a 2d wall on an existing plan and the macro will attempt to trace around the wall, skipping over any door or window openings etc.

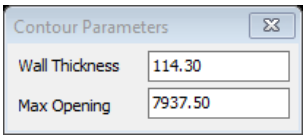


Fig 28 - Contour Parameters

When you select this option a small Contour Parameters form is displayed. The macro uses the entered 'Wall Thickness' to avoid tracing down wall caps at window and door openings etc. The 'Max Opening' parameter is used in the logic that traces over openings (to limit the distance that it searches when looking for the wall at the other side of the opening).

The 'Room Contour' options can also be used to create a space from existing lines that do not close (e.g. if the lines define 3 sides of a rectangle), but you should note that the logic looks for quite specific conditions and may not work as expected in all circumstances. I would welcome any feedback on this functionality as these may be scope to improve it in future versions of the macro.

3.1.5 Add Void

Use this option to add a void to an existing space. (Note that the macro uses its own void functionality and may not recognise voids that are created using the standard DataCAD void functionality.)

Once you select the space that you wish to add a void to you can define the void by selecting an existing polyline. Note that if the space you selected had fill then it may be necessary to refresh the display (Esc key) to redraw the polyline you wish to select.

3.1.6 Existing

Use this option to select an existing polyline to convert to a space.

3.2 Edit Spaces

Select this option to display the macro's Edit menu described in section 4.

3.3 Refresh/Update

The Refresh/Update menu is described in section 5. Use these options to update space labels (e.g. if the space has changed or if you wish to change the label layout.

This menu also allows you to show or hide the space polylines.

3.4 Excel

The Excel menu options allow you to Import or Export space data to or from an Excel spreadsheet. Note that the macro interacts with the version of Excel installed on your computer to perform these functions: **The functions will not work if Excel is not installed**.

The process of importing or exporting from/to Excel spreadsheets is covered in reasonable detail in section 2.5 of these instructions. Please refer to that section.

3.5 Measure/Detail

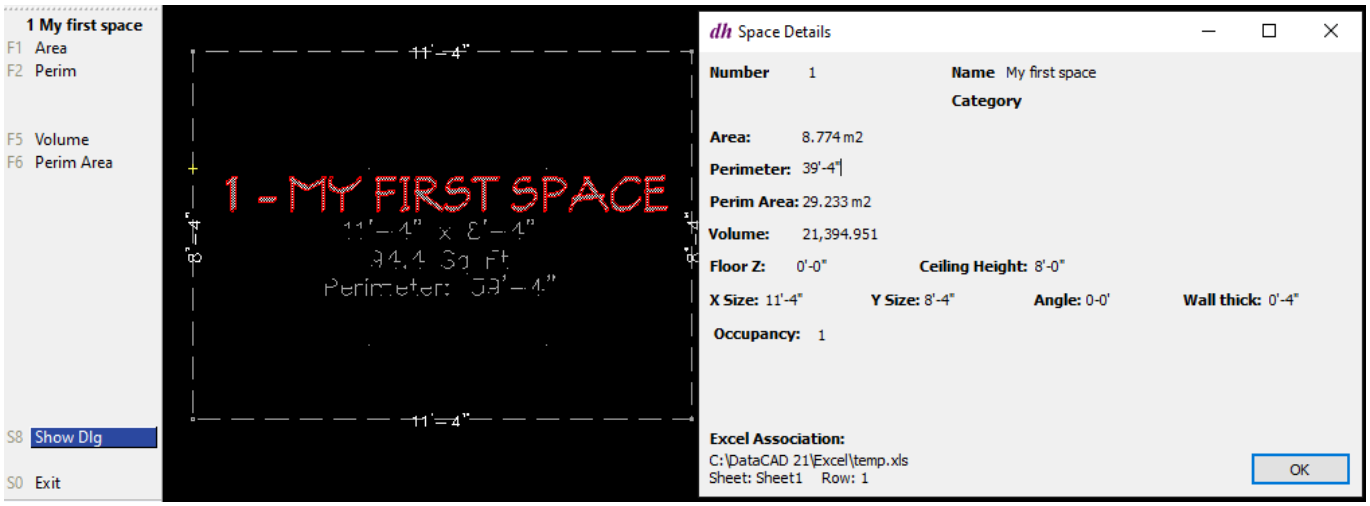


Fig 29 - Measure/Detail Display

Select S4 Measure/Detail and then click on a space to display detailed information.

If S8 Show Dlg is enabled then Space Details will be displayed in a dialog box as shown to the right of Fig 29. Note that although you cannot change any of the numbers on this form, you can use the cursor to select individual entries and then use Ctrl/C to copy the selected information to the clipboard.

Area, Perimeter and Volume of the space will be displayed in DataCAD's message area, and the space will be highlighted with the length of each side displayed as shown to the left in Fig 37. (Note: if the Space Details dialog is displayed then the side lengths may not be displayed until that dialog is closed.)

You will need to close the Space Details form (if it is displayed) before using the function keys (F1, F2, F5, F6) to copy various preset pieces of information to the keyboard (as indicated by the function key labels). Hover your mouse over the function key to see exactly what will be copied to the clipboard by selecting that option.

3.6 Settings

Select S6 Settings from the main menu to display the Space Settings form. If you don't see the form after selecting this option then please check if it has opened behind other windows. DataCAD will be unresponsive until you exit the settings form.
The various settings options are described in section 7.

3.7 Arrows

Select S6 Arrow from the main menu to display the Arrows menu. The macro allows you to draw arrows similar to DataCADs standard arrows (not smart arrows), with the additional feature of various options for curved leaders.

3.8 Help/About

Selecting this option will display a panel showing the version of the macro (in the top left corner) , some copyright information, and a button to display this instruction manual (at the bottom center). It also has links to the dhsoftware.com.au web site and to the contribute page (it is expected that you will contribute towards the cost of developing and distribution of the macro if you find it useful).

4 EDIT MENU

Fig 30 - The Edit Menu

All the options F1 through S6 on the Edit menu are functions are performed directly from this menu: Enable an option and then select the Space you wish to perform that action on.

Option S8 Copy Dist/Lyr invokes a separate menu.

Always use the Copy functions (F2, S8) in this menu when copying Spaces. For other editing functionality you can use these functions, but you can also use the standard DataCAD functionality to move, rotate, stretch or edit the Spaces polylines if that is more convenient (noting that if you edit Spaces outside of the macro then Labels will not be updated until you return to the macro.

4.1 MOVE (DRAG)

Use this option to drag a Space to a new location. Note that the drag 'handle' will be the point that you select the space by (so if you wish to drag the space by a corner for example then you should snap to that corner when selecting).

While dragging the space you can also optionally rotate it by 90° by pressing the F4 key (this will rotate the space, leaving the label at its original orientation).
You can also use function keys to change the grid origin and snap size whilst dragging.

4.2 COPY (DRAG)

The functionality is the same as the Move (drag) command described above except that the original space remains and a copy is created which is dragged to the new position.

4.3 DYNAMIC ROTATE

This option allows you to dynamically rotate a Selected Space. The space will be rotated about the point you selected it by, although for rectangular spaces that are parallel to the X and Y axis you can select one of the corners as the rotation center after selecting it using the F7 through F0 buttons.

If you select a space that is not already parallel to the X or Y axis then this option also displays an F6 Straighten option which will automatically rotate the space so that the first straight side is parallel to the X axis.

You can also select S6 Key Angle to specify a precise angle to rotate the space by.

4.4 ROTATE 90

Use this option to rotate a selected space by 90° in an anti-clockwise direction. The space is rotated about the point you select it by (so if you wish to rotate it about a corner you should snap to that corner to select the space).

4.5 MOVE/ROT LABEL

In addition to allowing you to drag a label to a new position (and left-click to place it), this option allows you to use the following options:

F1 To Centroid will move the label to the centroid of the space and then return to the Edit Menu.

F4 Rotate by 90 rotates the label by 90° and remains in the move/rot function so that you can both move and rotate the label in a single operation. If you just wish to rotate the label without moving it then right-click (or press S0) after pressing F4.

F5 Rotate by … Allows you to key an angle to rotate the label by and remains in the move/rot function so that you can both move and rotate the label in a single operation.

F6 Rotate To … Allows you to key an angle to rotate the label to. Like the above functions it remains in the move/rot function so that you can both move and rotate the label in a single operation.

F7 Horizontal and F8 Vertical are used to orient the label horizontally or vertically respectively. Like the above functions the move/rot function remains active so that you can both move and rotate the label in a single operation.

4.6 Change Size

This option can be used to change the size of a rectangular space by keying new X and Y dimensions.

4.7 Fold Corner

Use this option to move a corner and the connect it to the adjoining sides by a new sides which are at right angles to the existing sides. Fig 31 below illustrates the effect of folding the bottom left corner of the spaces illustrated.

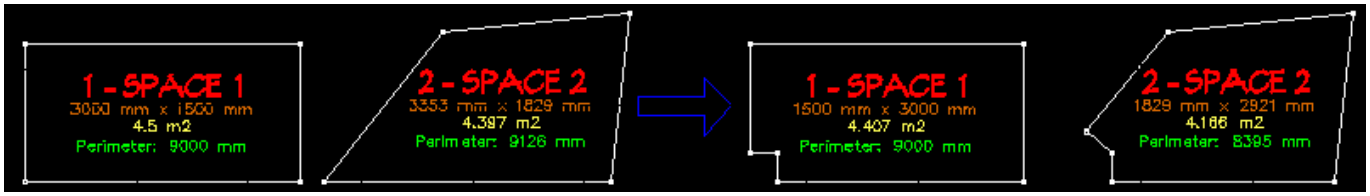


Fig 31 - Fold Corner Examples

4.8 Delete Corner

Use this option to remove a vertex from a space outline. Where the side following the deleted vertex (in a clockwise direction) is curved then the 2 adjoining sides will be replaced with a new curved side. In all other cases they will be replaced by a new straight side.

4.9 Add Corner

Select a point on an existing side and drag it to a new position to insert a new vertex in a space outline. If you pick a point on a curved side then the new side inserted before the selected point (in a clockwise direction) will be straight and the side following the new point will be curved.

4.10 Del Void

Use this option to remove a void from an existing space. Note that the macro uses its own void processing and that Spaces voids are not compatible with normal polyline voids.

4.11 Details

This option will display the Space Properties form to allow you change details such as room name and number as well as the value of any user defined fields and fill properties of the space.
Note: Always use the macro's Edit functionality to change Space Names or Number. Do *not* use the standard

DataCAD change text functionality to change the name, number etc. in space labels as the macro may automatically change it back to the original values.

4.12 ReNumber

When you select a space with this option enabled you will be prompted to enter a Starting Number. The selected space will be renumbered and you then select subsequent spaces which will automatically be renumbered by incrementing that number (by the Room Number Increment specified in the macro Settings).

4.13 Copy Dist/Lyr

Fig 32 - Copy Options

When you select this option you will be prompted to either select the first point of the distance to copy, or else select one of the options as shown in Fig 32 at left.

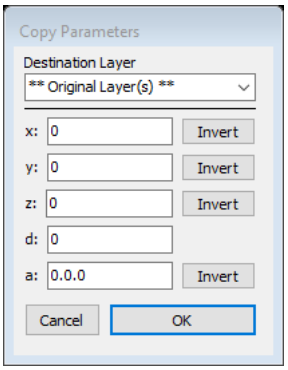


Fig 33 - Copy Parameters

If you select any of the options S1 through S7 the Copy Parameters form shown in Fig 33 will be displayed. The cursor will initially be in the appropriate field of the form (depending on which function key you pressed), but you can move the cursor and alter any combination of fields as desired.

Once you have specified the distance to copy (or the layer to copy to) you can select to copy a single space (which will copy both the outline/fill and any label entities) or to copy by area (note that to select spaces by area the entire outline must be within the area selected – the associated label entities will be copied even if they are not within the specified area).

5 Refresh/Update Menu

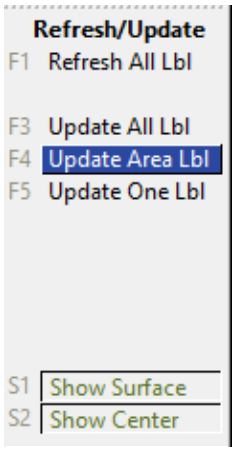


Fig 34 - Refresh/Update Menu

Use this option to refresh or update space labels. You can also control the visibility of the space outlines from this option.

5.1 Refresh All Lbl

Refreshing the labels updates their text if the space has changed since being created or previously refreshed. Refreshing does not change the text size or label format[12] (even if you have changed the label definition since creating the space). Refreshing may change the label position if the label was previously at the centroid of the space and the 'Auto Recenter Labels on Recalc' is enabled (see section 7.9.3).

The 'Auto Refresh Lablels' setting is enabled by default, so in most cases[13] you will not need to use this Refresh All Lbl option. (unless you have disabled this option, see section 7.9.2).

[12] Although the label format is not changed, individual elements of the label may change if you have changed related DataCAD settings (e.g. if you specify to use 'Current Scale Type' as the units for label dimensions and then change DataCAD's Scale Type setting then dimensions in labels will be updated to use the new scale type by a refresh).

[13] The 'Auto Refresh Labels' logic checks a number of parameters, and only refreshes each label if one of these has changed. The parameters include the space's area, perimeter length, and overall x, y and z dimensions. This avoids the overhead of a complete recalculation for each auto refresh, but occasionally you may need to use this 'Refresh All Lbl' option. (e.g. where a space polyline has been moved but the label has not been moved: If the label was previously at the centroid of the space (and 'Auto Recenter' option was enabled) then the Auto Refresh will not move the label, but the label would be recentered if you select the 'Refresh All Lbl' option).
You could also to a Manual Refresh to update dimensions to a new format if you had changed a DataCAD setting such as described in footnote 12 above.

Note that labels can also be refreshed using the standalone SpaceRefresh macro that is provided as part of the macro installation (see section 9).

5.2 Update All Lbl

This option will not only update the label text of every space label, but if the label format has changed since the last update then it will also re-format the label according to the new specification. All labels in the drawing will be updated.

5.3 Update Area Lbl

This option allows you to select the spaces to have their labels updated by area. Note that the entire outline of a space must be included in the selected area if its label is to be updated (the label itself need not be included in the area if it is located outside the space outline).

5.4 Update One Lbl

This option allows the label for just a single space to be updated. Select any entity associated with the space to update the label.

5.5 Show Surface / Show Center

The macro can create up to 2 'outlines' for each space. The normal usage is to create a polyline on the inside wall surface of each space (this is the default when you first install the macro), but you can also create a polyline at the wall center (see section 7.8).

Both of these polylines can be either visible or 'invisible'. When invisible dots are displayed on your screen at the vertices but the dots do not print.

Use options S1 Show Surface and S2 Show Center to control the visibility of each type of outline. If one (or both) of these options are disabled then all appropriate space outlines in the drawing will bee 'invisible'. Note that the selected setting applies to all spaces in the drawing … it is not possible to apply different visibility settings to individual spaces.

6 REPORTS

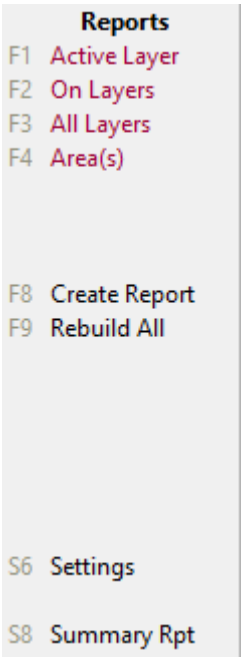


Fig 35 - Reports Menu

The reports menu allows you to create new reports or to update existing reports. Reports can be copied to the clipboard (and then subsequently pasted elsewhere), but if you wish to export data to an Excel Spreadsheet you may be better served by using the Excel Export option detailed in section 3.5 below.

Additionally, the S8 Summary Rpt option will display a summary report on screen. The summary report is not added to the drawing, although it may be copied to the clipboard (and the text subsequently pasted into the drawing or elsewhere).

Multiple reports can be created, and a report name is assigned to each one. Note that section 2.4 of this manual also works through various examples of report creation.

6.1 CREATE A NEW REPORT

To create a new report select one of the options F1 through F4 and then select F8 Create Rpt. If you selected F4 Area(s) then you also need to select 1 or more rectangular areas to include in the report[14] before proceeding to select F8 Create Rpt.

(Note that selecting F8 Create Report without enabling one of the F1 through F4 options will allow you update an existing report, but not to create a new report.)

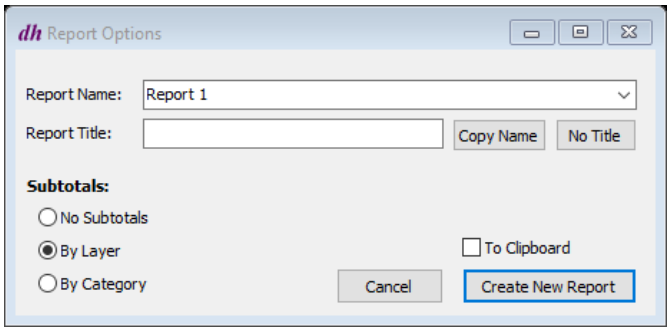


Fig 36 - Report Options

Once you select F8 to create a report the Report Options illustrated in Fig 36 will be displayed with a default name, and the title will be defaulted to the value set in the 'Reports (Page 1)' tab of the macro settings (see section 7.3). You can leave the default title or delete of change it to a new value.

You can select to have no subtotals in the report, or to subtotal by either Layer or Category be selecting the appropriate radio button.

You can also select to have the report text copied to the clipboard by checking the 'To Clipboard' checkbox (the clipboard setting will be cleared each time you create a report).

Note that the format of the report (text font and size etc., spacing between columns and rows and whether or not lines are added between columns and rows) is controlled by the Settings accessible from F6 Settings (see section 7.3.1).

6.2 UPDATE AN EXISTING REPORT

You can update reports in 2 ways as detailed below.

[14] The Area(s) option allows you to pick multiple rectangular areas to include in the report. To select a space it's complete outline must be within the selected area. Once one or more spaces have been selected an F5 Rem Area option will appear and you can select that to remove some of the selected spaces.

6.2.1 Rebuild All

The most convenient is to update all reports in the drawing by simply selecting the F9 Rebuild All option from the Reports menu. All reports in the drawing will be updated with any changed or added spaces as appropriate.

The macro decides which spaces are appropriate to be added to a report based on the original selection criteria for the report:

- If a report was produced for 'Active Layer' then any spaces that are now on the layer that was active when the report was produced will be included in the updated report (any spaces that have been moved from that layer since the report was produced will no longer be included).
- If a report was produced for 'On Layers' then any spaces that are now on the layers that were On when the report was produced will be included in the updated report (any spaces that have been moved from those layers since the report was produced will no longer be included).
- If a report was produced for 'All Layers' then all spaces in the drawing will be included in the updated report.
- If a report was produced for 'Area(s)' then the report will include only the spaces that were included in the original report. (The macro keeps track of the spaces that were in the area at the time the report was produced and not of the actual bounding box(es) selected at the time.)

Note that each report is anchored at its top left corner. If extra spaces are included in the updated report then it will be expanded downwards. Likewise, if the width of the report increases then it will expand to the right.

6.2.2 Update an Individual Report

You can select F8 Create Report to update an existing report. Before clicking this option ensure that the appropriate report selection criteria is selected: If one of the options F1 through F4 is active then the report will be redefined using that selection; if none of those options are active then the report will be rebuilt using its original selection criteria (as described in section 3.4.2.1 above).

When the Report Options form is displayed (as shown in Fig 35), you can select the existing report name that you wish to rebuild. If an existing report is selected then the 'Create Report' button will change to a 'Rebuid Report' button. The rebuilt report will be anchored at the original top left corner of the report as described in section 3.4.2.1 above.

6.3 Summary Report

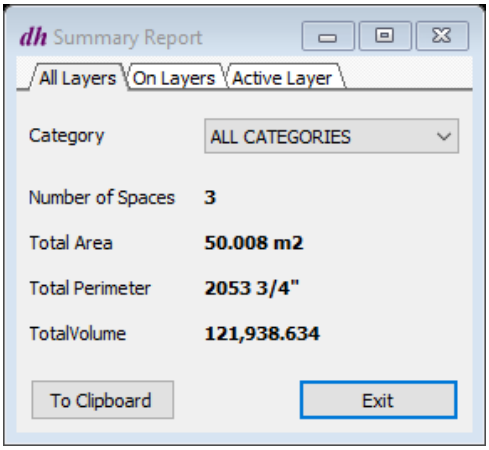


Fig 37 - Summary Report

A sample Summary Report is illustrated in Fig 37 at left.

The report is displayed only, and not added to the drawing (although you can copy the results to the Windows Clipboard)

Use the Category drop-down list to select to report all categories, one particular category, or only uncategorised spaces.

The different tabs allow you to report on various layer selections as indicated by the captions on each tab.

The units used for each of the reported criteria are as set for 'Clipboard' on the 'Units' tab of the macro Settings Form (see section 7.5).

6.4 SETTINGS

The settings option on the Reports menu displays the exact same settings form as the settings option on the main menu. Refer to section 7.

7 SETTINGS OPTIONS

The Settings form has several tabs allowing you to configure various aspects of the macro. In addition, there is a top menu with just the one 'Options' item.

When you select 'Save' (or 'Save and Exit') on the settings form all settings are saved (not just those that you have changed).

Most settings[15] are saved both to the drawing and to an ini file. When settings are being read by the macro it looks at the drawing file first and only looks at the ini file if the setting does not exist in the drawing. If you use the macro to save settings in your default file then obviously those settings will exist in new drawings, but if new drawings do not contain any settings then they will get settings from the ini file which will effectively be the settings that you have most recently saved in any other drawing.

7.1 OPTIONS MENU

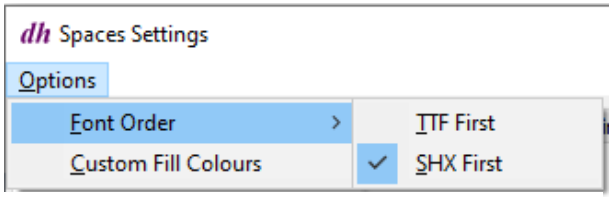


Fig 38 - Options Menu

The options menu contains just a couple of items in this version. Note that options that are set on this menu will be retained even if you Cancel out of the settings form (whereas entries made on the various tabs of the form will be lost if you cancel).

Font Order specifies the order that fonts will be displayed in the drop-down font lists on the 'Labels' and 'Report (Page 2)' tabs.

If 'TTF First' is enabled then TTF fonts will be displayed at the top of the list, followed by SHX fonts (each in alphabetic order).
If 'SHX First' is selected then SHX fonts will be displayed at the top of the list.
If neither option is selected then fonts will be displayed in alphabetic order regardless of the font type.

Custom Fill Colours is applicable to the colour dialog that will be displayed if you select the Fill Colour button anywhere in the macro (such as when adding or editing a Category on the Categories tab of this form, but it also applies to the Space Properties form). This setting effects the dialog that is displayed for choosing fill colour – it has no effect on fill colours that have already been selected. If 'Custom Fill Colours' is enabled then a standard Windows Colour Picker form will be displayed, if it is disabled then the DataCAD Colour Palette will be displayed. This setting has no effect on font colours (which must always be specified using the DataCAD Palette).

[15] There are a few settings that are not saved to both the drawing and ini file:
Items in the 'Options' menu are saved to the ini file only (and are saved immediately you change them, not by the Save button).
User Field Definitions are saved to the Drawing File only.

7.2 LABELS TAB

Vastly different options are displayed on this tab depending on whether the 'Specify Text' or 'From Symbol' radio button is selected. In both cases the 'Auto-place labels at Space Center' checkbox control whether the labels are automatically placed at the center of newly created spaces (if not enabled then you will always be prompted to manually place the label).

7.2.1 Specify Text

This option allows you to specify up to 5 lines of text.

You can also specify various details of the font for each line as well as the spacing of the lines (the space below each line is specified as a multiple of the text size for that line).

7.2.1.1 All Caps

If you enable the 'All Caps' option then any tags that you add using the buttons on the left side of the form will be added in all capital letters. The effect of this is that the associated data will be converted to Upper Case when added to the label.

Note that this does NOT change the underlying data (e.g. if you enter a Space Name of 'Office 1' and use a tag of '{NAME}' in the label definition then the label will use capitalised text (i.e. 'OFFICE 1') for that item, but if you use a tag of '{name}' in the report definition (or if you export data to Excel) then the name will display without capitalisation (i.e. 'Office 1') in the report or exported data.
If you want the name or number to always be in upper case then you should enter it in upper case in the Space Properties form ('Name ALL CAPS' and 'Number ALL CAPS' options are available on that form).

7.2.1.2 Label Alignment

This option allows you to set the alignment of the label text (either left, center, or right aligned). The setting applies to every line of the label.

If you wish more control over the alignment and relative placement of each label line then you may consider defining the label using a symbol (see Section 3.7.2.2 below).

7.2.1.3 Text Scale

This option is the same as the Text Scale option in DataCAD's standard text menu. If this option is enabled then text sizes on this form represent the final printed size of the text at the current text scale; if it is not enabled then the text sizes on this form are in absolute dimensions of the text.

7.2.1.4 Text Pattern

For each line you can specify a Text Pattern using fixed text as well as tags recognised by the macro (refer to section 8 – Tags). You can either type the tags from the keyboard, or use the buttons on the left side of the form to add tags (the buttons for the available tags will be enabled as your cursor enters each field). Avoid using opening and closing braces ('{', '}') in the fixed text as these characters are used to delimit tags.

7.2.1.5 Font

You can select from any of the available TTF or SHX fonts for each line. A drop-down list of fonts is displayed as you enter the field. The Font Order option described in Section 3.7.1 controls the order the fonts are listed in.

7.2.1.6 Height

Enter the font height for each line. If the Text Scale setting is enabled then this represents the printed size of the font at the current print scale, otherwise it is the absolute size of the text in the drawing.

7.2.1.7 Aspect

You can specify a different aspect ratio for each text line in the label.

7.2.1.8 Slant

For TTF fonts you can choose between 'Regular' or 'Italic'. For SHX fonts you can specify the slant angle for each line.

7.2.1.9 Weight

For TTF fonts you can select either 'Regular' or 'Bold'. For SHX fonts you can select the line weight to be used for each line.
Note: Line Weight Display must be enabled in DataCAD for the weight of SHX fonts to display/print.

7.2.1.10 Colour

Specify the pen colour for each line of the label text. For TTF fonts this colour will be used for both fill and outline of the text characters (If you wish to use different colours for fill and outline then consider specifying the label using a Symbol (see Section 3.7.2.2 below).

7.2.1.11 Space Below

Use this field to adjust the spacing between lines. It is specified as a multiple of the text height of the current line.

7.2.1.12 Knockout

The knockout options allow you to specify a couple of different ways that text knockouts can be implemented in the text labels.

If you choose 'Knockout by Entity' the knockout is enabled for each text line of the label in the usual way. The 'Border', 'X enlargement' and 'Y Enlargement' settings will work in the same way as the corresponding settings in the standard DataCAD knockout settings

If you choose 'Knockout Box' then a rectangular polyline with knockout will be created around the text and the text entities will be placed in front of that box. Note that various datacad settings including compatibility mode and the layers the entities are on will impact the way these knockouts do (or don't) work (there are several discussions of knockouts on the DataCAD Forum such as this post).
For 'Knockout Box' specify a margin size rather then enlargement factors (which I personally find more useful as the typical text entity is much longer than it is high so if you use the same enlargement factor for X & Y you end up with a much bigger margin at the ends of the text than above or below it).

7.2.2 From Symbol

This option allows you to choose a symbol file to use as a template for space labels. The symbol you create for this may contain various entity types, but should contain text that includes the required tags recognised by the macro (see section 8 – Tags). These tags must be in the actual text in the symbol (do not use symbol attribute text[16]).

Note that although all entity types can be used in these symbols, *it is recommended that you do not use polylines*. Although polylines will perform as expected in this version, it is planned to introduce special functionality for

[16] There are a number of reasons the symbol logic has been implemented to use actual text rather than text attributes; the main one is that the macro caters for stacked fractions in labels, and stacked fractions use multiple entities for a single line of text whereas a text attribute represents just a single text entity.

polylines in a future version[17] which may cause polylines in symbols to behave differently in future versions of the macro.

The symbol you select will be used as a template for the label; it will still be added to the drawing as discreet entities.

7.3 Reports (Page 1) Tab

This tab is used to specify the fields and text that will be included for each column of the reports. The text for each field is specified in a similar manner to the text for each line of the label as described in section 3.7.2.1.4 above. Refer to section 8 for a description of the available text tags.

7.3.1 Alignment

This tab also allows you to specify the alignment (left, center, or right) of the various items in the report. Alignment can be specified separately for the report heading, for column data, and for sub-headings.

7.4 Reports (Page 2) Tab

This tab is used to specify various formatting options for each type of line contained in the report.

Text Scale, Font, Height, Aspect, Slant, Weight and Colour are as described for the corresponding fields on the Labels tab as described in section 3.7.2.1 above. Other items are as described below:

7.4.1 Space Above / Space Below

Space Above and Space Below are used to define the spacing between lines of the report, and are defined as a multiple of text height for each line type.

For example, given the following settings:
Report Title Text Height = 8”
Report Title Space Below = 0.75
Col Headings Text Height = 4”
Col Headings Space Above = 0.25
The space between the bottom of the report title and the top of the col heading text will be 7” (being 0.75 x 8” plus 0.25 x 4”).

The reason that the spacing between the lines is specified in 2 parts is that if you choose the have 2d lines drawn between the lines of text in the report the 2d line will be placed at the appropriate position (e.g. in the above example the line would be drawn 6” below the bottom of the report title text and 1” above the top of the column heading text.

Note that the ‘top’ and ‘bottom’ of the text may not always be exactly where you think it is, depending on the font being used. For example the descenders of lower case letters in most fonts will be below what is being referred to as the ‘bottom’ of the text. Depending on the font being used some trial and error may initially be required to get a spacing that you are happy with.

7.4.2 Space Left/Right

This field occurs in the Report Title row only, but applies to all rows and specifies the minimum space to the left and right of the text in each column. It is specified as a multiple of the height specified for the report title text (even if you leave the actual title blank).

[17] It is planned to automatically stretch polylines according to the varying dimensions of text entities in a future version

The width of each column is variable depending on the maximum width of text in that column: The actual width will be the maximum text width plus twice the specified left/right spacing, and the minimum spacing between text in adjacent columns will be double the specified spacing (the spacing to the right of the column to the left, plus the spacing to the left of the column on the right).

7.4.3 Draw Lines

If you check the Draw Lines option the macro will draw 2d lines around the outside of the report and also between each row and column of the report.

The positioning of the lines is determined according to the space specified above and below each line and the space to the left and right of each column as detailed above.

The pen colour used for the lines will be the current colour if the 'Use Current Colour for Lines" box is checked. If that box is not checked then the current colour for the layer the report is being created on will be used, otherwise a 'Line Clr' button is displayed so that you can select the desired colour for the lines.

7.4.4 Report Layer

You can specify to have reports created on the currently active layer (at the time the report is created), or you can specify a specific layer where all reports will be created.

This field provides a drop-down list of the existing layers in the drawing, but you can enter a new layer if desired (that new layer will not be created straight away, but if the specified layer does not exist when you create a report the layer will be created at that stage).

7.5 Units Tab

This tab allows you to specify the units that will be used for the various measurements made and reported by the macro.

Different units can be specified for different destinations (Labels, Reports, Clipboard), but as it is considered likely that you will want the same units for each of these both reports and clipboard settings contain a 'Same as Labels' option that will be the default when you first install the macro.
An example of where you might want different units would be if you specified 'Feet/Inches' for dimensions and were planning to copy data to the clipboard to be pasted into a spreadsheet: you may want to specify 'Decimal Feet' with no unit display for the clipboard setting as the spreadsheet may not recognise the formatted feet/inches text as a number (although if you are using Excel then you may wish to use the Excel Export option instead of the clipboard as it always exports numbers rather than text).

Note that the actual units set for the Clipboard setting will also be used if you use the Excel Export option, but that values exported to Excel are exported as numbers and so ignore the Units Display and Rounding options (you should use Excel itself to set rounding and display formats).

7.5.1 Dimensions

The dimensions setting will be used to format text that replaces standard tags such as {hdim}, {vdim}, {sdim}, {ldim}, {sdim}, {fllvl} & {ceiling}. It will also be used for any user defined fields where you specify the format as 'distance'.

Most of the options are fairly self-explanatory, but notes are provided below on a some of those options:

7.5.1.1 Current Scale Type

This tells the macro to use DataCAD's inbuilt formatting routines to format any distances, so is dependent on the Scale Type settings you have configured in DataCAD.
If the configured scale type has Stacked Fractions enabled then the macro will use stacked fractions when formatting label text, but the macro does not use stacked fractions for reports or when copying data to the clipboard.

7.5.1.2 Feet/Inches (rounded)

Displays feet and inches only (with no fractions of an inch). You can choose to have the rounded up or down or to the nearest inch.

7.5.1.3 Decimal Feet

The distance will be formatted as a decimal number of feet. You can choose the unit display (e.g. you might choose "ft" or the single quote foot symbol (')).

You can choose how rounding will be performed (round down, to nearest, or round up) as well as the number of decimal places to round to (0 to 9).

The 'Remove trailing zeros after decimal point' option determines whether or not all the decimal places will always be displayed (e.g. if rounding to 2 decimal places resulted in a value of 2.30 then this would be displayed as '2.3' if this options was selected, or as '2.30' if this option was not selected).

7.5.1.4 Meters, Centimeter, Millimeter

These options all allow the specified metric unit to be used. The rounding and formatting options are similar to those described above for decimal feet.

7.5.1.5 Custom

This option allows you to specify any unit that you desire. You specify the required unit size (e.g. if you wanted distances to be displayed in yards then you would enter a unit size of 3 feet). You can also specify the Unit Display (e.g. you might choose 'Yrd' or 'yards'), the usual rounding options, and whether you wanted fractions or decimal numbers displayed.

7.5.2 Areas

The settings here are used for floor areas ({area} tag. They may also be used for wall areas ({parea}, {oparea}, {vparea} tags) or user defined fields depending on the settings chosen for 'Alternate Areas'.

Although the actual options are obviously different, the various settings work in much the same way as described for Dimensions above.

7.5.3 Volumes

Although the actual options are obviously different, the various settings for volumes work in much the same way as described for Dimensions above.

7.5.4 Alternate Areas

The options available here are similar to those for the Areas setting, but you can choose to have these settings used for different types of areas. For example, you may wish to use 'Squares' for floor area but to use 'Square Feet' for wall areas.

You can choose to use these settings for Wall Areas ({parea}, {oparea}, {vparea} tags) and/or for user defined fields. Note that the form includes options for windows, doors and ceilings but these are not implemented in this version of the macro (choosing those options will have no effect).

7.6 User Defined Fields Tab

Use this tab to define your own fields that can be included in Labels and Reports as well as imported from or exported to Excel files.

7.6.1 Description

Enter a brief description of your field (up to 30 characters).

7.6.2 Unique Tag

The tag can be a maximum of 6 characters only and must be unique. The value you select can be used in label and report formats. Do not include curly braces ('{', '}') in your tag.

It is recommended that you include at least some lower case letters in the tag. If the tag is entirely upper case then associated data will always be converted to upper case in labels and reports.

Note that once you have created a User Field definition you will not be able to change the tag.

7.6.3 Format

You can specify your field to be one of the following types of data:

Text: A text field can hold free format text of up to 25 characters long.
Integer: Used for whole numbers (no fractions or decimal places).
Decimal Num: Used for any number, typically with some decimal places.
Distance: Used for distances. Values are entered using the normal entry for the current scale type specified in DataCAD, but are reported using the Distance Units specified in the macro.
Angle: Used for angles. If your DataCAD Angle Type is 'Dec. Degrees' then angles are input as decimal degrees; for all other angle settings the Default Value is entered using DataCAD's normal Deg.Min.Sec format.
Area: Based on the current DataCAD ScaleType setting, the area is in either square feet (for 'Arch.', 'Eng.', 'Decimal', 'Inch/Frac.', and 'Inch/Decimal' scale types) or square meters (for other scale types).

Note that once you have created a custom field you will not be able to change the format.

7.6.4 Default Value

The default value you specify will be used as an initial value each time you create a space (unless you modify the default for a particular category … see Section 7.7).

Any spaces created before the creation of the User Defined Field will report this value. You can change the default value if you wish, but bear in mind the following:

- When a space is created the current default value is assigned to that space unless you specify a different value. Changing the default value will not change the value of existing spaces that were created after the Used Defined Field was created.
- If you Edit a space (using Edit Spaces / Details), whatever value is shown for the User Defined fields will be assigned to that space (whether it is the default or some value you have entered). Changing the default value will not change the value of any existing space that has been edited since the User Defined Field was declared.
- If a space was created before the User Defined Field existed *and* has not subsequently been edited since the creation of the Field, then changing the default value will change the value reported for that space.

7.7 CATEGORIES TAB

Categories can be created in various ways. You can create a category simply by typing an entry in the Category field when you create a space. But you can also create a new category using this tab. The advantage of using the functionality on this tab is that it allows you to assign some default properties to spaces that are created using the category.

The dropdown list attached to the Category input field at the top of this tab will list any existing categories. Choose one of those values to edit an existing category, or type in a new category name.

If you select one of the existing categories then its properties will be displayed in the bottom part of the form. Press the 'Edit' button to enable editing and updating of those existing values. Note that any defaults that are changed will not impact any existing spaces assigned to the category; any new spaces created will default to the new values for that category.

If you enter a new category then you will need to press the 'Add' button to display the fields that allow you to specify default values for the category.

7.8 WALL OPTIONS TAB

7.8.1 Defining Spaces by Wall Surface or by Wall Center

By default the macro allows you to define spaces by specifying points that are assumed to represent actual inside wall surface of the space. Thus if you define a space using the '2Pt Rectangle' method and pick a 2nd point that is offset 10' vertically and 15' horizontally from the first point, the space will have the an area of 150 sq ft and a perimeter or 50'. This is the behaviour when the 'Define Spaces by Wall Surface' radio button is selected.

If you select the 'Define Spaces by Wall Center' option then the actual space will be defined as being inside the polygon you define by half the wall thickness. You define the thickness by entering the appropriate distance in the 'Wall Thickness field'. So if you specified a wall thickness of 5" in the above example the wall surfaces of the space would be 2½" inside the rectangle you defined and the space would have an area of approximately 139 ¾ sq ft and a perimeter of 48' 4".

7.8.2 Creating the Wall Surface and/or the Wall Center polylines

You can choose to create either 'wall surface' and 'wall center' polylines by checking both the appropriate checkboxes. You can select to create both surface and center polylines. You cannot disable both checkboxes (as soon as you deselect one of them the other will automatically be selected)

In all cases you can select which of the created polylines will be visible (see below).

7.8.3 Polyline Visibility

Select both 'Wall Surface Polylines are Visible' and 'Wall Center Polylines are Visible' buttons if you want all the created polylines to be visible (these options control visibility of created polylines, the do not control which lines are created).

Note that the option chosen will apply to all spaces in your drawing (e.g. you cannot have wall surface polylines visible for some spaces and invisible for other spaces).

Lines that are 'invisible' will display a small dot on the screen at each vertex. Those dots can be snapped to, but they will not appear on any printed output.

These options are identical to the 'Show Surface' and 'Show Center' options on the 'Refresh/Update' menu described in section 3.3.5.

7.9 Processing Options Tab

7.9.1 Increments

Each time you create a space the default space number is incremented from the previous space. You can of course type over the default with a new number. By default space numbers are incremented by 1, but the 'Room Number Increment' field allows you to specify a different number.

Space names are only incremented if the previous name ended in a number. The default increment of 1 can be changed by entering a new value in the 'Room Name Increment' field.

7.9.2 Auto Recalculation

Auto Refresh Labels is enabled by default when you first install the macro. This means that each time you start the macro each spaces that have changed area or perimeter etc. will have their labels refreshed with any changed details. If you disable this option then labels will not be automatically updated if you have changed a space outside of the macro (but you can still start the refresh manually using options on the Refresh/Update menu (see section 3.3).

Auto Recalc Reports when macro starts is not enabled by default. If you enable this option then any reports that you have created with the macro will be updated with new or changed spaces each time the macro starts.

If a report was created based on layers (either all layers, on layers, or active layer) then any changed or added spaces on the layers that were originally selected will be updated or added to the report.

If a report was created based on area(s) then any of the originally selected spaces that have changed will be updated in the report, but no new spaces will be added to the report (you would need to redefine the report to add spaces to it – see section 3.4.2.2).

Add to Reports when adding spaces is also not enabled by default. If this option is enabled then any reports created based on one of the layer selections will be updated each time you create a new space on one of the layers included in the report (note that if the report is based on 'On' layers or the 'Active' layer, then that refers to the layer(s) that were on or active at the time the report was created).

7.9.3 Auto Positioning

The 'Auto Recenter Labels on Recalc' option is effective only for labels that are currently placed in the center of a space. If this option is enabled and such a label is recalculated (e.g. due to a change in size of a space) then the label will be re-centered in the space.

Labels will never be repositioned automatically if this option is disabled or if the label was not at the space centre prior to the recalculation.

8 Tags

The macro uses 'tags' to specify the content of labels and reports as well as mapping data to columns for the Excel import and export functions.

The tags are entered in curly brackets ('{', '}') to distinguish them from other text in the label or report format. Although you can type the tags in manually, it is recommended that you use the function buttons provided at the left side of the appropriate forms for label and report formats. For Excel functions you need to select the appropriate tag from a list.

There are a large number of standard tabs, as well as tags for each User Defined Field that you create (if any – you specify a unique tag for each field as you create it).

When you hover your cursor over a tag button a brief description will be displayed. When a label or report is created the standard tags will be replaced with the appropriate data as described below:

{name} Room Name

{hdim} Horizontal dimension of room. For rectangular spaces that are parallel to the axis this will normally be the x dimension.
Note that the macro considers the first straight side of the space to define a 'virtual x axis', and it uses this to specify the angle that the 'horizontal dimension' is measured at. This is designed to cater for spaces that are not parallel to the axis, but could also cause the horizontal and vertical dimensions to be swapped around if you have rotated a rectangular space by 90° for example. It is recommended that you use the {sdim} and '{ldim}' tags (instead of {hdim} and {vdim}) to avoid such unexpected behaviour.
Note that dimensions are 'overall' dimensions and do not take into account irregular shapes

{vdim} Vertical dimension of room (i.e. the measurement perpendicular to the 'virtual x axis' - see notes for {hdim} above).

{sdim} Smaller of the 2 room dimensions (either horizontal or vertical)

{ldim} Larger of the 2 room dimensions (either horizontal or vertical)

{perim} Total Space Perimeter (including the perimeter of any voids)

{operim} Perimeter of the space outline (does not include any voids)

{vperim} Perimeter of any voids only

{dunit} Dimension Units. Note that units will be blank (and not applicable) if you have specified to use 'Current Scale Type' as the dimension unit as the units are controlled by the datacad option selected. It is also blank if you select 'Feet/Inches (rounded)' as the units as the ft and inch symbols are automatically included. For other units this tag will be replaced by the 'Unit Display' that you selected on the Units tab of the macro's Settings form.

{area} Room area as calculated by the macro.
In terms of the following 2 tags, this area will equal {oarea) minus {varea}.

{oarea} Overall Room area calculated by the macro but ignoring any voids.

{varea} The area of any voids in the space

{aunit} The area 'Unit Display' that you defined for Areas on the Units tab of the macro's Settings form. Note that if you speficied 'Alternate Areas' settings to be used for some measures (such as wall areas) then you should use the {aaunit} tag associated with those measures.

{parea} Total Area of perimeter, including the area of the perimeter of any voids associated with the space. This is equal to the perimeter length multiplied by the ceiling height.
In terms of the following 2 tags, this area will be equal to {oparea} plus {vparea}.

{oparea} Area of Outline Perimeter, NOT including the perimeter of any voids associated with the space.

{vparea} Area of the Perimeter(s) of any voids associated with the space.

{aaunit} The 'Unit Display' that you specified for Alternate Areas on the Units tab of the macro's Settings form.

{vol} Volume of the space (i.e. area multiplied by ceiling height).

{vunit} The 'Unit Display' that you defined for Volumes on the macro's Settings form.

{rarea%} Percentage of Report Total Area (applicable to reports only). The percentage of area for a space compared to all other spaces included on the same report. (If the report contains all spaces in the drawing then this will be equivalent to {darea%}.)

{darea%} Percentage area for a space compared to all spaces in the drawing (applicable to reports only).

{lyr} The layer that the space outline is on

{cat} The category that you specified for a space (if any). This will be blank if no category has been specified

{grp}	This field that is used for sub-total grouping on reports. It will be equivalent to {lyr} if you specified Subtotals By Layer when you created a report, or equivalent to {cat} if you specified Subtotals By Category.
{fllvl}	Floor Level (effectively the Z-base of the space polyline).
{ceilng}	Ceiling Height (effectively Z-height minus Z-base of the space polyline).
{count}	Count of Spaces. This field can only be used in the Sub-Totals and Totals lines of the report layout.

8.1 Considerations for Dimension Tags

Typically for a rectangular space that is parallel to the X & Y axis the horizontal dimension ({hdim}) will be the dimension parallel to the X-axis, the the vertical dimension ({vdim})will be the dimension parallel to the Y-axis.

Note however that the macro uses a 'virtual X-Axis' which is defined by the angle of the first straight side in the defined space outline. This is done to cater for spaces that are not parallel to the axis, but one effect is that if you rotate rectangular space by 90° then the {hdim} and {vdim} may be swapped around. To avoid this unexpected behaviour it is recommended that you use the {sdim} and {ldim} dimension tags unless there is a good reason to use {hdim} and {vdim}.

Note also that the dimensions reported will be the overall dimensions of the space and do not account for irregular shapes. An example of the way the dimensions are measured are shown in Fig 39.

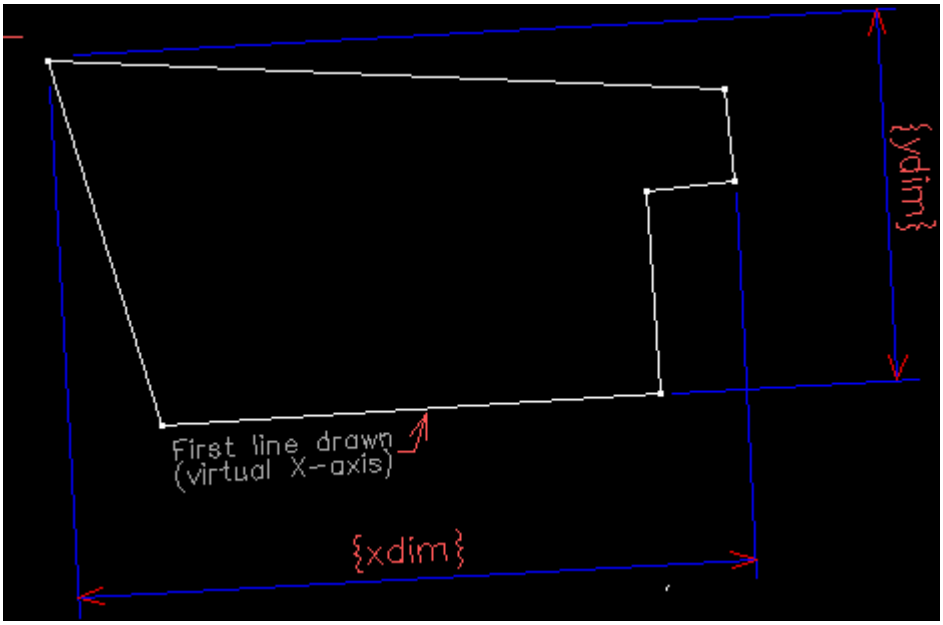


Fig 39 - Example of x & y dimensions

9 Refreshing Labels using the SpaceRefresh Macro

If you modify a space outline (e.g. by stretching or moving a vertex) using the normal DataCAD functionality outside of the Spaces macro, the label can be updated by invoking the Spaces macro and then exiting the macro once the labels are refreshed (if 'Auto Refresh Labels' is not enabled then you would also need to go to the 'Refresh/Update' menu and select the 'Refresh All Lbl' option before exiting the macro). To simplify the refresh process in these circumstances a separate SpaceRefresh macro is provided as an alternative.

The SpaceRefresh macro does not have any user interface. It will simply refresh all labels and then exit without any user interaction. The SpaceRefresh macro uses the settings established by the Spaces macro.

By default the SpaceRefesh macro will check if each space has been modified, and will only update the label of those spaces where it detects changes[18]. You can force the SpaceRefresh macro to recalculate all labels (even if no space modification is detected) by changing an ini file setting as described in section 9.1 below.

When the macro exits it displays a message in DataCAD's error area to confirm that labels have been updated. This message will also include the macro name and the version of the macro.

9.1 SPACEREFRESH.INI FILE

If you wish to force the SpaceRefresh macro to update the labels of all spaces without first checking if each space has been modified, you can update SpaceRefresh.ini file that is found in your DataCAD Macros folder.

This file is created by the install program with the 'RefreshAll' parameter set to 'FALSE'. With this default setting all spaces are checked for changes[18] to determine whether the label needs to be refreshed. If you set it to 'TRUE' (as shown below) then all labels will be refreshed regardless:

```
[SpaceRefresh]
RefreshAll = TRUE
```

10 CREATING TOOLBAR ICONS FOR THE MACROS

The creation of custom toolbar icons to invoke macros is possible, but is not well documented in the DataCAD manual. For a more detailed description of how to create these I recommend that you visit Josh Huggin's page at http://joshhuggins.com/category/datacad/toolbars-datacad/.

You can create custom toolbar icons to invoke the Spaces and/or SpaceRefresh macros by associating the appropriate keystrokes with your icon. The 'M' action code is meant to invoke macros directly, but (as of DataCAD 21) this code only appears to work with 'dcx' macro files (and not with 'dmx' files such as the Spaces macro … this may be fixed in a later version of DataCAD).

An example of a toolbar file entry for the Spaces macro is shown below (note that you would need to create the appropriate icon files Spaces16.png, SpacesMacro16.png, and SpaceRefresh16.png):

```
[Spaces]
DropdownCount=3
Hint=Spaces Macro from dhSoftware
Icon=Spaces16

Hint00=Spaces Macro
Icon00=SpacesMacro16
A00=^;^S9^Spaces.dmx$^

Hint01=Space Refresh
Icon01=SpaceRefresh16
A01=^;^S9^SpaceRefresh.dmx$^
```

[18] The change detection logic looks at a number of parameters, and only refreshes each label if one of these has changed. The parameters include the space's area, perimeter length, and overall x, y and z dimensions. This avoids the overhead of a complete recalculation, but occasionally a label may not be updated when you think it should be. (e.g. where a space polyline has been moved but the label has not been moved: If the label was previously at the centroid of the space (and 'Auto Recenter' option was enabled) then the default refresh will not move the label).

11 CUSTOMISING MESSAGES AND BUTTONS

All the message text and button labels used by the macros are held in text files which you can edit with a text editor if you wish to change any of the wording (or even translate to a different language). *Note that if you do edit these files then you should keep a copy of your changes before installing any new version of the macro* (the macro installer may overwrite your changes, so you will need the backup to place your changes back in the new file …).

Do NOT insert or delete lines when editing these files. The macro references the content of the files based on the line number, so adding or removing lines will result in the file content being out of sync with the macro. Generally speaking you should try to keep the entries in these files to a length not much longer than the default entries as increasing the length may lead to the text being truncated when it is used in the macro.

These files are located in a 'dhsoftware' folder within DataCAD's Support Files folder, and are detailed below.

Spaces.lbl
This file contains text that is used as captions on buttons as well as the pop-up hints that display when you hover your cursor over a button. It also contains some short messages and label captions that are used on various forms used by the macro.

Spaces.msg
This file contains message text that is used for messages that display both in the message and error areas of DataCAD, as well as messages that are displayed in pop-up dialog boxes.

SpaceRefresh.msg
This file contains messages displayed by the SpaceRefresh macro to confirm that labels have been updated (or not). Each message contains a dollar symbol ($) that is replaced by the macro name and version when the message is displayed (see section 10.1.2 below).

11.1 SPECIAL CHARACTERS

Some characters have a special meaning when used in the spaces.lbl as detailed below

11.1.1 Pipe Symbol (|)

The pipe symbol (which looks like a vertical line) has a special meaning in each file:

Spaces.lbl
In this file it is used to separate the button caption from the hint text that is on the same line. An example of this is line 11 of this file which contains the following text:

```
Delete|Delete '$' from User Defined Fields.
```

The first part of the text (before the pipe character) is used as the button caption whilst the part of the text after the pipe character is used as the hint text as shown in Fig 40 below:

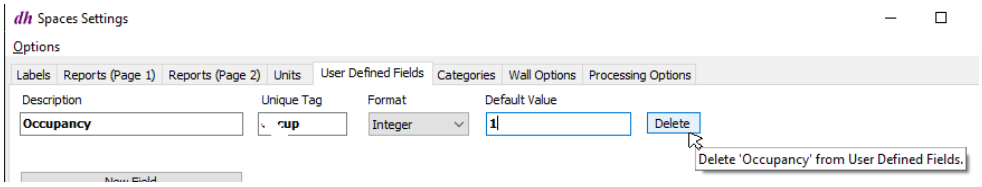


Fig 40 - Cursor over Delete Button in User Defined Fields

Note that this line also contains a dollar symbol. It's use is detailed in section 9.1.2 below.

Spaces.msg

In the spaces.msg file the pipe character is used to signify a new line in messages that are displayed in pop-up dialog boxes. It has no special significance for messages that are displayed in DataCAD's message or error areas.

For example line 87 of the file contains the following text:

```
Layer '$' is LOCKED.||Report will be placed on currently active layer.
```

If you try to place a report on a locked layer named 'My Locked Lyr' then this will be displayed as follows:

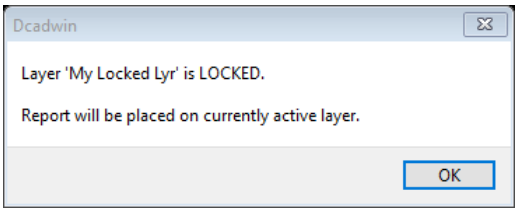


Fig 41 - Example of message with $ replaced by text and | replaced by new lines

See section 9.1.2 below for an explanation of the dollar symbol which is also used in this example.

11.1.2 Dollar Symbol ($)

The dollar symbol is used as a place marker for variable text that can be inserted by the macro. You should not include the $ character for any other purpose, and you should never include more $ characters in a line than were in the original line in the default file.

Examples of the use of the dollar symbol are shown in Figs 40 and 41 above.

11.1.3 Hash Symbol (#)

Where a hash character is included immediately prior to a dollar character, the hash will not be displayed. It indicates that the space immediately preceeding the hash is to be deleted if the data represented by the dollar character is blank.

An example is line 106 in the Spaces.msg file which contains the following text:

```
Area=$ #$, Perim=$ #$, Volume=$ #$
```

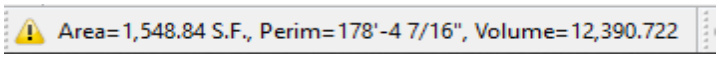


Fig 42 - Message displayed in Error Panel

In this case the 3 dollar symbols that are preceeded by a hash character are used for units, but it is possible for the units to be blank. In the event that the units are blank then the space after each measurement will be deleted so that the comma immediately follows the measurement. This message is used to display information in DataCAD's error area when you use the Measure/Detail function as shown below:

In this example the area units ('S.F.') are displayed for the first '#$' but no perimeter units are blank (for the second '#$') so the comma follows immediately after the perimeter measurement.