I&E Systems Pty Ltd

Dynamic Asset Documentation (DAD)

DAD v9 Users Guide

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Table of Contents'

Contents

1 Using the DAD v9.1 User's Guide 1
2 System Information Modelling 2
3 The Modelling Process 2
4 DAD Software 2
5 Software Installation 3
6 Where to start. 3
6.1 The Basics 5
6.2 Main Menu 5
6.3 Right Click Menu (RCM) 5
6.4 Drag & Drop 6
6.5 Making Connections between Components (Glanding) 6
6.6 Tracing connections 8
6.7 Terminating Cores of Connectors 8
7 Tagging and Naming. 9
8 Quick Search 10
8.1.1 Search Names 10
8.1.2 Search Names and Data 10
8.1.3 Search Terminals 11
9 System Menu 12
9.1 Current User Details 12
9.2 Licence Key 12
9.3 Users 13
9.4 Backup 14
9.5 Reindex 14
9.6 Save Window States 14
9.7 Exit 14
10 Workspace Menu 15
10.1 Change Workspace 15
10.2 Manage Workspace 16
10.3 Set Current Workspace as Default 16

10.4 Icons 16
10.5 Options 17
10.6 Page Sizes 19
10.7 Title Block 19
10.8 Working Copy 20
11 History Menu 22
11.1 History Overview 22
11.2 Recent User History 23
11.3 Search Component History 23
11.4 Search Connector History 23
11.5 Search File History 23
11.6 Search Published Document History 23
11.7 Search Revision History 23
11.8 Search Deleted Component History 24
11.9 Search Deleted Connector History 24
11.10 Search Deleted File History 24
11.11 Search Deleted Published Document History 24
11.12 Search Deleted Revision History 24
11.13 Search Changes since Document Published. 24
12 Help Menu 25
12.1 Database Info 25
12.1.1 Server Details 25
12.1.2 Licence Details 25
12.1.3 Statistics 25
12.1.4 Users Logged In 25
12.1.5 Client Details. 26
13 Creating Attributes 27
13.1 String Attributes 28
13.2 Currency 28
13.3 Date 28
13.4 Equation Instance 28
13.5 Equation Children 28
13.6 Hyperlink 28

13.7 Numeric Attributes 29
13.8 True/False 29
13.9 Entering Attribute Data 29
14 Creating Components 30
14.1 Type View 30
14.1.1 Edit / Simple Views 31
14.1.2 Assigning Type Attributes 32
14.1.3 Appearance 32
14.1.4 Connections 34
14.1.5 Software Channels 36
14.1.6 Linking to Files 36
14.1.7 Linked to Revisions 37
14.1.8 Functional Images 38
14.1.9 History 38
14.1.10 Layout 39
15 Location View 40
15.1 Edit / Simple Views 41
15.2 Assigning Location Attributes 41
15.3 Appearance 42
15.4 Linking to Files 42
15.5 Linked to Revisions 42
15.6 Map Coordinates 43
15.7 History 43
15.8 Layout 43
16 Connectors 44
16.1 Connector Details 45
16.1.1 Edit / Simple Views 45
16.1.2 Assigning Type Attributes 45
16.1.3 Appearance 46
16.1.4 Connections 47
16.1.5 Linking to Files 47
16.1.6 Linked to Revisions 47
16.1.7 History 47

16.2 Connector Types 48
16.2.1 Folders (Standard Connectors) 48
16.2.2 Rail Folders 48
16.2.3 Stub Folders 49
16.2.4 Fanout Folders 50
16.2.5 Internal Jumper Folders 52
17 The Workpad 53
17.1 Layers 53
17.1.1 The Title Layer 54
17.1.2 Block Layer 54
17.1.3 Termination Layer 55
17.1.4 Diagram Layer 56
17.1.5 Elevation Layer 57
17.1.6 Plan Layer 61
17.2 Previews 61
17.3 CAD Export 62
17.4 Publishing 63
17.4.1 Publishing New / Existing Documents 64
17.4.2 The Title Block Details 64
17.4.3 Published Document Folders 65
17.4.4 Revision Control of Documents 65
17.5 Page Size 66
17.6 Workpad Controls 67
17.6.1 Zoom In 67
17.6.2 Zoom Out 67
17.6.3 Marquee Zoom 67
17.6.4 Undo 67
17.6.5 Redo 67
17.6.6 Clear Workpad 67
17.6.7 Refresh 67
17.7 Filter 68
17.8 Component Takeoff 68
17.9 Cable Schedule 68

17.10 Select All Components 68
17.11 Select All Connectors 68
17.12 Manage Layouts 69
17.13 Save Layouts 70
17.14 Show Wiremarkers 70
17.15 Resize Wiremarkers 72
18 Groups 73
18.1 Group Views 73
18.2 Group Folders 73
18.3 Group Filtered Folders 74
19 Documents 76
19.1 Folders 77
19.2 Import Files 77
19.3 Import e-mails 78
19.4 Edit / Simple View 78
19.5 Assigning Type Attributes 78
19.6 Preview 79
19.7 Revisions 79
19.8 Published Objects 79
19.9 Unique ID 79
19.10 History 79
20 Folder Reports 80
20.1 Designing Folder Reports 80
20.1.1 The Header 81
20.1.2 The Common Data (Top) 81
20.1.3 The Content 82
20.1.4 The Common Data (Bottom) 82
20.1.5 The Footer 82
20.2 Generating Folder Reports. 82
21 Shapes 84
22 Spreadsheet 85
23 Map Components and Connectors 86
24 DAD Administration 87

Appendix A. Basic Principles of a DAD Model 89
Appendix A.1. Make Fewer Attributes. 89
Appendix A.2. Inheritance in DAD. 90
Appendix A.3. Rules of Inheritance. 92
Appendix A.4. Creating Attributes. 97
Appendix A.5. Create Type Folders. 98
Appendix A.6. Connect Cable Cores. 99
Appendix B. Better Handling of Design Changes. 100
Appendix B.1. Change Folder Properties 101
Appendix B.2. Change a Connector Type 104
Appendix B.3. Change a Component Type 106
Appendix B.4. Adding Terminals to Components. 109
Appendix B.5. Adding Shapes to Type Folders. 110
Appendix B.6. Adding Functional Image to Type Folders. 111
Appendix B.7. Adding Attributes to Type Folders. 112
Appendix B.8. Documents that need revising 113
Appendix B.9. Find spare cores 114
Appendix B.10. Have Components been connected? 117
Appendix B.11. Duplicate Names 118
Appendix B.12. Consistency Checking in Names. 119
Appendix B.13. Wildcard characters in Filters 120
Appendix B.14. Re-editing existing Published Documents 121
Appendix C. V9 Application Notes 123
Appendix C.1. Finding Components & Connectors in the model 123
Appendix C.2. Finding Components (Connectors) in Groups 126
Appendix C.3. Sharing Data via Excel. 127
Appendix C.4. Clone Components 128
Appendix C.5. Clone with Connections 129
Appendix C.6. Find spare terminals 132
Appendix C.7. Sharing Data via Excel. 133
Appendix C.8. Take Off For Equipment 134
Appendix C.9. Take off Cables (Connectors) 136
Appendix C.10. Move Component to New Location 137

Appendix C.11. Move Cable End 138
Appendix C.12. Find where to isolate circuits 140
Appendix D. EXPORTING DATA 141
Appendix D.1. Cable Numbers 141
Appendix D.2. Wire Markers 142
Appendix E. User Configuration 144

1 Using the DAD v9.1 User's Guide

Every effort has been made to provide detailed information that is accurate, easy to understand and explains the way the many different functions in DAD can be applied. DAD is a very flexible modelling tool that permits users to build a Systems Information Model in many different ways for many types of systems. Examples provided may not always match your own requirements and are simply intended to illustrate how the modelling can be applied in certain typical systems.

Users are able to build the DAD model in a way that suits the type of system that they are working with and the size and skills of the team that is involved. Each team of users working in DAD will need to develop their own basic procedures and policies, to enable the members of the team to collaborate effectively and to adhere to their own agreed standards.

This document is intended as a User's Guide for the use of the DAD modelling software. The software is constantly being developed to add new functionality to meet user's requirements. As the software evolves and new versions get released, this guide will be updated to provide current information. This guide may therefore not always describe the features as they are implemented in every specific version of the software. If you find disparity between this guide and the particular version you are using, requests for further information can be sent to support@dad.net.au and we will endeavour to clarify any differences.

Furthermore your feedback would be appreciated to allow us to correct any errors in the User's Guide or to improve the way this information is presented. Any changes / corrections / comments or additional information should be sent by e-mail to support@dad.net.au together with details of the relevant Section in this document and the version of the User's Guide that your comments refer to.

Your assistance in this regard will be greatly appreciated.

Due to the extensive list of features that are available in DAD and that are described in this guide, it is recommended that you should attempt to locate individual topics in the Table of Contents and then refer to the individual section that is of interest. Where necessary the document contains cross references to other sections that may also be relevant to individual topics.

There are some basic principles that all users need to be aware of. New users should familiarise themselves with these topics in Section 6 starting on page 3 before starting to use the DAD software. The details contained in Appendix A are also important in deciding how to build a DAD Model for your specific System.

It is important that the SQL Server software and the DAD software are correctly installed and configured to suit the IT Domain that the software will reside within. The details provided in Appendix E starting on page 144 are therefore important for the IT Administrators that may be involved in the installation and configuration of these systems.

2 System Information Modelling

System Information Modelling is a generic term used to describe the process of modelling complex systems using appropriate software.

A definition created for Building Information Modelling by the National Institute of Building Sciences in the USA has been paraphrased for SIM as the principles of SIM and BIM have many obvious parallels.

We therefore define SIM as "A digital representation of physical and functional characteristics of a system… and a shared knowledge resource for information about a system forming a reliable basis for decisions during its life-cycle, from earliest conception to decommissioning."[i]

Systems have structure, defined by components/elements and their composition. Systems have behavior, which involves inputs, processing and outputs of material, energy, information or data. Systems have interconnectivity: the various parts of a system have functional as well as structural relationships to each other.[ii]

3 The Modelling Process

In System Information Modelling we are concerned with creating definitions of all those objects that form part of the system by considering the following:

- What is it?
- Where is it?
- How is it connected?

In modelling a System we aim to build a prototype model of the system with a 1:1 relationship between the objects in the model and the real components and connections in the real system. User defined attributes are assigned to each object to identify relevant characteristics and information.

4 DAD Software

The Dynamic Asset Documentation (DAD) Software has been developed by I&E Systems for use in Systems Engineering and is equally applicable in the fields of Control and Instrumentation, Power Distribution, Motor Control and Telecommunications. This software is designed to provide a flexible tool that can be utilised by Systems Engineers to facilitate the rapid modelling of complex systems.

There are no strict rules that must be applied when developing a system within DAD. The basic principles applied within DAD are that every object contains information that is only entered once. Information is checked upon entry to ensure that it has been correctly captured in the model. Information within the model can be viewed in a variety of formats to suit specific purposes.

5 Software Installation

The DAD Client software must be installed on a suitable MS Windows based PC. The PC should be running the MS Windows(XP/Vista/7) operating system and must have .NET 4.0 Framework or later installed. Refer to the Technical Specifications section under the Resources Tab on the DAD website for the latest information. (www.dad.net.au) Install the correct version of the DAD Client to suit the operating system on the PC. Two install files of the DAD client are always provided via the DAD support site. For a 32 bit operating system use the (x86) version and for a 64 bit operating system use the (x64).version.

To be able to view documents created with DAD you should also have a suitable PDF viewer installed on the same system. Free viewers are available from http://www.adobe.com/ and from http://www.foxit.com/.

DAD also requires the installation of MS SQL Server on a suitable server or on the same PC that is running the client in single user applications. Details are provided of the suitable versions of SQL Server on the DAD support web site using your Support Login account.

6 Where to start.

Helpful Hint.

In DAD, when you design, you are building a prototype. Define the types of equipment, make the different components, place them in the desired locations and connect them up.

Work on the prototype to achieve the required system functionality. The prototype (model) is always the source of all information currently available for the system.

When the prototype/model meets the specified requirements you have completed the design. There is no need for traditional drafting checking.

DAD is a model made up of components and the connectors that join them together. To get the most benefit in design you need to re-examine your current work practices.

DAD is a framework within which you can build any system. The logic of the framework is simple

Engineers think in terms of systems, sub-systems and circuits to outline system hardware. Then they make block, network and other architecture sketches to capture the concepts.

Subsequently many drawings and lists are prepared to fully specify the equipment and how it is connected. This information is then used by others to implement (and maintain) the systems.

When using DAD the first phase of the work is unchanged, that is, you must still take the requirements and establish concepts to satisfy them. At this point the work changes as you no longer create lots of drawings and lists.

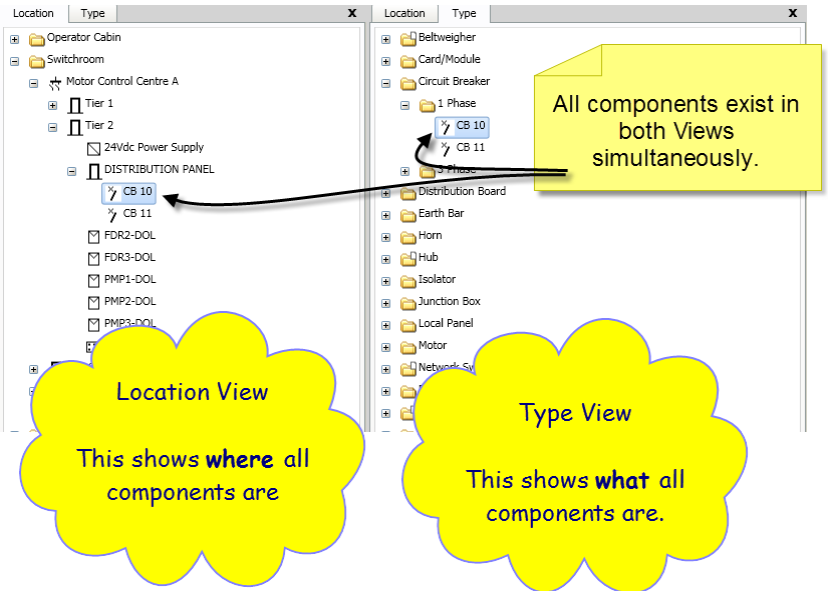
Instead you:

- Define the equipment you will need - **WHAT**
- Define where it will be installed - **WHERE**
- Detail how the equipment will be connected – **HOW**
- Then you publish the results as (pseudo) drawings and lists for execution by other parties such as construction teams.

So you should try to model only the physical aspects of your system initially placing more emphasis on selecting equipment and building assemblies than producing typical circuits and diagrams.

You can work top down or bottom up and swap between them anytime as necessary. Review our Examples and Exercises to sample different aspects of this work.

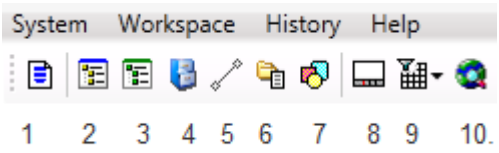
DAD is built around two independent and simultaneous views of the model:



6.1 The Basics

There are a few basic principles that are applied throughout the DAD software. By understanding these basics the user will be able to successfully utilise the software to design a comprehensive System Information Model (SIM).

6.2 Main Menu



The Icons on the toolbar at the top of the DAD screen open the following windows:

1	Attribute List
2	Components View
3	Groups View
4	Documents View
5	Connectors View
6	Folder Reports
7	Shape Explorer
8	Workpad
9	Spreadsheet (with Options)
10	Map Components and Connectors

6.3 Right Click Menu (RCM)

All operations within DAD software are accessed using Context-sensitive Menus. This is a generic Microsoft Windows function that is applied across most Microsoft Windows based software applications.

The menus are displayed when the mouse cursor is positioned on any object or area of the DAD software screen and the right button of the mouse is clicked. Depending on where the mouse cursor is positioned the menu options will vary to display the available options for that context.

In all cases the options that are displayed will only include those functions that apply to the specific object or area of the screen. Certain options may not be available to the user due to permission levels or the step in a specific sequence. For example Copy and Paste are sequential functions. It is therefore not possible to select the function “Paste” if a “Copy” function has not already been performed.

The steps that apply for this function are:

- Point at an object or area with the mouse cursor
- Right-click the mouse button
- Once the right-click menu is displayed move the mouse cursor down the menu to highlight the required option
- Left click the mouse to select the function.

It is important to recognise that these right click menus are not only available for functions that involved objects already displayed on the screen. They are also used to create objects by pointing to blank areas within the DAD screen. If no menu is displayed when pointing to any object or area and right clicking the mouse button then this indicates that there are no available options available for the user in that area.

6.4 Drag & Drop

This operation is used extensively in DAD to pull an object from one window into another.

The steps are:

- Move the cursor on to the desired object(s)
- Click the left mouse button and do not release it
- Drag the object(s) on to the target window to your chosen spot and then release the left mouse button. Note that the screen cursor displays a + symbol when you are dragging.
- The object(s) now appears in the target window.

You drag and drop to:

1. Bring objects from the Views to the Workpad
2. Bring objects from the Spreadsheet to the Workpad
3. Add objects to any spreadsheet filter
4. Add objects from a spreadsheet to the filter for another spreadsheet
5. Add objects to a Group Folder
6. Move objects from one folder to another.

6.5 Making Connections between Components (Glanding)

DAD is designed to model Systems. Systems are defined as a collection of components and their connections. It is therefore critical that DAD is able to create and manage connections between components. Component Types and Locations are dealt with in detail in Section 14 and Section 15 and Connectors are dealt with in Section 16 of this User Guide.

DAD makes use of graphical displays of model information on a Workpad (see section 17) to create connections between components. This is normally done using the Block Layer on the Workpad (see page 54) although individual wires or single core cables can also be connected in a Termination layer.

The action of connecting a connector to a component can be considered the equivalent of glanding a cable to a device in real life. The connector is firmly attached to the device when it is connected or glanded, however the individual cores remain loose, as spares inside the device, awaiting termination in a separate action. See section 6.7 on page 8 for Terminating cores.

The way the connection works in DAD is exactly the same as the way a real cable will function when glanded to a device. At the gland, the cable sheath is removed and the cores are all available to connect to any terminals within the glanded device. For example if a cable gland is installed in the gland plate at the bottom of a cabinet, then the cores within that cable could be terminated on any available terminal that is located within the cabinet. It does not mean the cable has to be terminated on the cabinet itself. It is possible to terminate the cores on any terminal strip or other component

that has suitable terminals within the entire cabinet. The cores cannot however be terminated on any other device that is located outside the cabinet as this would require a different connector to be installed from inside the cabinet to the device that is outside the cabinet.

DAD works exactly the same way. A connector / cable can be connected to a component e.g. a cabinet. Once this is done the cores of the connector/cable are available to be terminated on any terminal or device that is located within the cabinet. This means that any device that is listed as a Child of the Cabinet is a potential target for some of the cores in the connector /cable.

This is a fundamental principle in DAD as it allows connectors to be connected/glanded where appropriate and then terminated to different terminals and devices based on the connection/gland. This could mean that a single Cable that has cores to be terminated in different Cabinets within an Equipment room should therefore be connected/glanded to the Equipment room and not one of the cabinets within the room.

It is possible to shift the point at which the cable is glanded to a parent device at any time if it becomes necessary to split cores to different child components. Refer to Appendix C.11 on page 138 for more information.

Note : Normal connections can only exist between two components in the model. It is not possible to create a connector with one end attached to a component and the other end "floating" to be connected to another device at a later stage. There are a few exceptions to this rule for rail type connectors and Stub connectors however these are dealt with in Section 16.2

The basic principle behind creating connections between components is that the components to be connected are first displayed on a Workpad by dragging the component from a Type or Location View or from a Details View onto the Block Layer of a Workpad. Once two or more components are displayed on a Block Layer a Connection can be created between the two components as follows.

At the top of the Workpad alongside the "Connect" label a field is provided to enter a connector / cable name. A "Type" link is also provided to permit the user to select one of the connector types defined in the Connectors window of the SIM. See Section 16 starting on page 44. Once a connector "Type" has been selected, it is possible to create one or more new connector(s) between any components displayed on the active layer of the workpad. The connector names can be edited after they are created however it is preferable to assign names as the connectors are created. If the entered name ends with a numeric character, the numeric character will be incremented for each new connector that is created. If the entered name ends with an alphabetic character then the name will not be incremented. It is possible but undesirable to create multiple connectors with the same name as this can result in confusion when viewing connector/ cable schedules, etc.

To create a new connector between 2 components, hold the SHIFT key and left click on the first component, i.e. the starting point of the new connector. The component will be highlighted in Green. Hold the SHIFT key and left click on the second component, i.e. the destination for this connector. The connector is immediately created between the selected components and the name that was displayed in the Name field is displayed alongside the connector.

6.6 Tracing connections

In the Workpad you can trace or follow connections in several ways. Be aware that you are querying a model so you may have to format the result before you can make sense of the connections:

- Clicking on the arrowhead.
- Selecting “Trace ….” using a right click menu,

Various options exist depending on the information currently being displayed. These include: “Trace All Connectors”, “Trace Ends”, “Trace Full circuit”.

6.7 Terminating Cores of Connectors

Connector cores are Terminated on a Termination Layer. Connectors can be connected between two different components using the procedure explained in section 6.5 starting on page 6. Once these connections are made the individual cores in the connectors can be connected to Terminals in each component by displaying the components in a Termination Layer.

The way Terminals are displayed is dependent on the way they are configured using the Terminals setting in the Connections on a Connector Type Folder.

When components are displayed in a termination layer they will not initially have any connectors shown even if the components have already been connected in a Block Layer. Assuming that a connector or connectors have been connected (glanded) in a block layer the connector is attached to the component itself but the individual cores are not yet terminated to individual terminals.

The process of connecting any spare cores that are not yet terminated is done as follows:

Select any component that has already had connectors attached in a Block Layer. Using the Right Click Menu select the command for “Load Spare Cores” from the menu. A new window will open on the right hand side of the DAD screen called “Spare Cores”. If any connectors have been attached to the selected component, these connectors will be listed in the Spare Cores window by Connector Name. Left clicking the mouse while pointing to the arrow to the left of each connector name will open up a list of all the available cores in the selected connector/cable.

The complete connector or individual cores can then be dragged from the Spare Cores window onto the workpad that shows the components. As soon as the connector or core is dragged outside the Spare Cores window, the target component will be highlighted in Yellow. This indicates the only acceptable place that these cores can be terminated.

When the cursor moves over an acceptable target area / terminal the cursor will change to a + sign and the mouse button can be released to complete the Termination. If the complete connector is dragged, then the available cores will be terminated onto successive terminals in the order defined by the core definition in the Connector Folder. If there are insufficient terminals to terminate all the available cores, the remaining cores will still be listed in the Spare Cores window. If the connector includes any core(s) defined as a Screen, then the Screen core will be automatically terminated onto any terminal designated as a “Screen Bar”. If no “Screen Bar” has been defined on the component connection points then the Screen core will be terminated onto the next available terminal based on the sequence of cores in the connector definition.

Cores will be terminated one per terminal until all available cores or terminals have been allocated and terminated.

Individual cores can be dragged and dropped onto individual terminals in any sequence. Any groups of cores can be selected, dragged and terminated with a single action providing the sequence is correct.

Individual single core connectors or wires can be connected/terminated on a Termination layer without first being connected at a Block Level

7 Tagging and Naming.

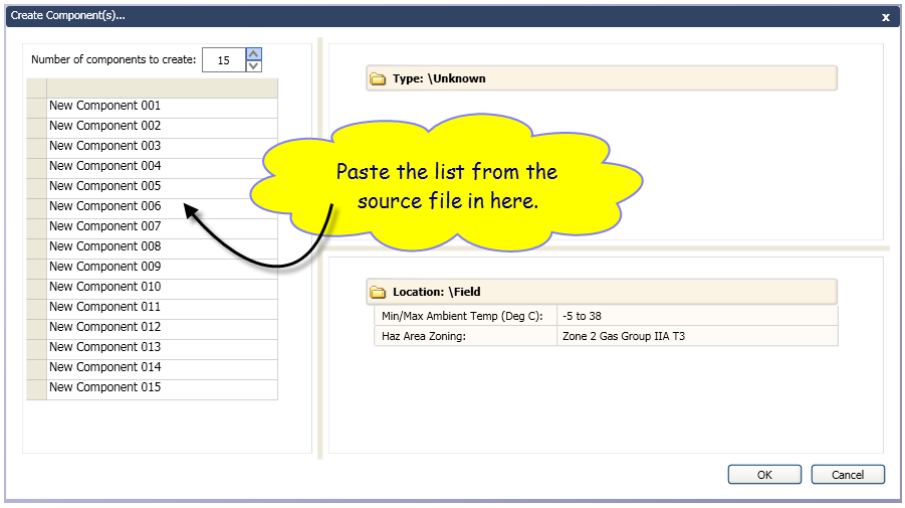
You can use any naming convention for the objects in DAD. The limit is 96 characters.

Here is some practical advice:

- keep names as short as you can,
- if possible avoid using names that are derived from function and location: such names are unnecessary in DAD because such information is built into the model
- try to use inheritance in the location tree to build up complex names as this helps keep names short,

You can rename all objects at any time.

If you are creating objects in DAD and have a list from some source, you can paste the list into the component creation form in DAD.

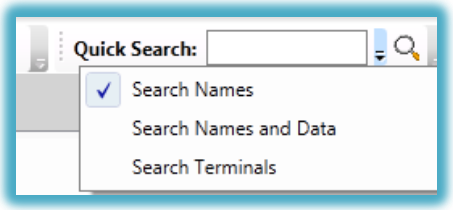


8 Quick Search

In System Information Modelling the model must be the repository for all information related to the System. A user should be able to find relevant information as quickly and easily as possible.

The simplest way to find information is by using Quick Search located in the top right corner of the DAD screen.

Quick Search has three selectable options that can be accessed by selecting the down arrow to the right of the Search text field. This controls the way the search will be carried out within the model.



Quick Search cannot locate data within attached documents such as vendor data sheets. If some information that may normally be found in vendor data sheets may be needed for future searches then this data should be captured as Data within a DAD attribute. Once the data is saved in an attribute then it can be located via Quick Search. This principle can be applied to determine which attributes may need to be created for the objects in the model.

8.1.1 Search Names

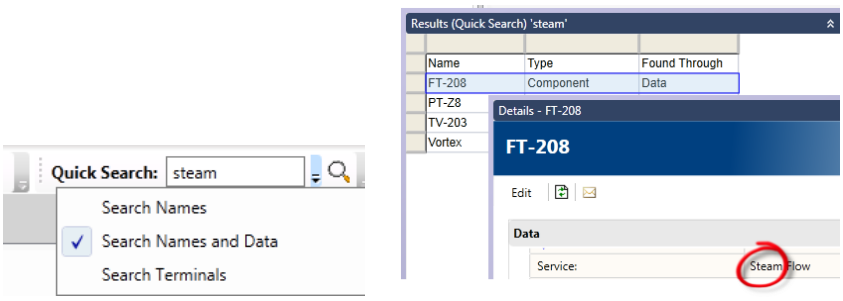
The default option is Search Names. In this mode the Quick Search will search through the model looking for a **name** of a component or a connector or document that matches the text string that is entered. The software will return a list that contains any names that exactly match the entered string. It is possible to use wildcards in a search string as follows:

Using the _ (underscore) character in the string will search for a single character in place of the underscore character.

Using a * or % character will search for any number of characters in place of the * or % character.

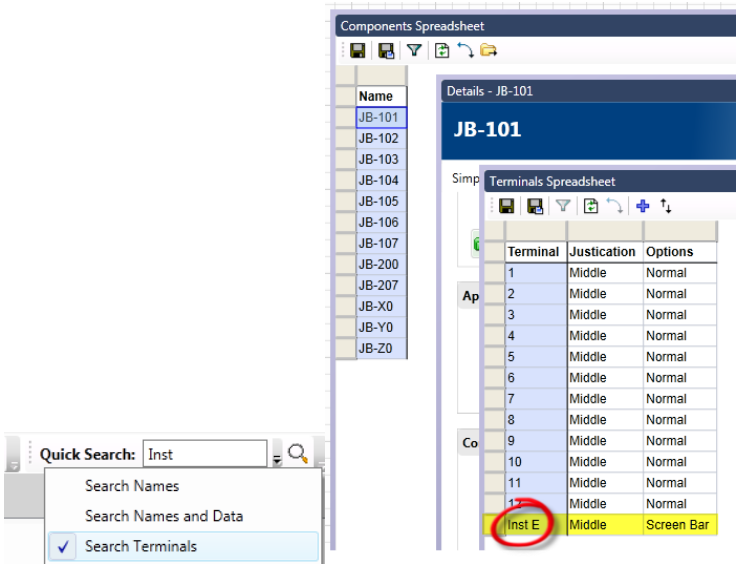
8.1.2 Search Names and Data

If this option is selected, the search will check all names and attribute related data to locate any matching string of characters. The search will return a list of component and/or connector names where the name or the data within one of the attributes includes the search string. If the search result returns component names after locating the search string within a Data attribute, then the results table will indicate that the name was found through “Data”. See example below when searching a model for the string “steam”.

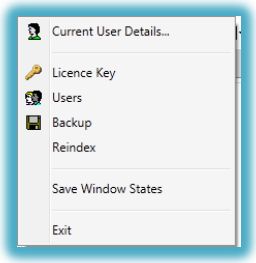


8.1.3 Search Terminals

If this option is selected, the search will find all components that have a connection point name that matches the search string of characters. See example below searching for components that have a connection point name containing “Inst”

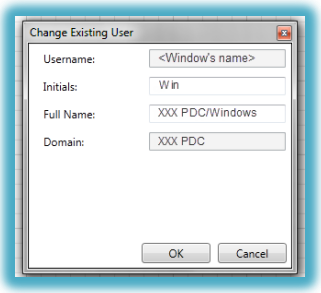


9 System Menu



9.1 Current User Details

Selecting this option opens a Change Existing User Window.



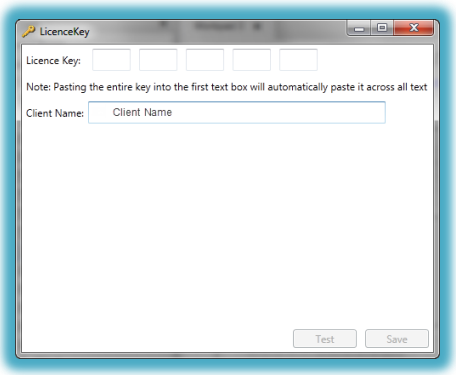
In this window the current user name will be displayed. This is the user name that was used to log in to DAD. i.e. <Window's name>.

The Initials that are displayed will default to the first three characters of the user name unless they are changed by the user. It is recommended that the Initials are changed to be the user's actual initials to simplify the identification of users when publishing of documents within DAD. The user's full name can also be changed to display it instead of a Windows user name.

The Domain name will be determined during login based on the way the login PC is set up within the registered domain. This cannot be altered.

9.2 Licence Key

The Licence Key selection will display the LicenceKey window shown below.



The registered “Client Name” that is encrypted into the Licence Key for the current system will be displayed together with an empty space to enter a new Licence Key provided by I&E Systems. The Licence Key provided will consist of a unique sequence of letters and numbers that can be copied and pasted into the space provided. Copy the sequence of characters for the licence key from another application using Cntrl C and pasted the complete Key into the first cell of the licence key by using Cntrl V.

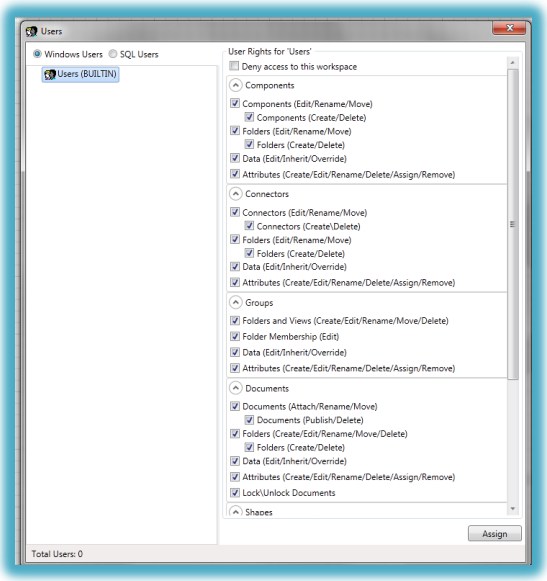
NOTE: It is necessary to hold Cntrl and then press and release V while still holding Cntrl. This will then paste the entire sequence. If Cntrl and V are pressed and released at the same time then this will often only paste the first set of characters into the first cell of the Licence Key.

Once a Licence Key has been entered into the space provided the Test button should be selected. If the key has been correctly entered together with the registered client name, a message will be displayed to indicate that the key is accepted. If it is not accepted please check that both the client name and the licence key match the details provided on the licence. If it is accepted then the Save button should be pressed to save the key into the model. This only needs to be carried out if and when a new key is issued. The licence key will enable a specific number of concurrent users and workspaces on a licensed model database.

9.3 Users

This menu option is selected to configure User rights for authorised users. The option may not be available for selection if the current user is not an authorised DAD Administrator.

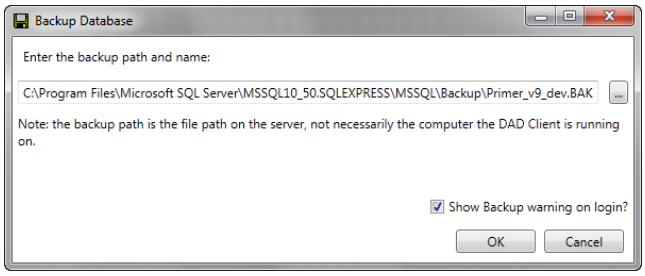
Once the option has been selected a separate Users Window will be displayed. This makes provision for configuration of SQL Users and Windows Users. These two selections are only used to select between user names that will log-in to DAD using SQL Authentication and users that will log-in to DAD using Windows Authentication.



For user rights to be configured for Windows Authenticated users, a Windows Group must be created within the Windows Domain. See Appendix E – User Configuration.

9.4 Backup

If the user has the necessary administrator rights then it is possible to make a backup of the DAD model at any time by selecting the Backup option in the System Menu. If the option is not available then the user does not have the rights to carry out this operation.



It is important to note that the backup file will be saved on the server that contains the DAD database. The backup will not be saved on the DAD user's computer.

9.5 Reindex

The DAD model contains many tables of data and many pointers and other software parameters that are used to keep track of where the different tables of data are saved. If the DAD model has been developed by many users over a period of time many of these tables may become complex and the pointers and settings that are within the system also become quite complex. It is possible to simplify these pointers and software references by re-indexing the model to remove redundant settings that are no longer in use or simplify settings that have been altered many times. This can improve performance of the system when searching for data or preparing spreadsheets of data in tables based on filters that have been created.

Re-indexing the model introduces a very minor risk as it rearranges complex pointers, settings, references, links, etc. within the model. It is considered good practice to take a complete backup of the model prior to re-indexing. This backup will provide the means to recover the full system in the unlikely event that re-indexing the model causes any problem.

9.6 Save Window States

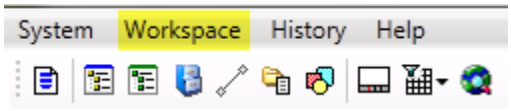
There are certain aspects of the DAD software that can be configured by the user to suit individual circumstances. If the user rearranges the windows in the DAD client software to suit a specific requirement, the arrangement of the different windows can be saved so that the windows will retain this arrangement the next time DAD is started. This is achieved by using Save Window States in the System Menu. It may not be possible to save certain states, for example settings that may be related to windows arranged on multiple screens on a single PC. Once the states have been saved an additional option is available on the System menu to Clear Saved Windows States. This will restore the default settings for the DAD application windows.

9.7 Exit

Selecting Exit will prompt you with a question "Are you sure you wish to exist DAD?". If you select "Yes" the DAD application will close. All data that has already been saved will be retained. Data that is being entered into a Details page data attribute or entered into an overridden cell or cells within a spreadsheet can be lost unless it is saved prior to selecting Exit. Any unpublished workpad displaying components and connections will be cleared upon Exit. The current workpad will not be saved and cannot be displayed when the software is re-started. All the underlying data for components and

connections displayed on a workpad will be available in the DAD model. The workpad display can be manually re-created by dragging the same objects onto the workpad and tracing connections etc., however this may still need to be arranged to suit specific needs.

10 Workspace Menu



DAD makes provision for the partitioning of a single model into a number of different independent sub-models. This is commonly used for multi-disciplinary projects where each sub model contains the information for a specific discipline. For example: a project that incorporates Electrical, Control and Instrumentation and Communications Systems within a single project can elect to divide the overall model into 3 discipline partitions or workspaces. If this approach is used then all the types, locations and connections in one workspace can be completely different to the equivalent objects in the next workspace.

The Electrical workspace will include electrical equipment types, electrical locations such as sub-stations and motor control centres and electrical connections e.g. HV, MV and LV power cables. The Controls and Instrumentation workspace will include control system component types, instrument types and related locations such as equipment rooms, PLC rooms, control rooms etc. The connector types will include single pair and multi-pair and multi-core instrument cables. The communications workspace may include Communication equipment types and locations and communications connectors e.g. fibre optic cable, coaxial cables, waveguides etc.

All these workspaces can form part of a single model for a project or plant site. Access to the overall model is determined by the type of licence that is procured and once an authorised user has access to the model, the user rights for each workspace can be individually assigned. An Electrical Engineer may be permitted to work in and change any information in the Electrical Workspace, however he may only be granted rights to view the Control & Instrumentation Workspace and Communications Workspace. The same may apply to the rights assigned to other discipline members.

It is possible to deny access to certain workspaces based on the user name that is logged into the system. This can be used to prevent unauthorised viewing of confidential information that may be located within a particular workspace.

The overall licence for the model will determine how many individual users will be permitted to access the complete model at any point in time. This limit will be applied irrespective of which workspace a user wishes to view or work in. If the licence limit has been reached in terms of concurrent users then new users attempting to login to DAD will be denied access and informed that the licence limit has been reached.

There can be up to 20 workspaces within a single DAD Model.

10.1 Change Workspace

In those systems where the model contains multiple workspaces, the user can select this function to view the names of the other workspaces and to select a workspace to be viewed.

Each workspace is named and is selected from a list by using the mouse cursor and left clicking the mouse button.

10.2 Manage Workspace

Manage workspaces allows the user to view a list of all available workspaces within the current model. In the "Workspaces" window that opens, the user can re-sequence the workspace list to suit specific needs and can rename workspaces providing the user has the appropriate user rights to perform this task.

The user is also able to delete an entire workspace from the model if they have the appropriate user rights. It should be noted that a deleted workspace can be recovered after it is deleted unless it has been purged from the model via the Database Administration function. The Database Administration facility that is provided with DAD requires DAD Administrator user rights and makes provision to un-delete a deleted workspace and to purge a deleted workspace. Once a workspace has been purged it can no longer be restored to the model.

10.3 Set Current Workspace as Default

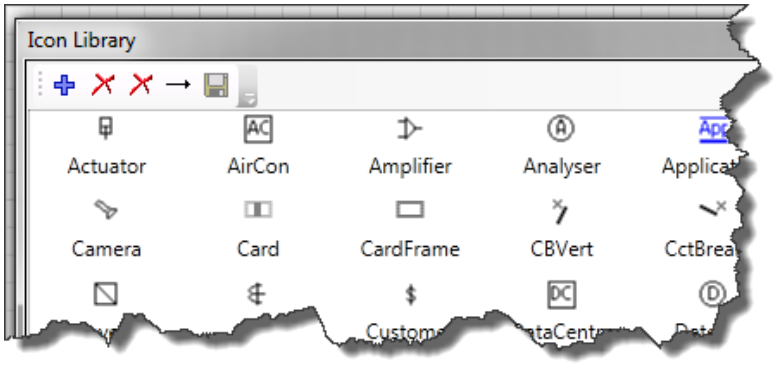
A user can set a particular workspace as the default so that this workspace will be displayed upon start-up. This function will be used once a specific workspace has been selected using the Change Workspace command. The current workspace that is being displayed will be set as the default when this function is used.

10.4 Icons

Icons are only used to improve the user's ability to visualise and identify the different types of components within the model. The default Icon for any component within the system is a small Blue ball. This icon is displayed for all components where no other icon has been defined in the Type Folder definition.

The DAD System has a default set of Icons provided for use by the user, however the user is able to create any number of special icons for use in the model by using any of the many software applications that are freely available for the creation of Icons. The Icons that are created by the user can incorporate any shapes and colours but must be configured as 16 x 16 pixel image in order to be compatible with DAD.

When the "Icons" command is selected from the Workspace menu the Icon Library Window is displayed. This window has a few function icons displayed at the top of the window. These can be used to add selected Icons to the library or to delete selected icons from the library. There is also a function to delete Unused Icons from the library and a "Save icon" to save any selected icons in the library.



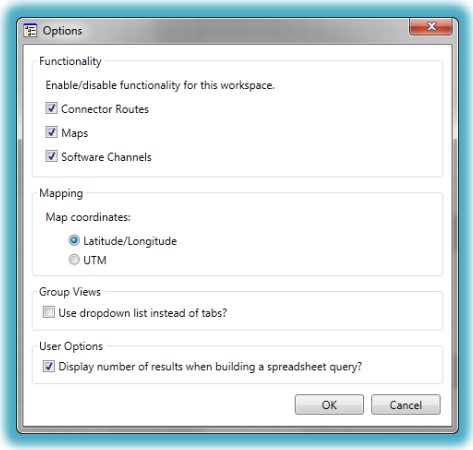
Adding new Icons will be achieved by locating the new Icon files within a windows directory and then selecting those icon file names that are to be added to the current library.

It is recommended that the existing Library of Icons be saved in a suitable location on a PC hard disk or server so that they can be used as a backup in case they are deleted for any reason. It is often easier to open an existing Icon and edit it to create a similar Icon before saving it with a new name. To save all the existing icons in the Icon Library first select all the icons by stretching the Icon Library window until all the Icons can be seen. Select the first icon with the mouse and then hold down the shift key. Select the last Icon in the library while holding the shift key and all the icons will be highlighted/selected. Click the save Icon at the top of the Icon library window. This will open a "Browse for Folder" window displaying the windows directories on the system. This will allow the user to select a suitable location to save the existing Icon Library. It may be necessary to create a new folder for this purpose. Use the right click menu and follow the commands to create and name a New Folder for DAD Icons. Once the folder has been created the selected Icons can all be saved. Each Icon is a small independent .ico file that is saved in the windows directory with the assigned name for the icon and the .ico suffix.

Creating new icons with a suitable Icon design application such as IcoFx is simple, particularly if one of the existing Icons is opened and edited to make the new icon. Once it is edited to suit the specific needs it must be saved with a new descriptive name so that it does not overwrite the source file. Any new icons that are created in the DAD Icon directory should then be imported back into DAD using the + sign icon at the top of the Icon Library window.

10.5 Options

The options function in the workspace menu allows the user to configure certain options within DAD. These options will determine whether certain facilities are available to the users of DAD and in some cases which standard is applied when these functions are used..



Options are applicable to individual workspaces and the ability to access and set options will depend on the users individual rights.

If an option is deselected for a specific workspace then the functions and features that relate to that option will not be visible for any user in that workspace.

Connector Routes – This option allows user to define routes for connectors. If this option is selected users will be permitted to access the routing function that permits individual connectors to be routed via other components and connections in the model. An example of routing would be the routing of fibre-optic cable through a network of Pits in the ground and pipes or ducts that interconnect these pits. Each cable will have a record of which pits and pipes it passes through and each pipe or duct will have a record of all cables or connectors are passing through it. If this option is deselected then no routing information will be provided and the applicable selections will not be displayed on the individual right click menus.

Maps – This option facilitates the mapping of components and connectors based on Latitude and Longitude coordinates or UTM coordinates that are entered for various locations in the model. If this option is selected then Location folders and individual components will have location attributes displayed in their Details windows. This option works together with the Mapping option that is also selected lower down in the same window. If Maps is deselected then the Mapping selection is disabled and the Location Folders will not display the location fields that could be used to save location related data.

The Mapping selection allows the user to select whether position coordinates are to be entered using one of the two available options, i.e. Latitude/Longitude or UTM (Universal Transverse Mercator) coordinates to define positions. UTM is commonly used by GPS systems and land survey systems. Latitude and Longitude is most commonly used in maps and charts available to the public.

Note: Coordinates can be entered using either coordinate system if the appropriate option is first selected. If the mapping selection option is changed, the system will automatically convert any existing data to the other format. This means that it is possible to enter some data in Latitude and Longitude and then after changing the selection to UTM, the data for other components could be entered in UTM format. If the Mapping function is then used to Map all these components, the system would have the correct relationship for the positions of all components irrespective of which format was used to create the coordinates.

Software Channels – This option will permit the user to assign Software channels to components to provide a means to document software addresses and tag names and associated data that may or may not be related to connection points on a component. For example - it may be necessary to assign 32 digital inputs, tag names and descriptions to a digital input module on a PLC whereas the module itself may only have a single multi-pin connector on it that connects any external digital signals to the module. This would allow the software channels to be used independent of any connection point information as they are not really related to one another.

10.6 Page Sizes

This function allows the user to create new custom page sizes. DAD has the metric standard page sizes defined for A0, A1, A2, A3 and A4 pages. These standard sizes can be deleted if they are not needed by selecting one or more and selecting the Delete Icon. This is not recommended but is possible.

New Customised sizes can be added to the list using the Width and Height settings and by assigning a name for the customised size before selecting Save.

10.7 Title Block

This function allows for the creation of customised Title Blocks for use on published documents created using the workpad. It is also possible to insert a Logo image into the Generic Title Block that is a default for published DAD documents.

Inserting a Logo into a Generic Title Block is accomplished by selecting the edit option in the Generic Title Block window. The logo that is to be used must be a JPEG image file that is accessed in a directory on the MS Windows system. This Logo will be scaled to fit the space for the logo on the Generic Title Block. Ideally the Logo image file should be square as the system will stretch or shrink the logo to correctly fit a square space. If the source Logo image is rectangular, the shape will be distorted to make it fit a square space. Adding some white background around the logo image to make it a square image will prevent the image from being distorted upon display.

Various Options are also available for the way Revisions are listed on published documents. These are self-explanatory and examples are displayed for each of the selected options. It is also possible to define how many revisions are to be catered for in any Custom Title Blocks created by DAD users. The Generic Title Block caters for up to 5 revisions to be listed on any published document.

On the right hand side of the Title Block Window there are options available for the creation of Customised Title Blocks. These Title Blocks can be created for normal Published Documents and for Folder Reports. Configuring Folder Reports is a subject that is dealt with separately in this Manual.

To create a new Custom Title Block the user must right click within the Folder Reports area in the Title Block Window.

The Page Size Preferences allows the user to define which of the custom title blocks that have been created should be used on the different page sizes. It is therefore possible to create a custom title block to suit an A3 page and to use a generic title block on all other page sizes.

It is important to recognise that the Custom Title Blocks are normally created to fit a specific page size and it is therefore simpler if these Custom Title Blocks are named in a way that makes them easily identifiable and indicates what page size they were created for.

If some new Page Sizes are created using the Page Size Function then these new page sizes are only available for selection in the Title Block page size preferences after DAD has been shut down and restarted. The options will always be presented for both a Landscape and Portrait view of each of the applicable page sizes

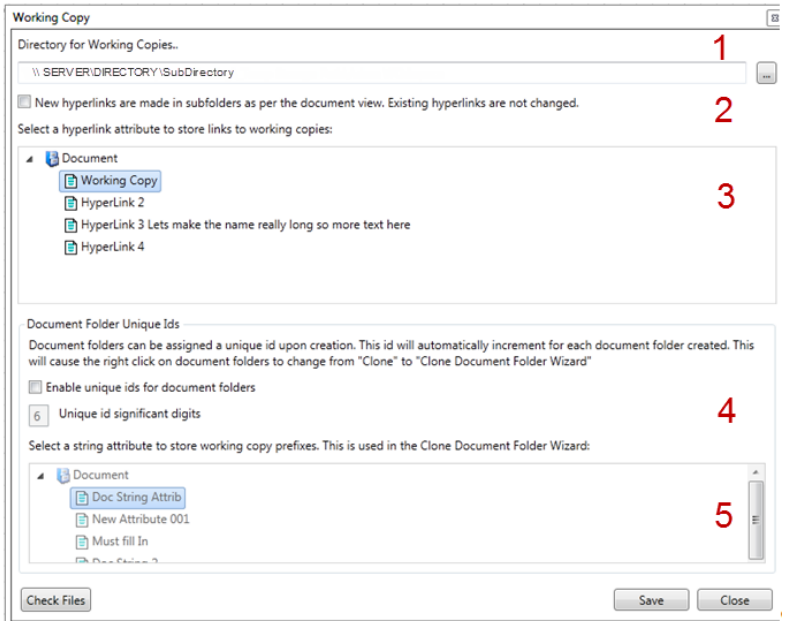
10.8 Working Copy

Working copies allow files stored on the file system outside DAD to be referenced from within DAD. Normally, all attached files are read-only, since they are stored within the database. Making it a working copy will copy it to an external file system and will allow edits.

When a file is moved outside DAD, the file name is stored as a hyperlink in the "Working Copy" attribute of that object. Clicking the hyperlink will open the file.

There are 2 main requirements for working copies.

Refer to screenshot below with section numbers marked.



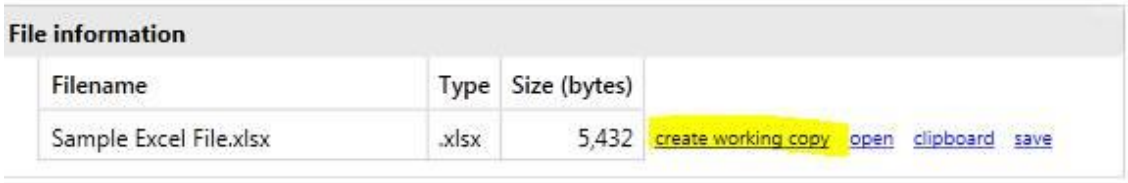
In **SECTION 1** a Path on the file system is specified that stores the file name. We recommend the use of UNC paths (\\Server\Directory\...), rather than a mapped path (Z:\Directory\...) since some users may not have the mapped directory. However DAD still handles either. Note : The directory is relative to the client machine, so using C:\Folder\ will result in the C:\ drive being used on each users own machine.

Another option on the form is **SECTION 2** – "Create working copies in subfolders". If this option is not selected, then all working copies will go into the directory path specified in SECTION 1. If this is selected, then subfolders will be made under the path as per the DAD directory structure.

A "Working Copy" attribute is specified. This is the attribute on the objects in which the working copy hyperlink is stored. This is set in **SECTION 3**. This displays all the document attributes which are of type "Hyperlink". One must be selected. We normally call this "Working Copy" however it can be any name specified.

If you have these 2 set for a workspace, and the Working Copy Attribute is on the object, then there will be new options on the document summary forms.

This link for “Create Working Copy” can be seen below.



If you click this link, it will copy the attached file from within DAD to the directory specified in SECTION 1. It will then populate the attribute specified in SECTION 3 with the file name.

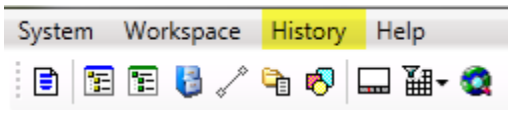
If you click that File Name link in the Working Copy attribute it will open the file.

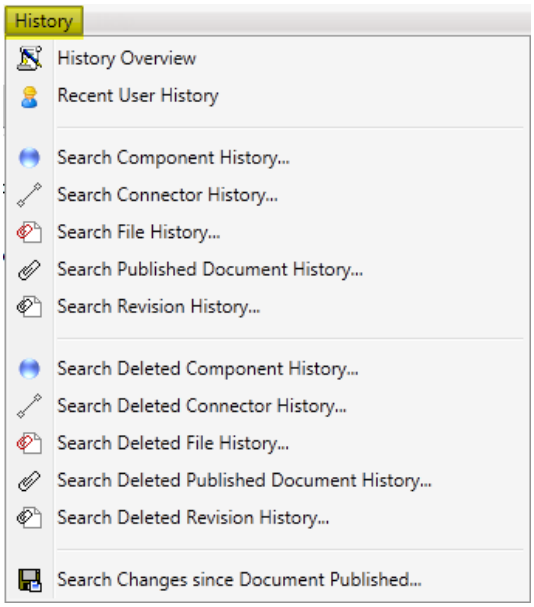
You can also Manually set a working copy file, by clicking the “Set Working Copy File” next to the Working Copy Hyperlink Attribute. This can be seen in the image above.

If you specify a file that is not in the working copy directory, then DAD will copy the file to that directory, and update the attribute value. If the file is already in the Working Copy directory, then it will just update the attribute value.

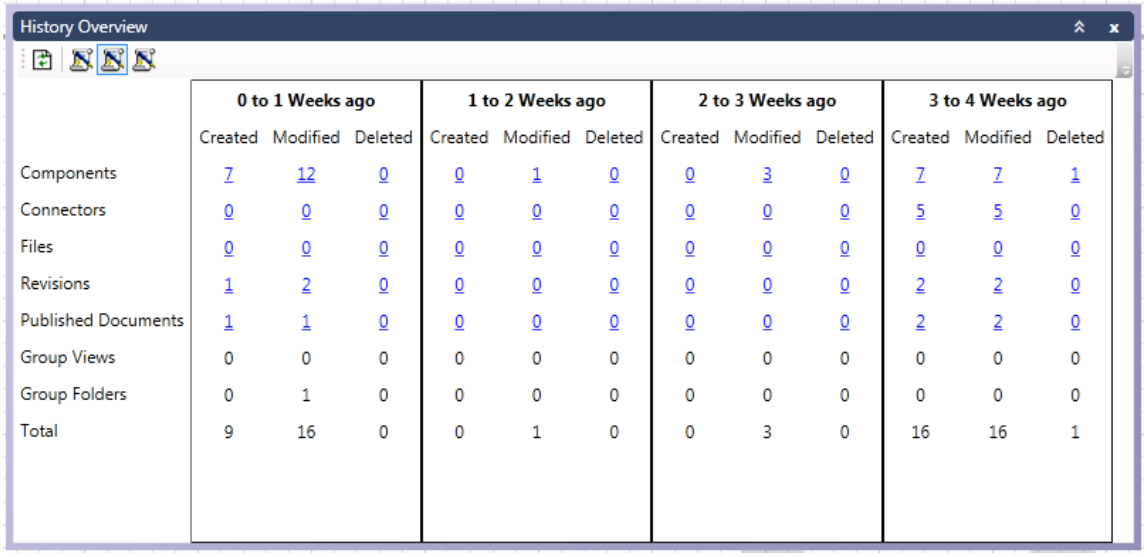
There is additional functionality for unique document folder ID’s for document control purposes. These are in configured **SECTION 4** and **SECTION 5**. If Section 4 is enabled, the Right click Clone on the document folders changes to a “Clone Document Folder Wizard”. This will clone the document folders with a given naming convention (Specified on that form) and copy any hyperlink with the same naming convention. The SECTION 5 working copy prefix is used in that Wizard.

11 History Menu





11.1 History Overview



	0 to 1 Weeks ago			1 to 2 Weeks ago			2 to 3 Weeks ago			3 to 4 Weeks ago		
	Created	Modified	Deleted	Created	Modified	Deleted	Created	Modified	Deleted	Created	Modified	Deleted
Components	7	12	0	0	1	0	0	3	0	7	7	1
Connectors	0	0	0	0	0	0	0	0	0	5	5	0
Files	0	0	0	0	0	0	0	0	0	0	0	0
Revisions	1	2	0	0	0	0	0	0	0	2	2	0
Published Documents	1	1	0	0	0	0	0	0	0	2	2	0
Group Views	0	0	0	0	0	0	0	0	0	0	0	0
Group Folders	0	1	0	0	0	0	0	0	0	0	0	0
Total	9	16	0	0	1	0	0	3	0	16	16	1

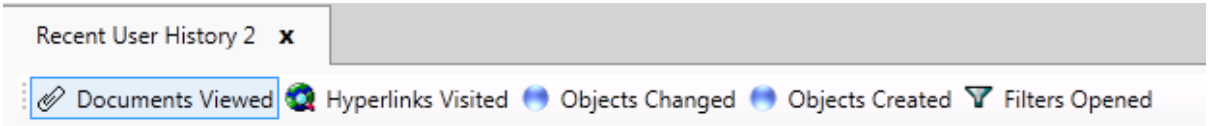
The History Overview allows a user to see an overview of activity within the model over different periods of time. The Icons at the top of the window allow for selection of Daily, Weekly or Monthly tables of data and the system displays categories of Created, Modified and Deleted items within each of the displayed periods.

Pointing at any of the displayed values will change the cursor from an arrow to a pointing hand and left clicking the mouse on any displayed value will display the log for the category of event that is selected.

Some Values are displayed in black text for information only and cannot be selected to display an associated log file. The associated log file will generally be far longer than the number of items that

are listed in the table. For example in the above example the table indicates that 12 components have been modified within the last week. The actual log file may contain hundreds of records of modified data associated with these 12 components.

11.2 Recent User History



This option will allow the current user to display a record of all events in the system logs that relate to the current user. The different tabs on this display will allow the user to see a detailed record of documents that have been viewed, Objects changed etc.

11.3 Search Component History

This option allows the user to create a Filter to search the model to find events in the system log that relate to any selected components within the model. This can be used to create a specific filter that will check all components that are included in the Filter. The Filter that is created can be saved for future use if required. This is done by selecting the Filter Menu at the top of the Components History Spreadsheet Filter and following the options available. Saved Filters can be used by opening any named filters that have previously been saved. The displayed spreadsheet of events can be sorted by selecting the column header and using the right click menu to sort in ascending or descending order.

11.4 Search Connector History

As per Component History – this option allows Connector History to be examined.

11.5 Search File History

As per Component History – this option allows File History to be examined. This will provide information on imported files that are saved in the model.

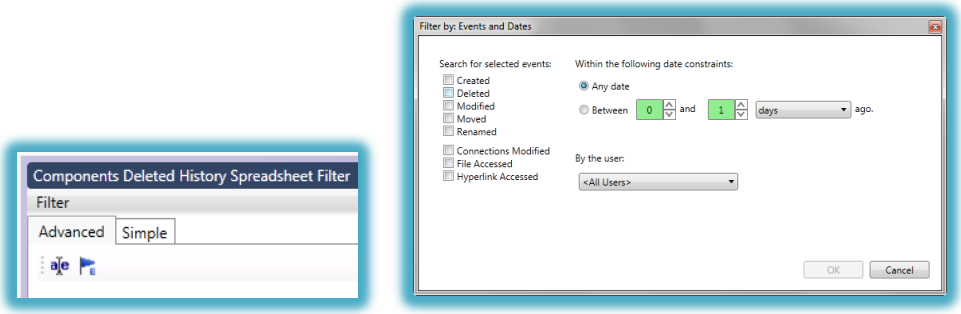
11.6 Search Published Document History

As per Component History – this option allows Published Document History to be examined. This will provide information on Documents that have been published by DAD within the model and saved within various document folders.

11.7 Search Revision History

As per Component History – this option allows the Document Revision History to be examined. This will provide information on all Document Revisions that have been published or viewed.

11.8 Search Deleted Component History



It is possible to search the model for components that have been deleted. As the deleted object no longer exists in the model, it is necessary to search for Description, When Deleted or Deleted by Who. Only two icons are displayed at the top of this Deleted History Spreadsheet Filter. The left Icon can be used to enter a Description to be used in the search for records of deleted objects. The right Icon can be used to select a classification for the event and a time period when this deletion may have occurred as shown - above right.

If a Name of a deleted component is known or partially known, the string or partial string with wildcards can be entered and the records in the model searched to locate matches.

11.9 Search Deleted Connector History

As per Deleted Components History above.

11.10 Search Deleted File History

As per Deleted Components History above.

11.11 Search Deleted Published Document History

As per Deleted Components History above.

11.12 Search Deleted Revision History

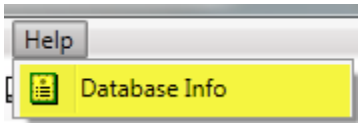
As per Deleted Components History above.

11.13 Search Changes since Document Published.

As per Deleted Components History above.

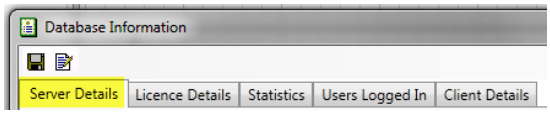
12 Help Menu

12.1 Database Info



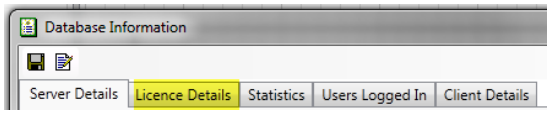
Selecting the Help Menu on the main menu will provide only one option and that is to view the Database Info.

12.1.1 Server Details



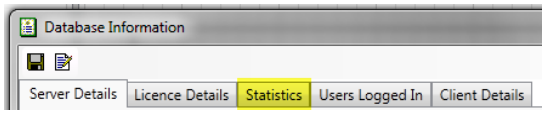
The first Tab within the Database Information window will display server details. This information includes data that shows the size of the model file on the server and the size of the Log file. It also displays information on when the last DAD backup was done and a variety of other facts about the configuration of the SQL server installation. This information may be important when looking at performance issues with a specific server and may be the sort of information that should be provided to I&E Systems in the event that performance problems are being experienced.

12.1.2 Licence Details



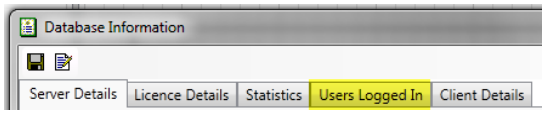
The Licence Details tab will show details of the current licence for the DAD model on this server. This includes the Registered Client name that will appear on every published document created within DAD. It will indicate the number of concurrent users that are permitted to access and work on the DAD model as well as the number of concurrent users that are permitted to have read only access to this DAD model. This page will also show the expiry date for leased licenses and the Limit of Workspaces that the licence makes provision for.

12.1.3 Statistics



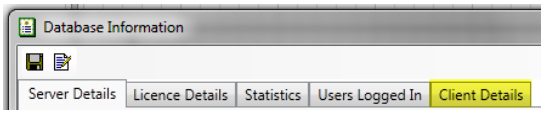
The Statistics tab will display all the data concerning the current model, including the number of components, connections, published documents, revisions, etc.

12.1.4 Users Logged In



This tab will list any users that are currently logged into the DAD model. It will indicate whether the user has Edit rights or Read only access. The name of the host PC that the client user is working on will also be listed.

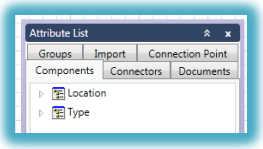
12.1.5 Client Details.



The Client details tab display the details for the current user including the Windows Operating system on the client PC/laptop and details of the DAD client that is in use.

13 Creating Attributes

Create attributes in the DAD model by selecting the Attributes Icon. displayed at the top left side of the DAD screen. This will open the Attribute List Window shown below.



Attributes are the names of the fields that are created to store appropriate data in the DAD model. There are different attributes for different categories of object in the model.

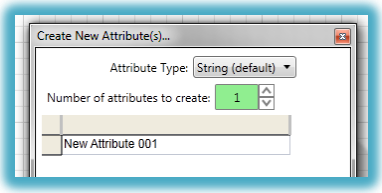
Attribute names should be kept as short as practically possible. Long attribute names will take up more space in spreadsheet views and anywhere else that attributes are displayed.

It is important that the attributes are created in the correct category to permit them to be used correctly to store suitable data. This means that Attributes that are created on the Components Tab under the Type Heading can only be utilised in Type Folder Definitions. Attributes created under the Location Heading can only be used in Location Folder definitions.

Attribute names cannot be duplicated and cannot be moved from one tab or category to any other tab or category after they are created. The same name can be used within different categories however care should be taken to avoid confusion with duplicated names as it may not always be obvious in some displays which category each attribute belongs to.

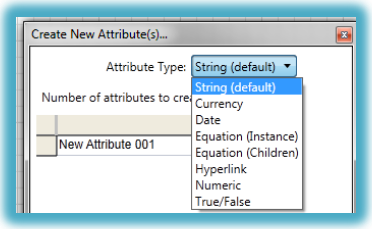
Attributes can be created with different formats and characteristics to suit the purpose for which they are to be used.

Creating a new “Type” attribute for components is achieved by right clicking on the heading “Type” in the Component Tab of the Attribute List window. Select “Create Attribute” from the menu using the muse cursor. This opens a new window called Create New Attribute as shown below.



The number of individual attributes to be created can be set by using the arrows alongside the green numeric field or a new number can be entered into the green field. The applicable attribute names to be created can be entered in the list that is shown below. It is possible to create numerous attributes at the same time and it is also possible to paste a list of attribute names into this table from any other suitable source such as a list of labels from a spreadsheet column.

The attributes that are created are based on the Attribute Type that is selected from the pull down menu. This menu is accessed by selecting the down arrow to the right of the Type field as shown.



13.1 String Attributes

The default Attribute Type is "String" which will permit any sequence of characters to be entered into an attribute data field. The maximum number of characters that can be entered in a String Field is 8000.

Note: If an attribute is created as a String attribute it cannot be changed to a different type after creation. If an attribute type is incorrectly selected upon creation it must first be deleted and then recreated with the correct type selected.

13.2 Currency

Currency attributes are used to display a numeric value with a $ Currency Symbol and 2 decimal places.

13.3 Date

Date attributes are used to enter dates in a consistent format and will provide a drop down calendar for date selection on data entry. This avoids potential problems with inconsistent date formats being entered into String fields and allows for dates to be used in a filter.

13.4 Equation Instance

Equation (Instance) attributes allow the user to create an equation that may calculate a value based on two attributes within any single object. The equation can only refer to other fields that are defined as numeric. The equation can only include numeric data or characters for specific arithmetic operations. An example is the cost per meter of a cable being multiplied by the length of that cable to calculate the cost of the specific cable.

13.5 Equation Children

Equation (Children) attributes allow the user to create an equation that may calculate a result based on the values of specific attributes that may occur within the children of an object. The equation can only refer to other fields that are defined as numeric. The equation can only include numeric data or characters for specific arithmetic operations. An example of this may be an equation that is used to calculate the total cost of all the components in a specific area or location. This would be used to sum all the individual costs assigned to each of the relevant components.

13.6 Hyperlink

Hyperlink attributes are used to save a Hyperlink that could link the attribute to another source of information e.g. a document that may be saved on another system e.g. a separate file server. The hyperlink attribute data will permit a user to follow the hyperlink to the new location where the file or specific information is stored.

13.7 Numeric Attributes

Numeric Attributes are used to store numeric values. This type of attribute will not permit the entry of any character except for a numeric character and a decimal point. Any alphabetic characters will be rejected if a user attempts to enter such a character. External data that is copied from another source e.g. a spreadsheet and pasted into a numeric field will be rejected and cannot be saved. The numeric field will be shown as Green in Edit mode and will change to Pink if a user attempts to enter invalid data that contains alphabetic characters or any other non-numeric characters.

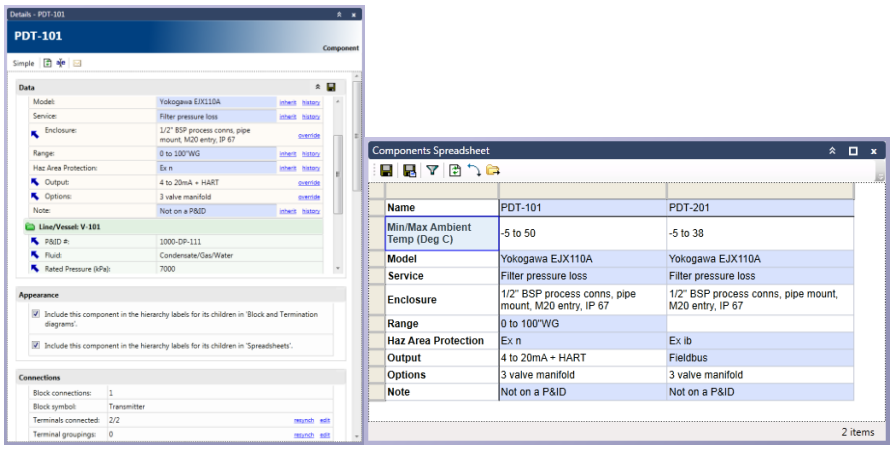
It is recommended that attribute names should be created for numeric attributes in a way that the applicable units are displayed in the attribute name e.g. Power(kW), or Press(kPa).

13.8 True/False

True/False attributes are used to provide a facility to store a simple selection where the answer is either True or False, Yes or No etc. The field will be presented in the form of a Check box that the user marks with a Tick by left clicking in the check-box using the mouse cursor. If data is exported from a DAD model and includes a True False Attribute then the status of the True False selection will be reflected in the exported data as a 1 or 0. 1 would indicate the check-box was ticked and 0 would indicate that it is not ticked.

13.9 Entering Attribute Data

You enter attribute data in both the Summary and the Spreadsheet when the cell background is Blue:



Data that is displayed with a White background is being inherited from the Parent folder. In a Details page there is a link alongside each data attribute that will allow the user to override inherited data or to Inherit overridden data. There is a second link alongside each overridden data attribute that allows the user to examine the history of that specific attribute. This allows for a detailed examination of any changes that have been made to data values that have been overridden for a specific object.

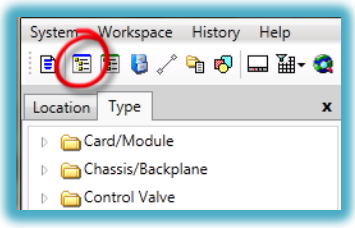
In a Spreadsheet view individual cells or ranges of cells can be overridden by selecting the cell(s) and then using a RCM to select the option to override the cell(s). If a cell or group of cells is already in an overridden state then the option will exist to select Inherit to force the cell(s) to display data that is inherited from the parent folder.

It should be noted that cells that currently display inherited data can be overridden and will then display the same inherited data against a blue background. This text can then be amended to suit the individual object. This will also mean that if a cell(s) is overridden and the parent folder data is then changed, the data in the child object will not be changed together with the parent folder.

14 Creating Components

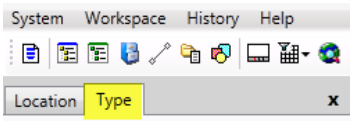
Any components that will be used in the DAD model will be defined in terms of "What it is" i.e. the Type and "Where it is" i.e. the Location. Every component in the model will always be found in both the Type View and the Location View. The basic principle of DAD is that Type Folders will be used to define the characteristics of generic type of components and Location Folders will be used to define the location of the same components. If the Type or Location is not defined at the time the component is created then it will be placed in the Unknown Type Folder or the Unknown Location Folder. The component can be dragged out of the Unknown folder and dropped into a specific folder at any time.

The default DAD display shows a Component View on the left of the screen. This View window has two tabs at the top that are marked Location and Type as shown below. All component Folders are Yellow and their Details Views are also coloured the same way to avoid confusion between Folders and Components. Component Detail Views are always colour coded Blue.



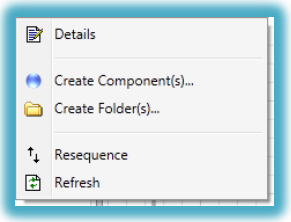
The views can be selected for display by clicking the left mouse button when the cursor is positioned on one of the tabs. The Type View and Location Views may both be empty when DAD is first started with a completely new model. If for any reason there is no Type and Location view window displayed then this can be opened by selecting the Components Icon at the top of the screen as indicated above.

14.1 Type View



To define the characteristics of Types of Components that will be used in the model, the user must create suitable Type Folder definitions in the Type View of the DAD Client User Interface.

To define generic types of equipment the mouse cursor is positioned on a blank area within the Type View window and the right mouse button is clicked to display the appropriate menu.



Select Create Folder(s) to create a generic type of object. The folder(s) will then be used to create actual components that match the generic type folder definition that has already been created. It is worth trying to create the Generic Type Folder with as much detail as possible before any components are created using the folder definition. This avoids the possibility of having to make changes to multiple components as new details are identified and are added to the Type Folder.

Note: A Type Folder definition is applied immediately to any component that is created using that Type Folder. If the Type folder is modified after components have been created then existing components will not automatically take on the new characteristics of the Type Folder. Any new components will match the current Type Folder definition but existing components can be selectively updated to match the new definition or can remain different from the current Type Folder definition.

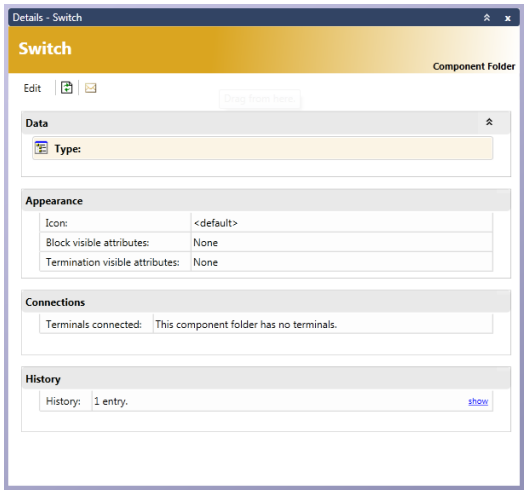
It is very important to understand that components within a Type folder can be different to the Type folder itself and to one another. This is a deliberate feature of the DAD modelling software as it permits one generic type folder to contain different variations of the "Type" depending on when they were created.

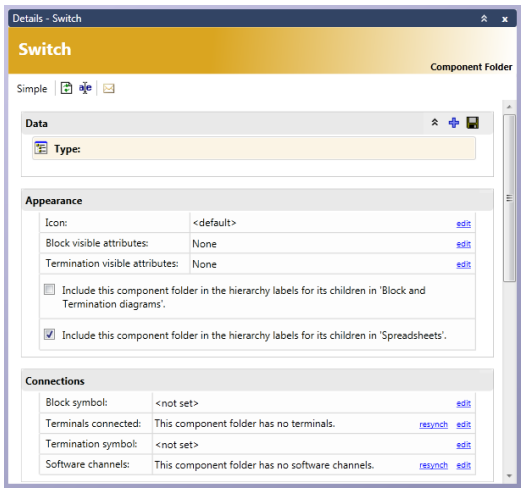
Consider an example where a manufacturer makes a particular product with specific features. The DAD model and live system may contain one or more of these products in particular locations and connected in specific ways. At some stage the manufacturer releases a new version of the same product with some additional features. This does not mean that all the existing installed products are going to change to the new version when we update the definition for this specific Type of device. Any new products purchased from the manufacturer will now be the "new" model and will have the new features. The older existing products will be the "old" version without the new features. At some stage one or more of the OLD units may be removed and replaced with NEW units. The user has the option to update or Re-synchronise selected items to match the new Type definition. This is a user selected update and is not simply applied to all existing devices.

Components cannot be nested within one another in the type view. You can change type by moving a component to a different type folder. Type folders impart features to their members according to the Rules of Inheritance.

14.1.1 Edit / Simple Views

Once a Type Folder has been created and given an identifying name, e.g. Switch, it can be configured to provide it with unique characteristics. This is done by selecting the "Switch" folder with the mouse cursor, using the Right-click option to select "Details" for that folder. A Details window will open as shown on the left.

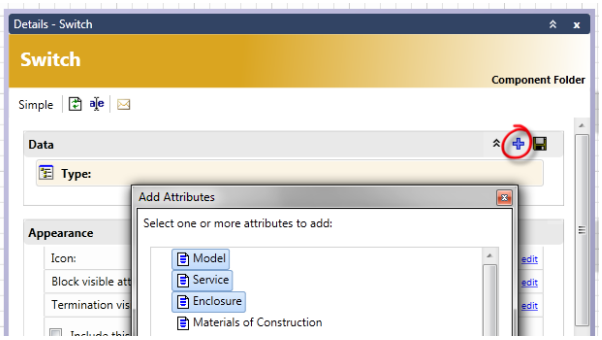


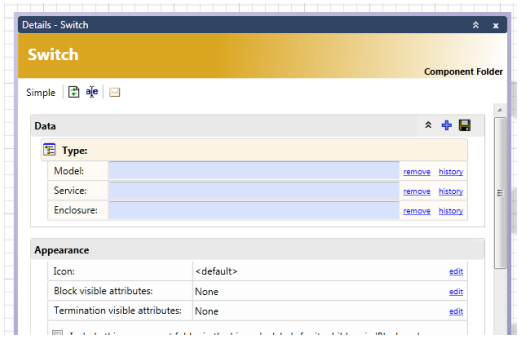


The details window will open in the Simple View Mode (left) with the default settings for Type Folders. To configure the details for this folder it is necessary to display it in Edit mode. This is selected by pointing the mouse cursor to the word “Edit” and clicking the left button of the mouse. The window will then change to display the edit view and the details window will expand to display additional settings. This Edit view will display a link to return to the “Simple” view if required.

14.1.2 Assigning Type Attributes

Type Attributes can be added to the Type Folder Details by using the **+** sign alongside the heading **Data**. This will display the Add Attribute window with any the existing Type attributes displayed. One or more attributes can be selected and added to the **Data** section of the Type Folder details display when OK is selected.





Once these attributes are selected and added to the folder Details they are displayed as empty fields as shown - above right. They can be removed individually by selecting the remove link displayed alongside each attribute field. Data can be added into the attribute fields and saved by selecting the Save Icon at the right of the **Data** heading. Any data that is entered in these fields will be inherited by all components within this Type folder.

14.1.3 Appearance

An Icon can be selected for the components in a Type Folder. The selected Icon will be used for any component that is within this Type Folder and will be visible in the Type and Location Views. Icons can be selected from the Icon Library and will be assigned to all components that are within the specific type folder.

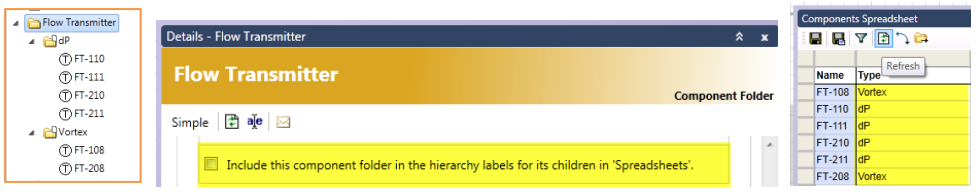
Block Visible Attributes can also be selected for members of this Type folder. This selection will allow the user to select certain attributes that are to be displayed below the selected Shape for this Type of object when the object is displayed on a Block Layer on a workpad. The Selection will apply for all members of the folder and cannot be applied selectively to individual components.

Termination Visible Attributes can also be selected for members of this Type folder. This selection will allow the user to select certain attributes that are to be displayed below the selected Shape for this Type of object when the object is displayed on a Termination Layer on a workpad. The Selection will apply for all members of the folder and cannot be applied selectively to individual components.

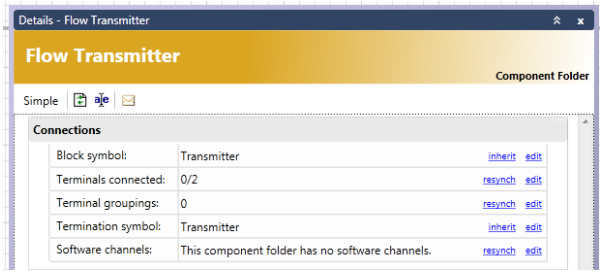
A selection is provided to determine whether the Type Folder name is to be displayed in the Hierarchy Labels above the Component Name for all the children of this folder in Block and Termination Layers on a workpad. This selection can be ticked and un-ticked prior to publishing individual drawings to suit specific requirements. Layers on a workpad will need to be refreshed to display or update these hierarchy labels prior to publishing if the selection has been changed.

The effect is shown below for a specific component within a Type Folder with a Block layer and termination shown for each option.

Similar settings are provided to select whether a folder name is included in the Hierarchy labels in a spreadsheet view. See example below for components shown on the left.



14.1.4 Connections



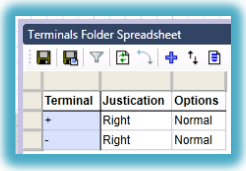
This section of the Component Details window contains details about how this component Type will be displayed on Block and Termination Layers and the specific Terminal details that may be available on a component in a termination layer.

The Block symbol will allow the user to select a Shape that will be used to represent the components that are within this Type Folder, when the components are displayed on a Block Layer within a workpad. This shape can be inherited from a Parent Folder or edited to select a suitable shape from the DAD Shape Selector Library. New Shapes can be created within the Shape Library using the editing tools provided within DAD. See section 21 on page 84 for more Block shape details.

"Terminals connected" displays the number of terminals that have been added to the Type Definition and will also indicate if any of these terminals currently have any cores or wires connected to them. For a folder this will simply show how many terminals have been created for this Component Type Folder Definition. It will not indicate that there are any cores connected to it as it is only a folder and not a real component.

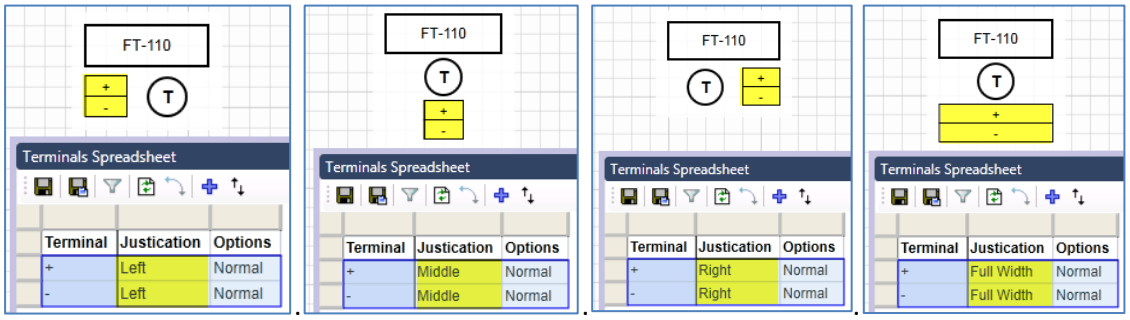
The same information is displayed for child components in which cases any terminals that are connected will be shown by the first digit(s).

Selecting "edit" will open a Terminals Folder Spreadsheet to allow terminals to be created, configured and named.

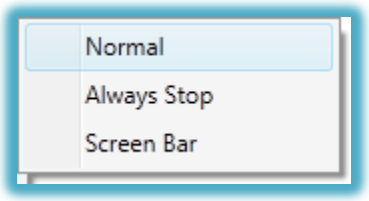


Terminals can be added to this spreadsheet by using the + sign. Each Terminal is given a suitable name to match the markings of terminals on the real component type based on vendor data. Terminals can be selected and justified to the Left, Middle, Right or Full as shown below. In each

case the Termination symbol has been selected as a “Transmitter” Shape. The Justification of terminals is important to permit wires or cores of a cable to be connected from the left or the right without passing through the selected Shape. If wires could be on the left or the right it is recommended to use Middle or Full Justification.



Terminal Options can also be selected. These will affect how the terminals behave under certain conditions. The available options that are provided are :



Normal Terminals are terminals that will allow any cores or wires to be connected to them. Terminals can have multiple cores connected to them and these can be arranged on the left or right hand side of the terminals. If a “Trace” is being carried out on one wire that connects to a terminal the normal “Trace Full circuit” command will continue then trace to any other wires / cores that are connected to the applicable terminals. It is possible to get the Trace to stop when it reaches a specific terminal so that the trace does not continue to other devices that may not be relevant to the circuit that was being traced. In that case the applicable terminal option can be set to Always Stop to prevent a trace from continuing beyond this terminal.

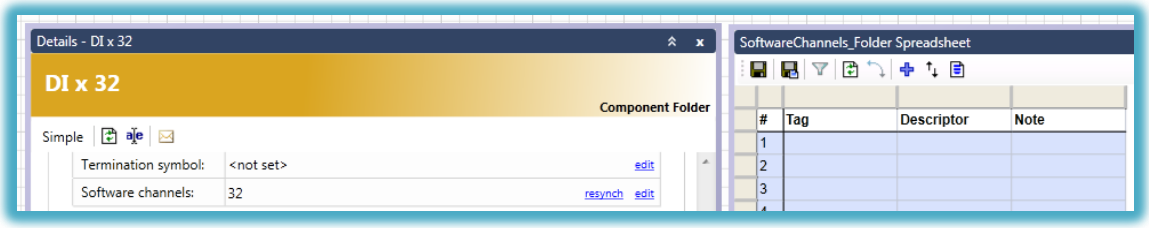
As example could be a trace that results in a connection to a common 0V power terminal or rail. If a circuit is being traced that includes a connection to the common 0V terminal, a “Trace Full Circuit” command could result in a trace continuing to display every other component that may also be connected to the common 0V terminal. If Always Stop is selected for the 0V terminal, then the trace from one component to the 0V terminal will stop as soon as it reaches the 0V terminal for that circuit. Failing to do this can result in the unnecessary tracing of dozens or hundreds of other components that share a common power supply terminal.

The Screen Bar option allows a specific terminal to be designated as a “Screen Bar”. This will work together with the “Screen” setting for a core in a connector /cable. When cables are connected to a terminal strip that includes a screen bar, DAD will automatically connect a core that is designated as a Screen to a terminal that is designated as a Screen Bar. Read more about the Screen and Screen Bar Terminations in Section 16.1.4 on page 47.

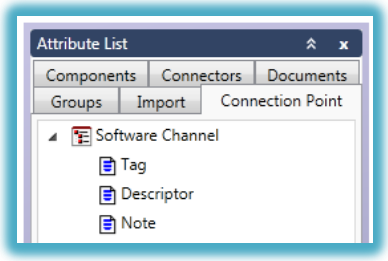
14.1.5 Software Channels

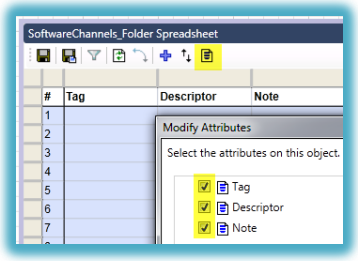
This function is situated under Connection for convenience however it is a selectable option that may not be available depending on the options that are selected in the DAD Workspace / Options menu.

Software Channels are not directly related to connections and they can be configured independently. The normal use of Software Channels is to allow the User to keep records of Software Addresses and Names and other information that may be related to a programmable system that is part of the System that is being modelled in DAD. This may include devices such as PLC Input and Output modules where the physical connection to the module may be a single multi-pin plug connection whereas the module may have 16 or 32 addressable channels or circuits that are used for various input or output signals as shown below for a 32 point Digital Input Module.

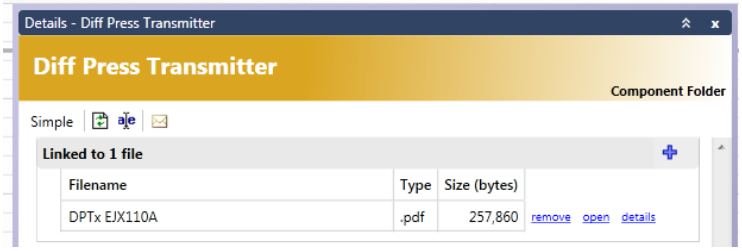


Software Channels can be assigned multiple attributes from the applicable attribute list below. The attributes are added to a Software Channel Spreadsheet by selecting the attribute icon in the spreadsheet window and ticking the attributes that are required for this particular object Type.



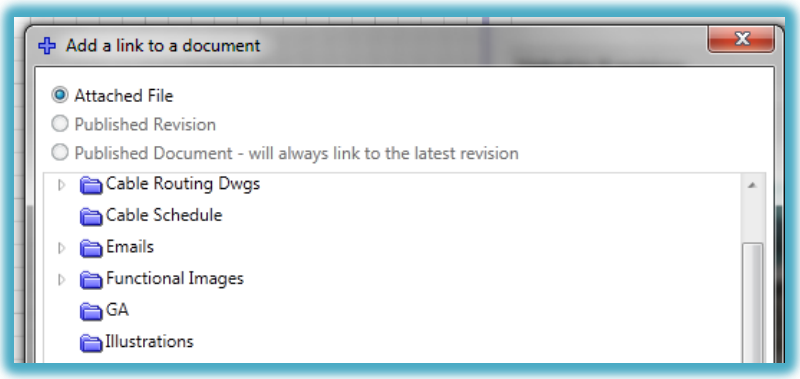


14.1.6 Linking to Files



It is possible to link files to any folder or component within the model. These files can be any format and can be linked to provide additional information for users that can be located easily by referring to the Details window for the object concerned. The files must first be imported into a Documents folder using the Import function available through a RCM in the Documents window.

Once a File has been imported into the DAD model the file can be linked to the folder or object as follows. Left click the mouse button on the + sign alongside the text "Linked to n files". This will open the window called "Add a link to a document". This displays the folders in the Document View.

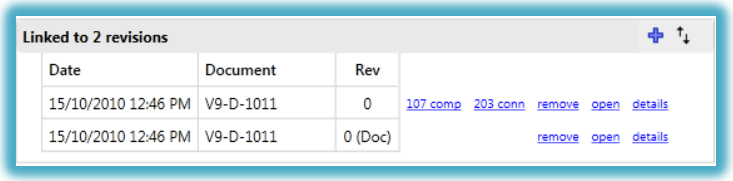


One can then open the folder that contains the applicable imported documents and select the document before clicking OK. This will create a link from the Details page to the applicable file saved in the Document Folder. The file itself is not attached to the details page, it is simply linked to the page so that it can easily be found and opened. Once a file is attached the name of the document is displayed on the Details page under the heading together with links to open the file, remove it or view its Details. These details will include any attributes that may have been added to the Document Folder and individual files when they are imported.

Opening a file that is attached to any object in the model is only possible if the client system has the necessary applications installed to allow the file to be opened and displayed. For example if a PDF file is being opened then the Client PC must have a suitable PDF viewer installed. If the attached file is a CAD drawing then the client PC must have a copy of the CAD software or a suitable CAD file viewer available to allow the file to be opened.

There is no real limit to the number of files that can be attached to an object and these can include all standard document formats, photographs, scanned documents, etc.

14.1.7 Linked to Revisions



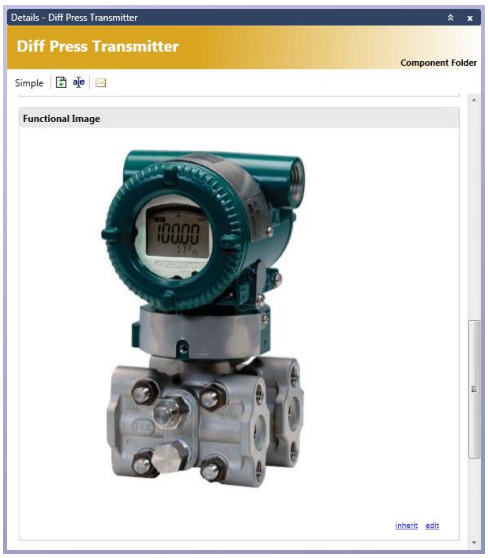
A Type folder can be linked to a specific revision of a published document if the document contains information that may be relevant to the Type Folder. These can be selected by using either a Document Reference (latest revision applies) or by selecting a specific revision of a Published Document. The document name will be displayed together with details about any components and connections that appear on the selected revision. This data indicates that 107 components and 203 Connections have been altered in the model since the document was published.

This only identifies components and connections that are included in this particular document. It is possible that some of these changes may not affect this document, as some affected connection

points or attributes may not appear on this specific document. It serves as a prompt to check the details before using this document.

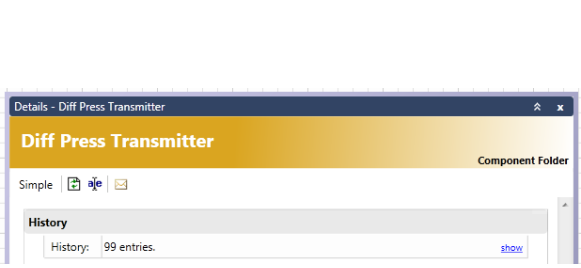
14.1.8 Functional Images

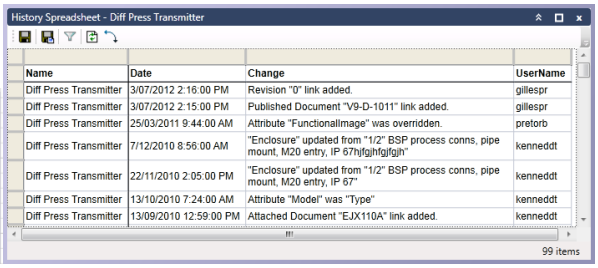
The DAD software makes provision for one Functional Image to be saved for every Type Folder and / or individual component. The Functional Image must be a .JPEG file and can contain any suitable image that could be used to better describe what the function is of a particular device or what the device looks like. The Functional Image is first imported into a Document Folder that has been created to save Functional Images as this makes them easier to locate when linking them to folders. Once the image is saved in a Document Folder it can be linked to the Type folder using the edit link below the heading for Functional Image. The imported file will then be scaled to fit the space and displayed in the Folder Details page as shown below left. It will also be displayed in the Component Details page of every child component as shown below right. A different image can be inserted for a specific component if required.



14.1.9 History

As with every other object within a DAD model, there is a detailed record of every action that is taken by any user from the time when the object is created until the present time. This history Log can be viewed at any time by selecting the “show” link below the History Heading. The length of the History Log is also displayed below the heading. The details are then displayed and can be scrolled through using the scroll bar, cursor control arrows or the wheel on a mouse.

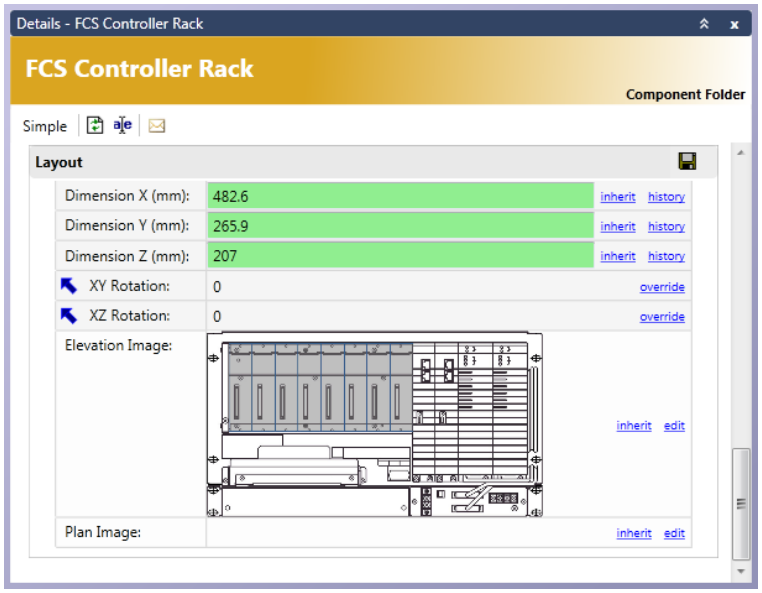




14.1.10 Layout

DAD can create Elevation and Plan views of objects based on Layout dimensions and images that are saved in the Type Folder Details view as shown below. The model will make use of the dimensions that are entered in the X, Y and Z axes. A JPEG Image can be imported into the model using the Document View and saved in a suitable location with other vendor data and images.

The Elevation Image that is added will be scaled to suit the dimensions of the X and Y fields. The Plan Image that is added will be scaled to suit the dimensions of the X and Z fields. The images can also be rotated for an XY layer (Elevation) and for an XZ layer (Plan). The rotation is entered in Degrees and will rotate the image clockwise by the number of degrees specified.



15 Location View

This is the view with folders defining locations.

These folders are examples of how to structure your location view. The examples given will not match your assets. So you should make new folders here for your plant or asset.

Folders can be deleted. Note that this does not delete the components in them it moves them to Unassigned.

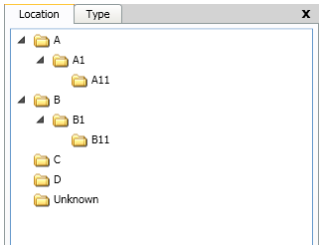
NOTE: *This View defines the physical location of equipment. You can place location folders (areas) within other location folders (areas) and components within components to create assemblies. It is usually inappropriate to create folders here for anything other than physical location.*

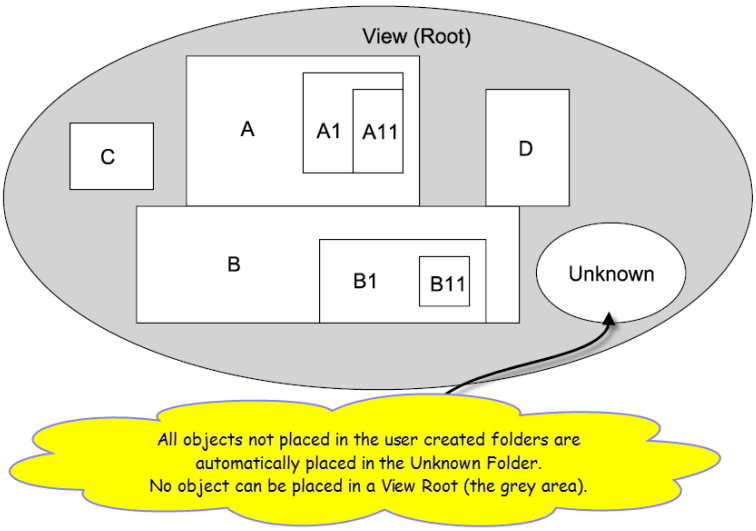
All components belong simultaneously to the Type and Location Views. The same object can be found either by equipment Type or physical Location.

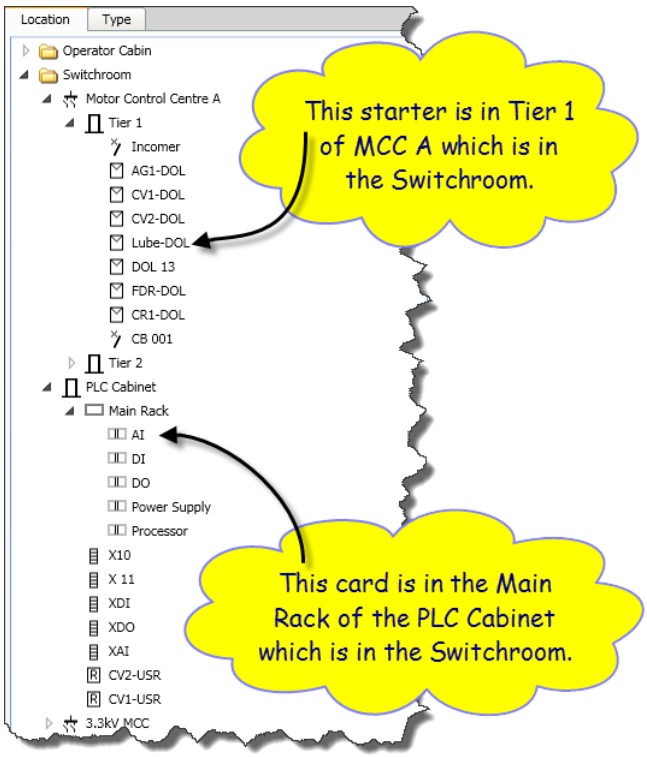
The Location View defines shows where components are relative to one another.

The user should make folders for areas that contain the equipment. Folders may also represent items of equipment outside the scope of the model, e.g. an equipment skid may be a folder.

The folder structure gives a logical relationship to locations relative to one another. The folder structure shown below gives this logical relationship:





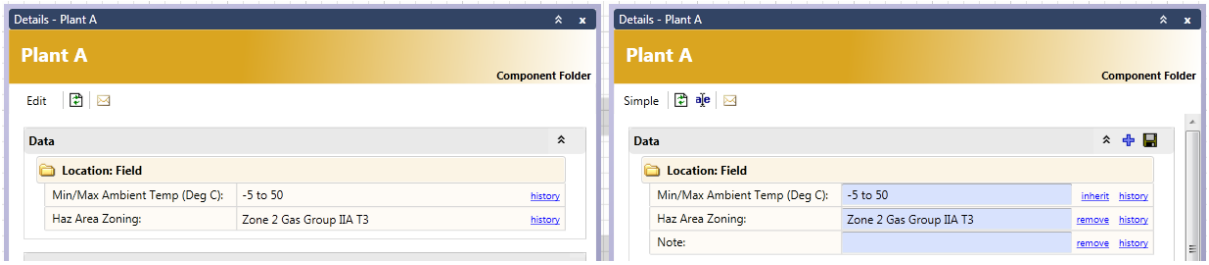


You change a component's location by moving it within the location view.

Location folders impart features to their members according to the Rules of Inheritance.

15.1 Edit / Simple Views

Location Folders can be displayed in the Simple View (Left) or Edit View (Right). The link in each view is provided to switch to the alternate view and is not an indication of the view that has been selected.



In the Simple View only attributes that have been populated with data are displayed. Any blank attributes are hidden in this view.

15.2 Assigning Location Attributes

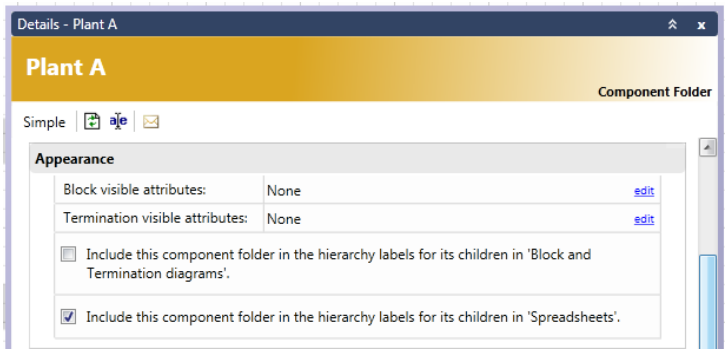
Location Attributes can be added to the Location Folder Details by using the **+** sign alongside the heading **Data**. This will display the Add Attribute window with any the existing Location attributes displayed. One or more attributes can be selected and added to the **Data** section of the Location Folder details display when OK is selected.

Refer to Section 14.1.2 on page 32 for more details.

15.3 Appearance

Block Visible Attributes can also be selected for members of this Location folder. This selection will allow the user to select certain attributes that are to be displayed below the selected Shape when the object is displayed on a Block Layer on a workpad. The Selection will apply for all members of the folder and cannot be applied selectively to individual components.

Termination Visible Attributes can also be selected for members of this Location folder. This selection will allow the user to select certain attributes that are to be displayed below the selected Shape when the object is displayed on a Termination Layer on a workpad. The Selection will apply for all members of the folder and cannot be applied selectively to individual components.



Refer to Section 14.1.3 on page 32 for additional information on the other options referring to Including the Component Folder on diagrams and in Spreadsheets. These work exactly the same way but obviously are related to Location Folder names in the Hierarchy Labels.

15.4 Linking to Files

It is possible to link files to any folder or component within the model.

Refer to section 14.1.6 on page 36 for more detailed information.

15.5 Linked to Revisions

A Location folder can be linked to a specific revision of a published document if the document contains information that may be relevant to the Location Folder.

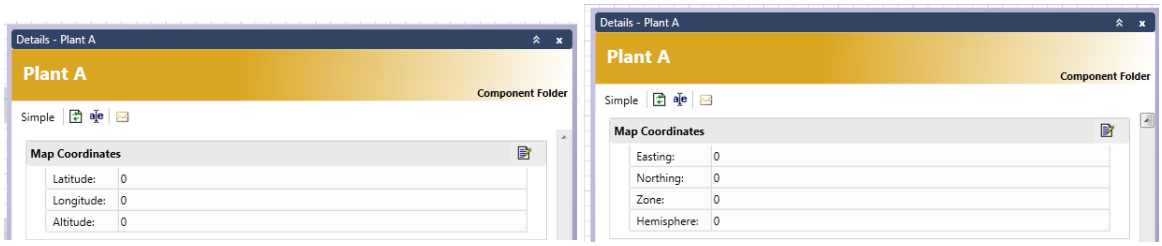
Refer to section 14.1.7 on page 37 for more detailed information.

15.6 Map Coordinates

DAD makes provision for the mapping of locations based on Map Coordinates that are saved in the Location Folder Details view. Every component that is a child of the Location Folder will inherit the Location coordinates that are entered for the folder unless the individual component coordinates are overridden at a component level.

The coordinates will either be entered or displayed in Latitude / Longitude format or in UTM format depending on the settings selected in the DAD Workspace Options Menu. If coordinates are displayed in one format they can be converted to the other format by selecting the alternate format in the main menu Workspace/Options menu.

The displays for Latitude / Longitude (Left) and UTM (Right) are shown below.



15.7 History

As with every other object within a DAD model, there is a detailed record of every action that is taken by any user from the time when the object is created until the present time. This history Log can be viewed at any time by selecting the “show” link below the History Heading.

Refer to section 14.1.9 on page 38 for more detailed information.

15.8 Layout

DAD can create Elevation and Plan views of objects based on Layout dimensions and images that are saved in the Location Folders. The model will make use of the dimensions that are entered in the X, Y and Z axes. A JPEG Image can be imported into the model using the Document View and saved in a suitable location with other vendor data and images.

This only applies to Location Folders which are used to indicate locations of areas that house other equipment. The individual components within the Location folder will get their own dimensions and elevation and plan images based on their specific Type Folders.

Refer to section 14.1.10 on page 39 for more detailed information.

16 Connectors

Users are able to create a standard library of Connector Types to be used in the model.

You can modify these and make more as and when required.

Connectors can be anything that connects two components together, so this would include electrical and instrument cables, wires, cable ducts, radio signals, fibre optic cores and cables and any other connections. A library of standard types can be developed over a variety of projects and re-used for the next project model when required. Connector folders are always Red in DAD to differentiate them from Component Folders that are always Yellow.

Individual named connectors can be observed within the Connector Folders in the image below.

Connectors (with some exceptions) must have a component at both ends.

You change the type of a connector by moving it to a different folder.

Connector folders impart features to their members according to the Rules of Inheritance.

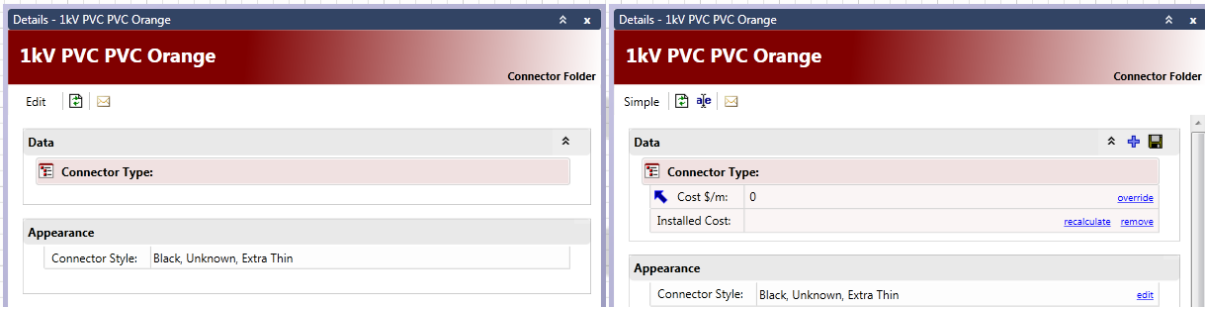
Note : Every connector within a connector folder will always have identical properties to the Connector Folder Definition. It is impossible for a connector to have a different number of cores for example to the connector folder that it is in.

This means that moving a connector from one folder to another will immediately cause the connector to be changed to match the new type. If this means that cores will be removed or added then this will be indicated in the Confirmation Window that will be displayed when the change is requested. Nothing will be altered and no move will take place if the Confirmation is cancelled.

16.1 Connector Details

16.1.1 Edit / Simple Views

Once a Connector Folder is created and given a descriptive name it can be configured to define the unique characteristics of the connector. The Connector Folder Details View can be opened and displayed as shown below. The Edit link will switch the Simple View to the Edit View on the right. The Simple Link will allow it to be switched back to the Simple View.



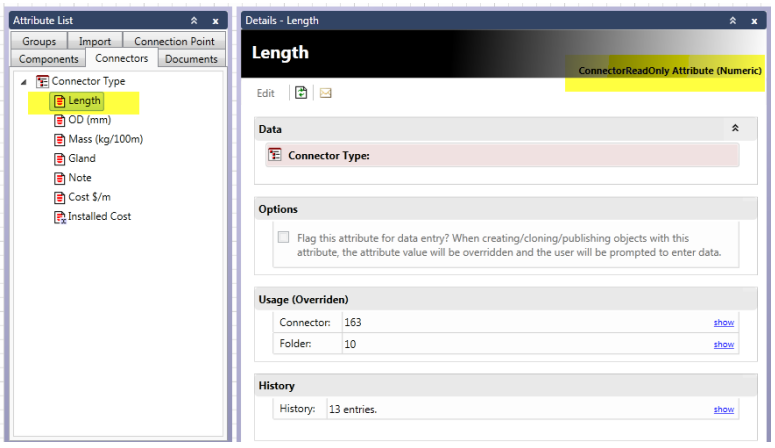
Attributes that have no data will not be displayed in the Simple view.

16.1.2 Assigning Type Attributes

Connector Type Attributes can be added to the Connector Type Folder Details by using the **+** sign alongside the heading **Data**. This will display the Add Attribute window with any the existing connector attributes displayed. One or more attributes can be selected and added to the **Data** section of the Connector Folder details view when OK is selected.

Once these attributes are selected and added to the folder details they are displayed as empty fields. They can be removed individually by selecting the remove link displayed alongside each attribute field. Data can be added into the attribute fields and saved by selecting the Save Icon at the right of the **Data** heading. Any data that is entered in these fields will be inherited by all components within this Type folder.

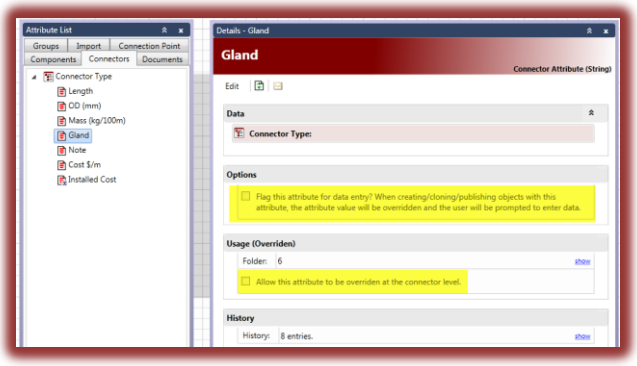
Connector Attributes are handled differently within DAD. In general the only Connector Attribute that will be permitted to have different data for every connector within a Connector Folder is Length. The Length attribute is the only attribute that will work this way from the start. If you looks at the Details view for the Length attribute you will observe that it is a Read Only Numeric Attribute.



Other Attributes normally relate to the connector specification and so these are usually defined for the Connector Type View and apply to every connector that is created with the connector folder.

If however it is necessary to create a connector Attribute that will be different for every connector in the folder it is necessary to configure the Connector Attribute to permit this to happen.

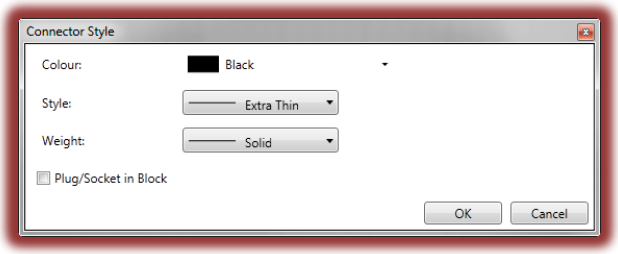
In the Details View for the Connector Attributes e.g. Gland below it is possible to tick the lower selection to permit the attribute to be overridden at a connector level. If this is not ticked the attribute data will be entered in the Connector Folder and inherited by all connectors within that folder. If it is ticked the system will permit the user to override the attribute for each connector to have a unique value, independent of the data in that attribute in the folder. It is also possible to flag attributes to force them to an overridden state and to prompt for data entry.

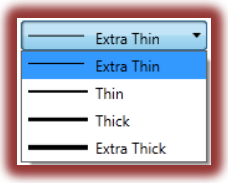


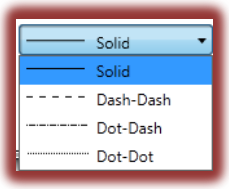
16.1.3 Appearance

Appearance for connectors has nothing to do with the physical appearance of the actual cable or connector in the real system. Appearance in the Connector Details definition is related to how this connector will be displayed on a workpad and published on DAD drawings.

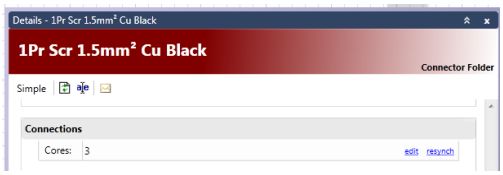
The appearance settings will affect every connector within the connector folder. Changing the appearance settings will affect every drawing that displays one or more of these connectors. The settings for appearance include the colour of line that will be displayed on a workpad / published drawing, the Style of line, the weight and whether a plug symbol should be used in a Block Layer diagram. The options for Style and Weight are shown below. Care should be taken when selecting colours based on the way these will appear on a white background, e.g. yellow and Cyan and others may be difficult to see on a normal white background.



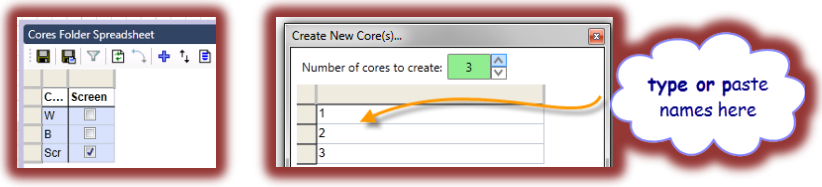




16.1.4 Connections



The Connections section of the Connector Details View allows the user to define the number of individual cores within the sheath of the connector. This can define individual cores within a cable, tubes or fibres within a fibre-optic cable, sub-ducts within a cable duct etc. Selecting Edit will open the Cores Folder Spreadsheet to allow the individual cores to be created, named and configured.



Cores are added by using the + Icon and will be named 1, 2, 3, …. By default. The cores can be renamed at the time they are created or once they appear in the spreadsheet. A list of core names, numbers or colours can be copied and pasted into the list of cores during creation or after they are displayed in the spreadsheet.

Cores can be treated as normal cores i.e. they can be terminated to any suitable connection point / terminal on a component. Cores can also be identified as a “Screen” by ticking the appropriate box in the column marked as Screen. This will ensure that the system handles the Screen core the way a Screen is normally handled in a real system. This works together with the “Screen Bar” setting for Component Terminals as described in Section 14.1.4 on page 34. If a connector / cable with one or more cores designated as a “Screen” core is terminated onto a component terminal strip where one of the terminals is designated as a Screen Bar, the system will automatically terminate the Screen(s) in the connector / cable to the Screen Bar terminal while other cores will be terminated to conventional terminals in the sequence that they are listed in the Connector Definition.

16.1.5 Linking to Files

It is possible to link files to any Connector folder or individual connector within the model. Refer to section 14.1.6 on page 36 for more detailed information.

16.1.6 Linked to Revisions

A Connector folder can be linked to a specific revision of a published document if the document contains information that may be relevant to the Connector Folder. Refer to section 14.1.7 on page 37 for more detailed information.

16.1.7 History

As with every other object within a DAD model, there is a detailed record of every action that is taken by any user from the time when the object is created until the present time. Refer to section 14.1.9 on page 38 for more detailed information.

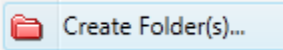
16.2 Connector Types

DAD supports a number of different types of connector to cater for different requirements within the Systems that are being modelled. These folder Types are created by Right Clicking the mouse with the cursor pointer within the Connectors View. New primary connector folders can be created by pointing to an empty space in this view. Sub-folders are created by pointing to an existing folder and using the right click menu to select the folder type to be created. Sub Folder Types must always match the primary folder type.

The connector types include :

- Standard Connector Folders (both ends of connector are the same)
- Rail Connector Folders (e.g. Power supply rails in Termination Layer)
- Stub Connector Folders (e.g. basic Power feeds in a Block Layer)
- Fanout Connector Folders (e.g. multicore cables with single plug on one end)
- Internal Jumper Connectors (jumpers between terminals on the same device)

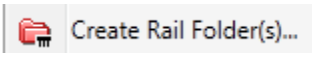
16.2.1 Folders (Standard Connectors)



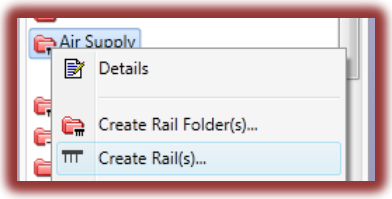
Standard Connectors are normally used in DAD and represent the category of connectors where both ends of the connector are the same. This means that if a specific Connector Folder defines a cable as a single pair with a screen then both ends of this cable will automatically have 3 cores marked White, Black and Screen for example. When cores are created within the Connector Folder these are considered to be identical at each end of the cable and it therefore makes no difference whether the cable is connected from component A to component B or from component B to component A. This Type of connector will be displayed as a single line between two components in a block layer based on the connector Appearance definition as detailed in section 14.1.3 on page 32.

This Type of connector will be displayed with the same core labels at each end of the individual cores in a Termination Layer and the main cable will be displayed based on the appearance definition as mentioned above.

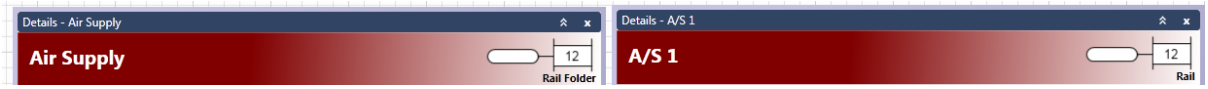
16.2.2 Rail Folders



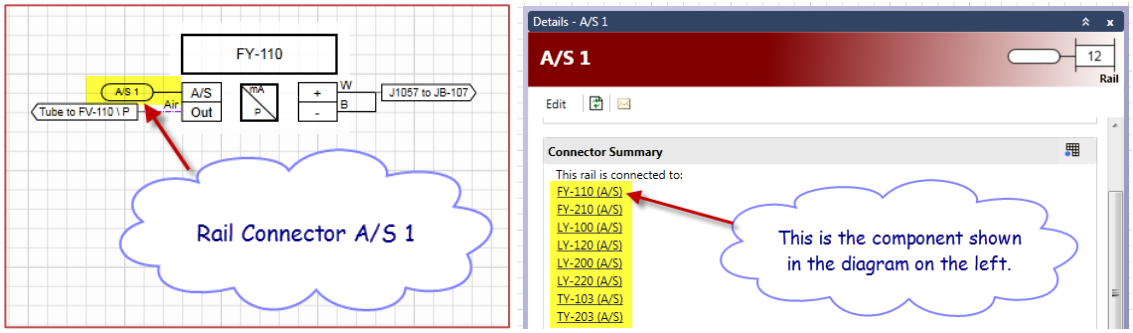
When a Rail Folder is created it must be assigned a suitable name to define the type of rail that it will contain. The Rail Folder could be named Air Supply or +24V or 0 Volt etc. It is important to note that the Folder is designed to hold a number of individual rails created within the specific Rail Folder. These are created by selecting the Rail Folder and using the Right Click menu to select Create Rail as shown below.



A Rail Folder can contain many individual Rails. Each Rail is intended to be a unique rail that may be identified as belonging to a specific Location or piece of equipment. The Details view of a Rail Folder will be as shown below left while the Details view of an individual Rail will be as shown below right.



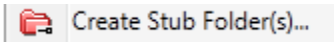
The Rails can be used for simple connections to any component terminal in a Termination layer. The individual Rail label will be displayed on the rail connector (below left)and the Rail Connector will accumulate a list of every component(&terminal) that it has been terminated to. A Component Spreadsheet showing all the connected components can be created by selecting the Icon shown alongside the Connector Summary text in the image of A/S 1 below. In the list the component name is shown i.e. FY-110 with the Terminal label in brackets (A/S).



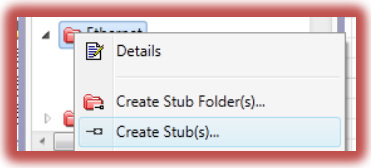
Rail Connectors are one of the few connector types that is created by selecting only one component. Effectively you first select a specific rail as the source for the connection and then select a single component terminal as the destination. The connection is made by holding Shift and Left clicking on the component terminal that is to be connected to the Rail. You can connect the same Rail connections to multiple terminals one after the other.

Rail Connectors do not use the Name that is normally defined in the Connect – Name field at the top of the Workpad. They get their names from the Rail they represent.

16.2.3 Stub Folders

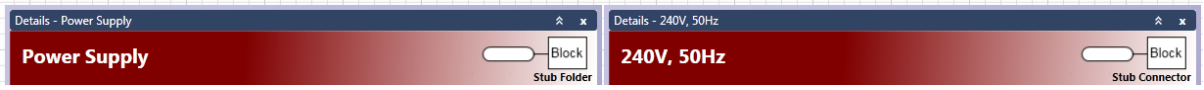


When a Stub Folder is created it must be assigned a suitable name to define the type of Stub that it will contain. The Stub Folder could be named 220Vac or Ethernet etc. It is important to note that the Folder is designed to hold a number of individual Stubs created within the specific Stub Folder. These are created by selecting the Stub Folder and using the Right Click menu to select Create Stub as shown below.

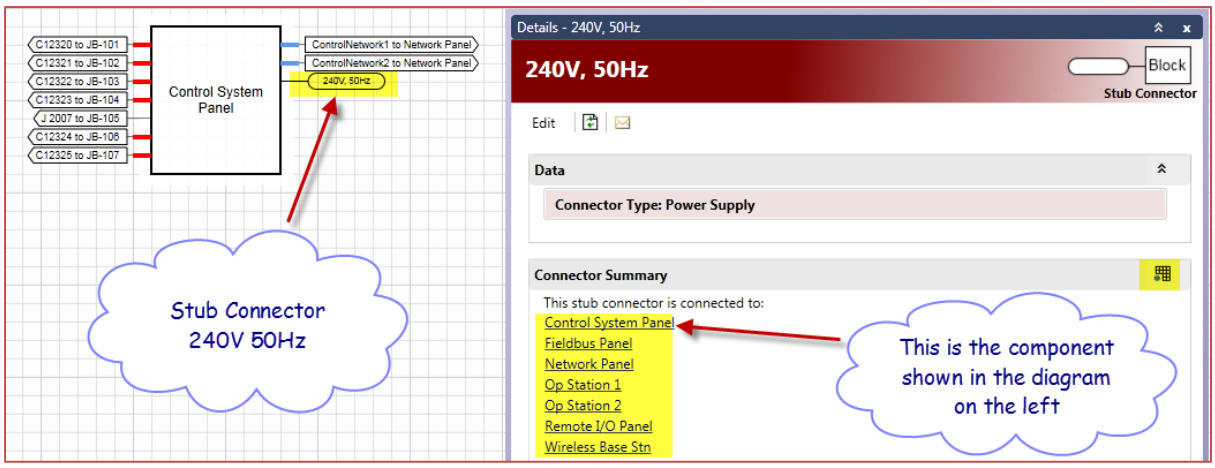


A Stub Folder can contain many individual Stubs. Each Stub is intended to be a unique stub that may be identified as belonging to a specific Location or piece of equipment. The Details view of a Stub

Folder (Power Supply) will be as shown below left while the Details view of an individual Stub (240V 50Hz) will be as shown below right.



The Stubs can be used for simple block connections to any component in a Block layer. The individual Stub label will be displayed on the stub connector (below left) and the Stub Connector will accumulate a list of every component it has been connected to. A Component Spreadsheet showing all the connected components can be created by selecting the Icon shown alongside the Connector Summary text in the image of A/S 1 below.



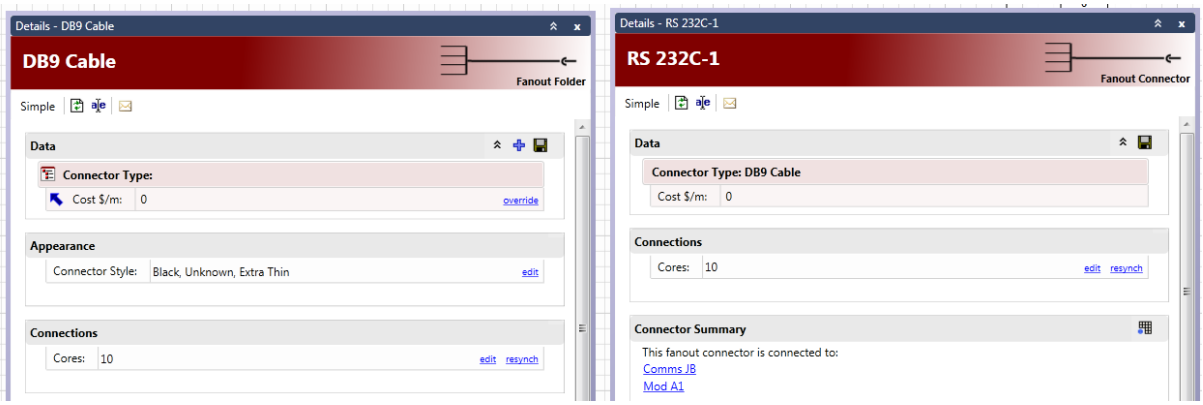
Stub Connectors are one of the few connector types that is created by selecting only one component. Effectively you first select a specific Stub as the source for the connection and then select a single component as the destination. The connection is made by holding Shift and Left clicking on the component that is to be connected to the Stub. You can connect Stub connections to multiple components one after the other.

Stub Connectors do not use the Name that is normally defined in the Connect – Name field at the top of the Workpad. They get their names from the Stub they represent. They cannot be renamed in Connector Spreadsheets

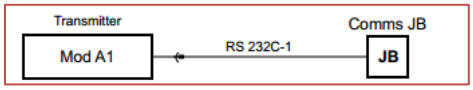
16.2.4 Fanout Folders

A Fanout Folder is created to provide a way to handle those cables where the two ends are different. Fanout Folders can be nested to provide a structure for keeping different specialised cables in a logical arrangement. The Fanout Folders are created by selecting the Fanout Folder on the Right Click Menu as shown above.

A Fanout Folder can contain many individual connectors however these are created via the Connect function on the Workpad. The Details of Fanout Folders and connectors are shown below

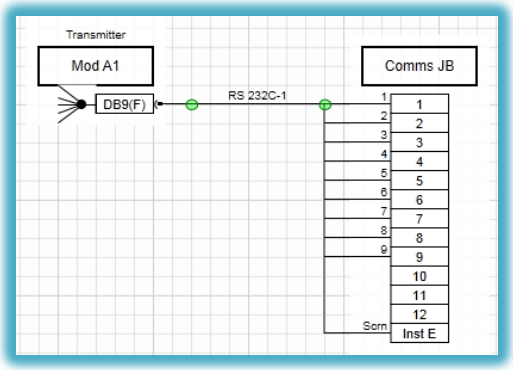


Fanout Connectors are normally used for those special Custom Cables where one end of the Cable has a single Plug connector and the other end has multiple different cores or plugs that are different from the Plug end. The Connections in a Fanout Connector are related to the end that has multiple cores or plugs. A Fanout Connector appears in a Block Layer as shown below with a plug on the left.



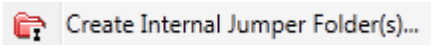
A Fanout Connector is created by connecting two components on a Workpad. The first component that is selected while holding Shift, is the component that will be connected to the Plug end of the connector. The second component that is selected while still holding Shift will be connected to the individual connections defined in the Fanout Folder Details View.

A termination Layer view of a Fanout Connector is shown below. The individual cores have been terminated n individual terminals in the JB on the right. The other end is terminated on a single Plug connector to a terminal that is marked as D9 in the Transmitter.



Fanout Connectors are named using the Connect – Name Field at the top of the workpad and can be renamed in Connector Spreadsheets or in the Details View for the individual connector.

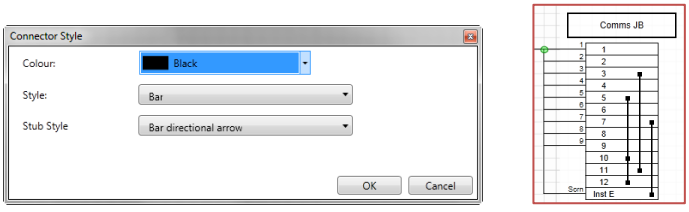
16.2.5 Internal Jumper Folders



Normal connectors can only be connected between two different components in a Block Layer or a Termination Layer. Internal Jumpers are designed to be connected between different terminals on the same component. The Internal Jumper Folders are created using the Right Click Menu.

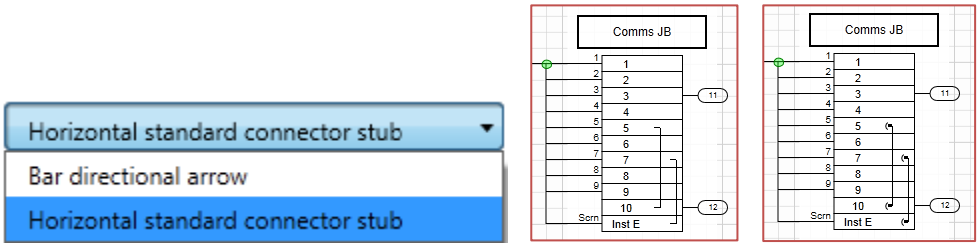
Individual Jumpers are created in a Termination Layer by first selecting the correct Internal Jumper Folder and then selecting a suitable terminal on a component in a termination Layer while holding the Shift key. The Link is created when a second terminal on the same component is selected while still holding the shift key. The individual Links that are displayed will be arranged to suit the overall layout of the connections and the terminal width will be adjusted to suit the number of parallel jumpers that are connected on the Terminals.

The Connector Style of the Jumpers can be altered to suit specific requirements using the Appearance settings in the Jumper Folder Details View as shown below.



In some cases when not all terminals are displayed it is necessary to indicate that jumpers are connected to one or more terminals while the other end may be on a terminal that is hidden. This defined in the Stub Style.

With the Stub Style selected as Horizontal standard connector stub and Style as “Wire” the display is as shown below left while the Style “Wire with plug/socket” is shown on the right.



It may be necessary to experiment with these settings to find an appearance that suits your specific requirements.

Note it is not possible to show Jumpers as connections that are shown outside the terminal shapes on the left or right even if this may be the way they are actually wired in the real system.

17 The Workpad

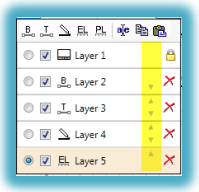
The System Information Model in DAD is defined in terms of Type Folders and Location Folders and each Folder has been given attributes that permit the components to be adequately described as already discussed. The Location View has been structured to take account of the physical position of the components and has been used to create assemblies, sub-assemblies and arrangements of components to match the actual system.

The Workpad is provided to allow the user to create graphical representations of the system in a variety of formats using different layers as appropriate. Each Workpad can be made up of many layers with each layer displaying information about the system components in a way that is specific to the particular layer.

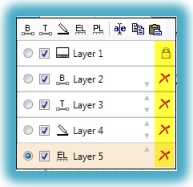
The Workpad is not a "Drawing" in the conventional sense of the word. We do not draw components and connections on the workpad. We display these components in the model in a graphical form using the workpad. The workpad should just be considered to be a View of the Model and not a drawing. It is not "drawn" using some creative process. Objects in the Model are just displayed on a Workpad and a certain amount of rearrangement and formatting is possible but the image is always a view of the model, using the data contained in the model. This data is identical to other views of the model in the form of list and spreadsheets of components and connections.

17.1 Layers

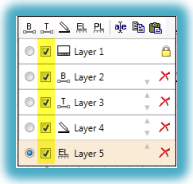
As already mentioned the Workpad can consists of at least 2 or more layers of graphical or tabular information. We will deal with the different types of Workpad Layer independently as each one has certain characteristics that make it suitable for displaying the model information in slightly different formats. The order in which layers are created is significant in that this could result in an Upper Layer obscuring information in a Lower Layer under certain conditions.



The order in which layers are arranged can be changed by using the arrows alongside each layer in the layer drop down list.



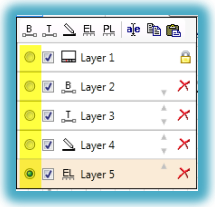
Layers can also be deleted if they are not required. Deleting a layer does not change the model or delete components or connections displayed on that layer. The Title Layer is locked and may not be deleted.



Layers can also be switched off and on to suit the current requirements for the tasks being carried out. This is done by "ticking" the layer selection box alongside each of the layers that are listed in the drop down layer list.

When a Layer is de-selected it is not removed from the workpad, it is simply switched off and any images on that layer will be hidden.

It is important to note that layers that may have been switched off are still kept within the workpad and are published together with all other layers. When a published document is later opened for re-edit, all the layers in the original Workpad will be displayed. Some information on layers that were previously hidden at the time of publishing may now clash with information that is displayed in other layers. The layers can obviously be selected and hidden again, however other users may not be aware that this must be done to make sense of the document. It is better to check that all layers are required and visible before publishing a workpad to avoid later clashes between layers that were not intended to be overlayed on one another.



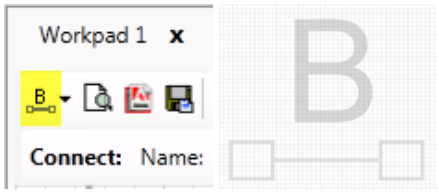
The Radio Buttons alongside each of the Layers are used to select the active layer. The active layer is the only layer that can be worked on at any time. Only one layer can be selected as “Active” and as each layer is selected, any earlier selections will be de-selected.

17.1.1 The Title Layer

The Title Layer is always present on every Workpad and cannot be deleted. It can be switched off if it is not needed but it will remain in the Workpad and will be displayed the next time a Published document is opened for re-edit. The Title Block Layer will display the outline of the page size that has been selected and will also display the title block that has been selected for this page size. The settings for the Title block for each page size is covered in section 10.7 on page 19.

The boundary of the Title Block Layer will not constrain the images that are displayed in other layers so care must be exercised to ensure that the objects displayed in the other layers are arranged to suit the outside frame size that is displayed in the title layer. Selecting a large page size will obviously provide more space to display components and connections however it is important to remember that a large page size may get printed out on far smaller paper and the text that has been scaled to suit an A0 page may be too small to read if the document is printed out on A3 paper.

17.1.2 Block Layer

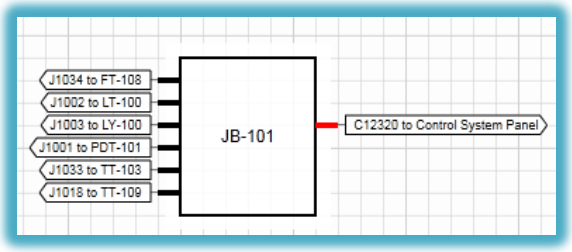


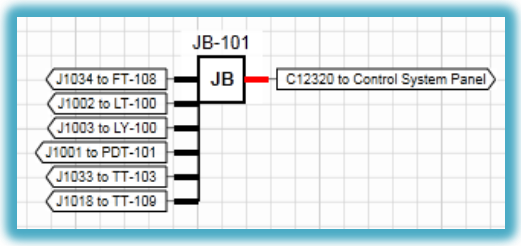
The Block Layer is selected by selecting the B in the layer settings on a Workpad and is confirmed by the B Symbol displayed in the centre of the workpad. The Symbol in the Workpad is only displayed while the layer is blank and is not shown on any published documents or PDF or DAD Previews.

A Block Layer is intended to create a Block Diagram that is able to display any components and Connectors in the DAD model. Individual connectors are shown as single lines (based on the selected appearance See Section 16.1.3 on page 46.

Components will always be displayed as a simple “Block” as a default unless they have been assigned a Shape using the Block Symbol Setting described in section 14.1.4 on page 34.

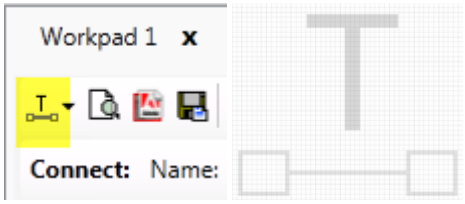
Please Note: Using the default block for components has an advantage over using any defined Shape from the Shape Library. The Default block will always expand automatically in the vertical direction to accommodate more than one connector on a component as shown below left. If a Shape is assigned to the component Type then this “Shape” symbol cannot expand to accommodate more than one connector. A vertical line will be displayed alongside the shape and all connectors will be joined to this line as shown below right.





A Block Layer is also used to connect Connectors between components that are displayed on the Block Layer. See section 6.5 on page 6 for further details on Connecting Components.

17.1.3 Termination Layer



The Termination Layer is selected by selecting the T in the layer settings on a Workpad and is confirmed by the T Symbol displayed in the centre of the workpad. The Symbol in the Workpad is only displayed while the layer is blank and is not shown on any published documents or PDF or DAD Previews.

A Termination Layer is intended to create a Termination Diagram that is able to display any Component Terminals and individual wires and cores of connectors in the DAD model. Individual connectors are shown as lines (based on the selected appearance See Section 16.1.3 on page 46. The connectors are shown as splitting into individual cores defined in the Connector Type.

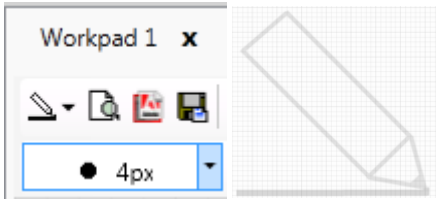
Components will always be displayed as defined in the Component Type Terminal Folder Spreadsheet. The setting for Terminals is described in Section 14.1.4 on page 34.

A Termination Layer is also used to terminate the individual cores of connectors that have been connected between components in the Block Layer. See section 6.7on page 8 for information on Terminating connectors.

Individual single core connectors/wires can be connected in a Termination layer without the need to connect them first in a Block Layer.

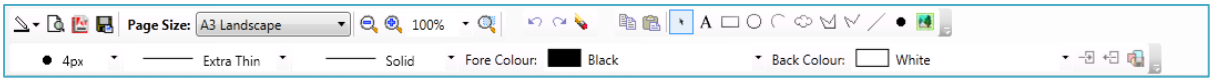
A Termination Layer also provides additional Icons for dealing with layouts and wire markers that are dealt with in Sections 17.12, 17.13, 17.14 and 17.15.

17.1.4 Diagram Layer



A Diagram Layer is the only layer that could be considered to be a “Drawing” layer where shapes and lines and objects can be drawn using a variety of tools that are provided in DAD. These shapes and lines only exist in the specific workpad and are only saved if the drawing is formally published.

The Diagram Layer has a Toolbar that includes a variety of Icons to be used in this layer.



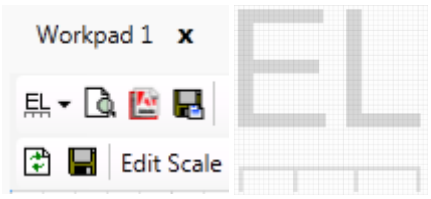
A Diagram layer will allow shapes, lines, pictures, and text to be added to the layer and arranged to suit specific requirements. It is important to understand that any diagrams and text added in a Diagram Layer will only exist on the specific drawing / published workpad and will not be visible when the Model components and Connections are viewed in any other way. This means that this layer should not be used to save any important information or notes that are relevant to a specific object and which should always be accessible when viewing the object in the model. No user will ever be able to see the information that is entered in the diagram layer of a drawing unless they open that specific drawing.

The Diagram Layer can be used to insert an image of a site or a picture of an object or location that may facilitate the virtual positioning of other objects in the model in an associated Block or Termination Layer. This may be used to convey information to a third party in a published document created with DAD, but the relative positioning of the objects will not be visible to anyone viewing the same objects in another workpad.

Each line, shape, text string and picture that is inserted into a Diagram layer, is saved as a separate diagram object. Each of these objects can be selected, moved, stretched and re-formatted to suit specific requirements.

The Diagram layer can be used to create a standard background template for a specific type of drawing, for example a Typical Loop Diagram may have some dividing lines to indicate the effective boundaries of the PLC Module, Marshalling Cabinet, Field Junction Box and Field Instruments. These dividing lines and labels for the different areas could be prepared in a Diagram Layer and then used in many different drawings as these are published within DAD. The Diagram Layer “template” can be used to prepare each drawing or the objects within a Diagram layer could be copied from a template drawing and pasted into a new Diagram layer in each Loop drawing. Many different ways can be devised to achieve the same end result and it is often a matter of personal preferences as there is no standard way to achieve this that must be followed by all users.

17.1.5 Elevation Layer



An Elevation Layer can be used to create a Front Elevation layout View of objects that exist within the model. This Layer makes use of the X and Y dimensions that are defined in Component Type Folder Details or in the individual Component Details. These component Dimensions will also be used to scale any Elevation Image that may have been added to the Component Type Folder or Component Details. The process of setting up these component dimensions and their Images is covered in more detail in section 14.1.10 on page 39.

The Elevation Layer is based on a Scale that can be edited to suit specific requirements. The Scale will be set automatically when the first object is dragged from the Type View or Location View onto the Elevation Layer. The scale that is set automatically will aim to make the first object fit onto the selected page size. Once the object has been displayed the Scale can be edited to suit individual requirements. The displayed shape is not constrained to fit within the page borders so it is important to check that the object is positioned and scaled to suit the overall page size, together with any other layers that may be required in the same workpad.

Once the parent shape has been positioned to meet the planned layout of the Workpad the position can be fixed by selecting the command “Lock Base Shape” at the top of the workpad. This will prevent the base shape from moving by mistake when shifting the child objects within the same space. It can be unlocked and repositioned at any time if necessary however locking the Base Shape does make the relative positioning of “Child” objects far simpler.

Note: A single Elevation Layer can only be used to display an individual component (or a Location Folder in certain circumstances), together with any of the children of the component based on the current Location Tree arrangement.

For Example : Consider a Location View that has a PLC cabinet within an Equipment Room. The PLC Cabinet also has many other components, terminal strips, earth bars etc., etc., located within the Cabinet.

In an Elevation Layer the user can drag the cabinet onto the Layer and the scale it and position it to suit the overall drawing size and layout. Once the Cabinet outline is displayed any of the “child” components that are located within the cabinet can be dragged onto the Layer and positioned relative to the cabinet outline/image and one another. The dimensions of each child component will be derived its own Component Type folder’s Layout Dimensions. Each of these child components will be scaled to match the scale used for the cabinet. The child components would generally be positioned within the Cabinet by the user and arranged to display their relative positions. DAD will not force a Child Object to be positioned within the outline of the parent object. It is up to the user to decide how best to illustrate the relative positioning of each object and to place them in the correct place. The Workpad display size can be adjusted to suit this task by using the Workpad controls to Zoom in or Out etc.

Once the components are positioned in a suitable position the relative positions of all components on the Elevation layer can be saved by using the Save Icon alongside the Edit Scale option. This will save the relative positions of each component and its children.

It is also important to note that some objects may not allow themselves to be perfectly aligned when viewed at high magnification. This is due to minor differences in the displayed objects and the underlying grid within the workpad. DAD is not aiming to prepare and publish detailed manufacturing drawings with sub-millimetre accuracy for all objects that are positioned on these layers. DAD is simply providing a Front Elevation View of the primary "parent" component and its children, to permit other user to understand the relative positioning of these objects in physical space as opposed to the basic tree structure in the Model Location View. Once again it is important to recognise that the Elevation Layer is not a Drawing but is just a scaled physical representation of the relative positions and sizes of the components in the model.

If a component has been positioned on a Workpad Elevation Layer, the only other components that will be permitted to co-exist on the same Workpad Layer will be the children of that component.

Example : to display 2 equipment cabinets and their internal components on one workpad there are 2 options described below:

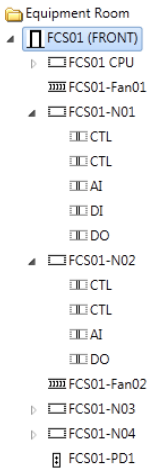
Option 1 would be to first add the equipment room (as an object) on the Elevation Layer. Once the Equipment room is displayed (N.B. This may be a Location folder that has been assigned suitable dimensions) then the two cabinet that are both children of this equipment room can be dragged and dropped into the scaled equipment room outline. Once they are displayed the children of each cabinet can be dropped into the cabinets and positioned to suit. Nothing will prevent the user from positioning sub-components in the incorrect cabinet in this case as they will all be allowed to be placed anywhere in this elevation layer. In this option the cabinets will be displayed within the scale of the "parent" equipment room. If the room is large relative to the size of the cabinets then this may not be suitable to show the details of each cabinet and its internal components.

Option 2 would be to add a separate Elevation Layer to the workpad for each of the 2 cabinets. One Cabinet component could be dragged onto the first Elevation Layer and positioned together with its children components. The second Cabinet could then be dragged onto the second Elevation layer and positioned in such a way that it was not interfering with the images on the first Elevation layer.

The Layouts of components and their children are all saved based on the parent child relationship between the relevant components.

Saving the Layout of a component in one Elevation Layer will retain the relative positions of every component if the same components are displayed in a second elevation layer at a later stage. One can therefore prepare assemblies of components in a detailed elevation layer at a suitable scale and then display these together with parent components in a new elevation layer.

Use the following example of a Control System Cabinet that contains a few PLC I/O racks. Each of the I/O racks may contain a number of child I/O modules positioned within the I/O Rack.

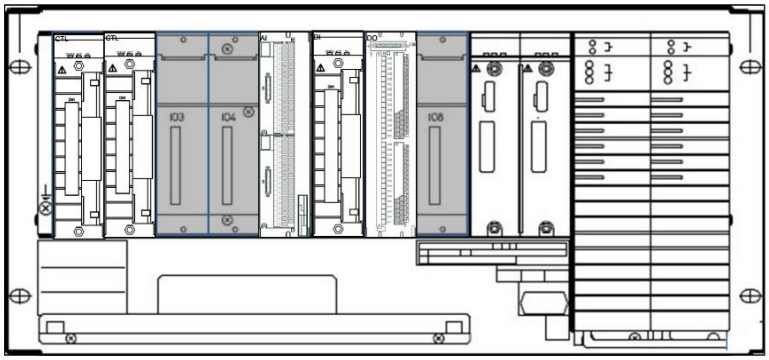


In the image on the left the Cabinet (FCS01(Front) is shown with a variety of child components. These include the FCS CPU Rack and FCS01-N01 Rack and FCS01-N02 Rack plus other Fans etc.

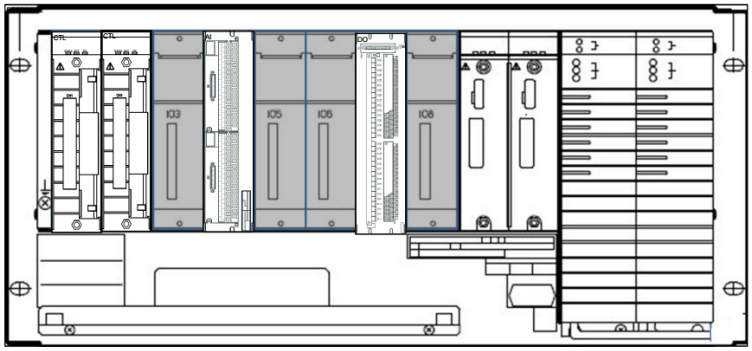
The Rack named FCS01-N01 has 5 child components called CTL, CTL, AI, DI and DO.

The Rack named FCS01-N02 has child components called CTL, CTL, AI and DO.

It is therefore possible to create an Elevation Layer for FCS01-N01 and its child components and to save the layout positions.

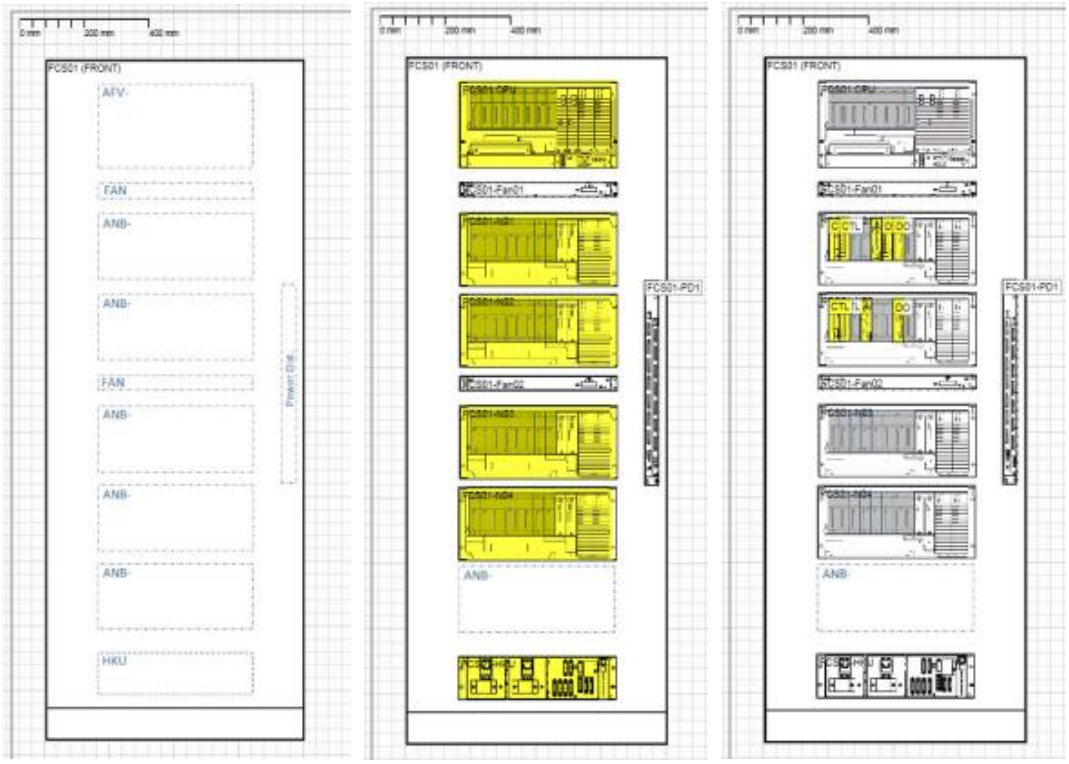


A second Elevation layer can be prepared for FCS01_N02 and its child components and this layout can also be saved.



Once these are completed and saved a new Elevation Layer can be prepared for Cabinet FCS01 and the two Racks FCS01-N01 and FCS01-N02 can be positioned within the Cabinet. When this layout has been prepared and saved the detailed images of each rack can be displayed on the Cabinet image by selecting the option to “Show Children”.

In the 3 images below the left image is the Cabinet layout with an embedded JPEG image from the vendor data showing the empty cabinet. Using the Right Click Menu on the first image and selecting Show Children the Racks in the Cabinet are displayed. Clicking on each of these racks and selecting Show Children will display the children components in each of the Racks as displayed in the earlier images created for the racks FCS01-N01 and FCS01-N02. Trying to position each I/O module while viewing the entire cabinet is not practical. It is far easier to set up each rack in a large image and then show these racks with their children in the larger image.

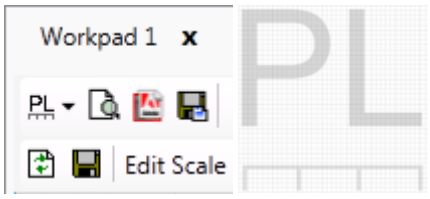


Other special components can be created to allow Cable Trunking and other cable routing hardware to be displayed within the cabinet if this extra work is justifiable. AS already stated the intention with the Elevation Layer is not to create a perfect manufacturing drawing but rather to create a workable layout that displays where the major components are to be positioned.

Care must be taken to not move components when pointing to them and clicking on them to select options such as Details to display additional information. If a component is inadvertently moved then it should be removed from the layer and displayed again by selecting Show Children.

To keep an image for later use, these elevation layers can be published as a normal published DAD document together with any other layers that may be appropriate.

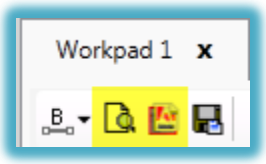
17.1.6 Plan Layer



An Plan Layer can be used to create a Plan View of objects that exist within the model. This Layer makes use of the X and Z dimensions that are defined in Component Type Folder Details or in the individual Component Details. These component Dimensions will also be used to scale any Plan Image that may have been added to the Component Type Folder or Component Details. The process of setting up these component dimensions and their Images is covered in more detail in section 14.1.10 on page 39.

Refer to Section 17.1.5 on page 57 for the description of how the Elevation Layer is handled and used. The Plan View uses exactly the same principles as applied to the top view or Plan View of components and Location Folders.

17.2 Previews



DAD makes provision for Preview images to be created to allow the user to see an image that will illustrate how a final published document will appear with all the layers of the Workpad clearly visible. This can be done with any working licence of DAD including Read only copies and expired leases of DAD that have reverted to a Read only state. The Previews can be saved outside DAD and can be printed for use by third parties however they are not formal published, revision controlled documents. It should be noted that if an existing published document is opened for re-edit and then altered in some way before a Preview document is generated, this may result in some confusion if a print is made of the preview document as it may contain different information to the information contained in the formally published, original document that was re-edited.

The Preview that is generated will contain the Title Block details that were embedded in the original drawing including the revision details. If a document is opened for re-edit, altered, previewed and printed, the printed document would indicate it was the original revision however it is obviously no longer valid as it has been altered.

Two options are provided for Previewing a document using the two highlighted Icons shown above. The left Icon will display a title “Preview in DAD” when the mouse pointer is positioned on this Icon.

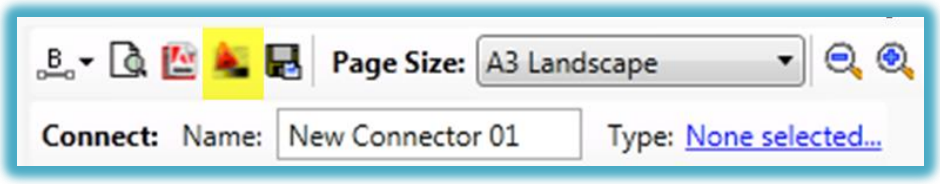
Selecting this option will create a Preview image in a file format with a “ .xps” suffix. This is the XML Paper Specification format developed by Microsoft and is basically a zipped XML file. This preview facility is built into DAD and has options to alter the way the image is displayed and to Print the preview image. The file cannot be saved from within the DAD Preview.

The Right Icon will display a title PDF Preview when the mouse pointer is positioned on the Icon. Selecting this Icon will create a PDF file format preview of the image on the Workpad. This image will require an external PDF Viewer application to already be installed on the PC that is running the DAD Client software. The PDF file will be opened in the PDF Viewer application and once it is displayed the Viewer software will permit the file to be saved outside of DAD in a suitable location on the client PC or on a file server. The PDF Preview file can also be printed using the PDF Viewer.

The PDF Preview file name will be generated as "previewXXXXXXX.pdf" where XXXXXXX is a random 7 digit number generated by DAD. If the file is to be saved then the name can be changed to another name. This file should not be named as an official Revision of an existing Drawing number and should always indicate that it is a Preview and not a Revision controlled officially published document. DAD cannot enforce this so it is up to the users to exercise appropriate discipline in this case.

Saving, printing and issuing Preview drawings as official drawings can undermine the strong change control and revision control principles embodied in the System Information Model.

17.3 CAD Export



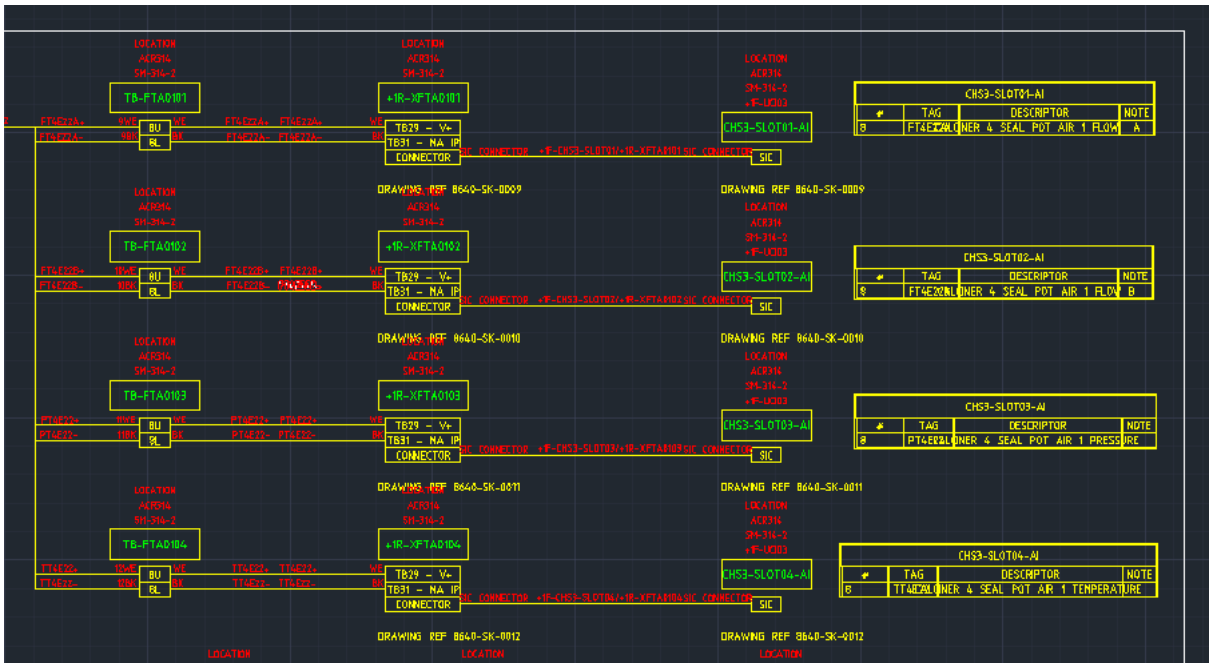
DAD has the facility to export any Workpad image to AutoCAD format. This function will only be available if the Client PC that is running the DAD client software has already got a licensed copy of AutoCAD installed before the function is selected.

The export to AutoCAD function will open the AutoCAD application and then run a script file in the AutoCAD application to create the exported CAD file. The CAD file will not necessarily be structured as you may require it to be and it may need to be configured in the CAD format before saving it as a CAD file based on some client specification regarding layers, fonts, line thicknesses etc.

The standard CAD Export from DAD has the following 6 layers defined.

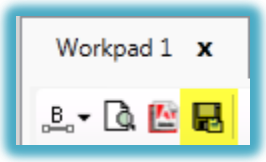
- Layer 0 is white and includes the Title Block
- Layer L2 is red and has the connector descriptions
- Layer L3 is yellow and has all terminal descriptions as well as all lines (i.e. everything other than text on the block and termination layers including any grids)
- Layer L4 is green and has the component descriptions
- Shapes Layer is white and has anything from the mark-up or grid layers (i.e. all shapes and spreadsheets)
- String is white and contains any text which doesn't match the sizes which get added to the L layers i.e.L2, L3 and L4.

An example of an exported CAD file is shown below to provide an illustration of the way these layers will appear and the types of information each layer will contain.



Under certain circumstances I&E Systems may be prepared to develop a customised CAD export utility that could structure these layers differently to suit very specific needs. The costs of such customised development cannot be defined in advance and would need to be negotiated with I&E Systems at the time the request was made. I&E Systems reserves the right to decline the request to undertake this type of customised development given that the exported CAD file is fully editable and further adaptation from the DAD Export standards defined above could be developed and executed within the AutoCAD application.

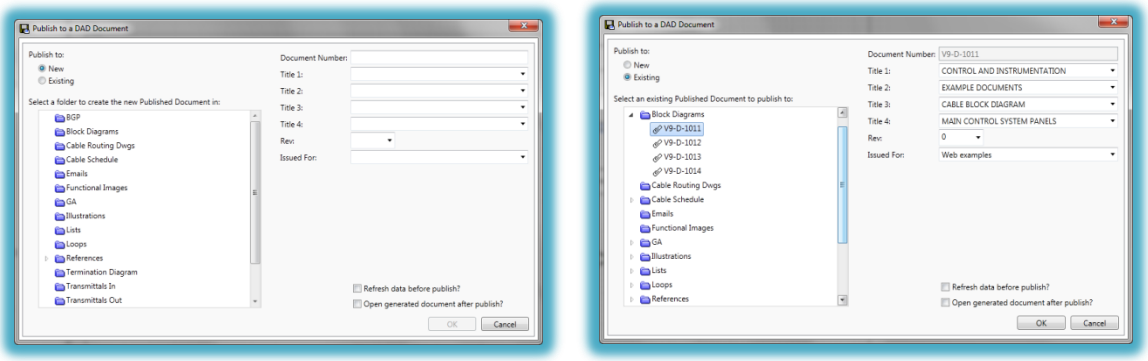
17.4 Publishing



Publishing Documents in DAD is a controlled process that is designed to ensure that documents are revision controlled and formally issued with valid information at the time the document is published. Detailed records are kept by DAD for all published documents including details of when this event occurred, who published the document, all fields in the title block and other related information. These records are kept in the DAD log files and can be accessed via History Logs, and Details pages. The system also keeps detailed records for every component and connection that appears on a document. This means that the publishing process is an active process that will write record data into the DAD model.

This means that Publishing formal revision controlled documents is not possible in a Read only DAD Operations licence and in a DAD Project licence where the lease has expired and the model has reverted to a read only state.

17.4.1 Publishing New / Existing Documents



Selecting the Publish Icon at the top of a Workpad will open the Publish to a DAD Document window shown above. This window has got selectable options for publishing New or Existing documents.

If a New Document is being published then the Title Block fields on the right will generally be empty and no Document folder will be selected on the left. If an existing document is being published then the title block details will be displayed on the right based on the current selected settings for the document.

Publishing a new Document will require a unique Document Number to be added to the field at the top right hand side. This number should be different from any previously used document number for it to be "New". DAD will not allow the publishing of a new Document with the same number as any previously published document unless the Revision numbers are different.

Note : If the same number is used as a previously published document and a new (unused) revision number is assigned then the new published revision of the document will be added to the existing document as a new revision. This can create confusion as the information contained in the new revision and the earlier revisions may be completely different. If a new Revision of an existing document is to be published then it is preferable to open the earlier revision for Re-Edit and then make any changes that are needed and re-publish as a new revision with the same Title Block details.

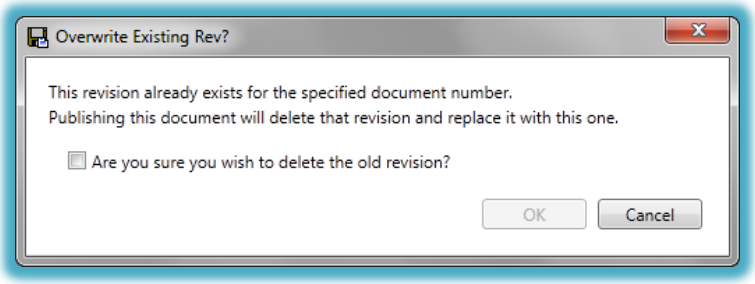
17.4.2 The Title Block Details

When a Document is published it will insert various Title Block fields into the relevant spaces together with the "values" contained in any other document attribute fields that may have been incorporated into the Default Title Block or any Custom designed Title Block.

The normal Title Block Fields are labelled Title 1:, Title 2:, Title 3: and Title 4:. These fields are simply document attributes that are assigned to the relevant spaces in the Default or Custom Title Blocks. Text Strings can be entered into these fields for inserting into the relevant spaces on the published document title block. Once a Text String has been entered into one of these fields it is saved in DAD and can be selected and used again on other documents without the need to retype it. This avoids

unnecessary additional entry of data and ensures that fields are displayed exactly the same way on different documents if this is required.

New Text can be entered at any time and it will be added to the pull down list as soon as the document is published. If a new entry is added with a spelling mistake or any other error, the document that contains the incorrect data must be deleted before the text will be removed from the pull down list. This can be done by opening the document revision that contains the incorrect text in Re-edit mode. Republish the corrected document with the corrected text using the same revision and select the option shown below to delete the old revision. If the text with the error appears in more than one revision of a document then all earlier revisions will need to be replaced or deleted.



17.4.3 Published Document Folders

If a Document is published and no Published Document Folder is selected on the left of the Publish Window, the new document will be saved in the Unknown Document Folder. It will remain there until the user moves the file to another folder based on the type of document and the folder structure that has been created.

A Document can be moved from one Document Folder to another by selecting the applicable document and dragging it to a different folder within the Documents View. Alternatively the Document can be selected and Cut and then Pasted in to the Destination Document Folder.

Document Folders can be nested to create a logical structure to organise the various documents in the Documents View.

Document names will be checked and duplicate names will not be permitted, irrespective of the Published Document Folder that the new Document is to be saved in. i.e. Document names can never be repeated unless the Revision number is different each time.

17.4.4 Revision Control of Documents

Documents can only be published when a Document Number (Name) has been assigned and a unique Revision Number has been assigned for the Document Number.

It is not necessary to provide Title Block Information for a document to be published although this is definitely not recommended as it makes it difficult to keep track of what is on each document.

Revision Numbers are not defined by DAD and any sequence of numbers and letters will be accepted as a valid Revision Number. It is recommended that the Revision numbering sequence should be defined in terms of some consistent policy and that users should be encouraged to adhere to the standard numbering sequence.

A common approach is to use letters for the initial Pre-release Revisions e.g. A, B, C, D, E etc. and then to use 0 (zero) for the first issue to outside parties or Issued for Construction Documents. The Numbered revisions 1, 2, 3, 4, etc. would then be used for subsequent issues that show changes since the Rev 0 issue.

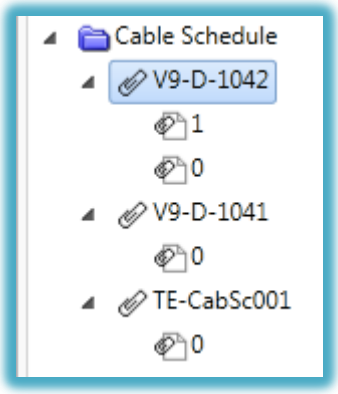
DAD does not enforce any sequence and will permit any new revision number to be created providing the combination of Drawing Number and Revision Number has not previously existed. This means that revisions can be issued in any order providing the new revision number does not exist in the system. It is also possible to insert more than one character as a Rev No so it is possible to create Revisions called “Temp1” and “Temp2” if this suits the needs and policy adopted.

Some discipline needs to be enforced by the client to avoid confusion with variations in the revision numbering sequences. DAD will insert the Revisions into the Revision History area on the published document strictly in accordance with the chronological order in which they are published.

If Revisions are published for Rev A, Rev D, Rev C, and then Rev B then then will be listed in that order on the published Revision B which would be the latest Revision.

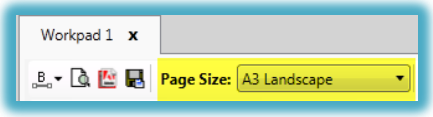
When a document is selected to be opened or re-edited then it will always open the latest revision that exists unless an earlier revision is specifically selected.

Every Document number will be displayed as a separate file name and will hold all the existing Revisions. These revisions can each be accessed by selecting the small arrow alongside the document number in the Document Folder. Once a list of all revisions is displayed an individual revision can be selected to Open or Re-edit.



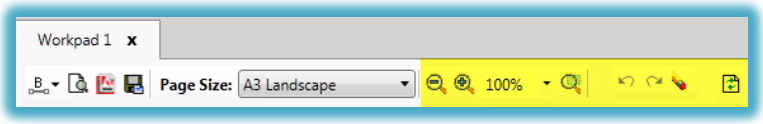
In this example the first document has 2 separate Revisions saved i.e. Rev 0 and Rev 1. Rev 0 is shown below Rev 1 as it was published first. Selecting the document name (as highlighted) and the selecting “Open” on a Right Click Menu (RCM) will open Rev 1 at all times as it is the most recent revision.
If Rev 0 is to be opened then Rev 0 must first be selected before using the RCM to Open it. The other documents only have one Revision each.

17.5 Page Size



Page sizes can be selected for each Workpad to provide appropriate space for the information that is being displayed. Different size pages can be configured to use different Custom or Default Title Blocks based on the selections made in section.10.7.on page 19.

17.6 Workpad Controls



The Workpad has a number of Icons along the top that are used to change the size of the Workpad. The functions of each icon are generally self-explanatory and their names are displayed when the mouse cursor is positioned on each Icon

17.6.1 Zoom In

This will expand the Workpad in pre-defined steps of 25%, 50%, 75% etc.

17.6.2 Zoom Out

This will decrease the size of the Workpad in pre-defined steps.

17.6.3 Marquee Zoom

This tool allows the cursor to be dragged over an area of the workpad to select the area for a "zoomed in" display. It must be deselected to use the pointer for other functions.

17.6.4 Undo

Very few functions allow the use of Undo as almost all actions involve making changes to the underlying model and these can be extremely complex. For example deleting a component such as a Marshalling cabinet could result in hundreds of changes for multiple cables and hundreds of terminations. These actions cannot be reversed by using Undo. Only some very minor formatting commands on graphic displays on workpads can be undone to revert to the previous format before a command was executed.

17.6.5 Redo

As per Undo above.

17.6.6 Clear Workpad

Clear Workpad – uses an Icon that resembles a pencil eraser. Selecting this Icon when a Workpad layer is displayed will remove all objects on the workpad. The objects are not deleted from the model and can be placed on the workpad layer and arranged as they were before. It may mean that some effort is wasted in arranging components and connections to suit a specific requirement. Care should be taken to not clear a layer unnecessarily. The Clear action is instantaneous and does not require confirmation.

17.6.7 Refresh

The DAD workpad does not update automatically to show all changes that may occur within the model. In certain cases it may be necessary to refresh a workpad layer to show updated information after some changes have been made to components or connections in the model. Note that the changes may be made by another working on the same model from a different office and would create problems if objects updated unexpectedly. Refreshing one layer does not affect other layers on the same Workpad. If changes are being made that could affect multiple layers then each layer should be selected and refreshed independently to be sure the displayed information is up-to-date with the model.

17.7 Filter

DAD provides a number of functions that permit the filtering of data on a Workpad to create a specific type of spreadsheet. These Icons are shown above and their functions are displayed when the mouse cursor is positioned on each of the icons. Different Icons will be displayed on different layers of the Workpad based on the applicable functions for each layer.

The left hand Filter Icon will open a Workpad Filter selection that will allow a specific filter to be created for Connector Type Folders or Group Folders. One or more Folders can be selected to create a filter that is related to the components and connectors that are on the current Workpad layer that is being displayed. An Invert check box allows the filter to be inverted i.e. selecting a connector folder and the Invert option will filter all Folders except the selected folder(s).

17.8 Component Takeoff

The Add Component Takeoff Icon will create a Component Spreadsheet of all the components on the current Workpad layer. This spreadsheet will automatically be inserted into the current Workpad in a Spreadsheet layer. If a spreadsheet layer already exists the new spreadsheet will be added into the Spreadsheet layer. If no Spreadsheet layer exists then one will be created. The spreadsheet can then be dragged to a suitable position in the Workpad once the Spreadsheet layer is selected. Each Spreadsheet on the layer can be moved and positioned independently. Care should be taken to ensure that the spreadsheets remain within the boundaries of the page size selected if the document is to be published.

17.9 Cable Schedule

The Add Cable Schedule Icon will create a Connector Spreadsheet of all the connectors on the current Workpad layer. This spreadsheet will automatically be inserted into the current Workpad in a Spreadsheet layer. If a spreadsheet layer already exists the new spreadsheet will be added into the Spreadsheet layer. If no Spreadsheet layer exists then one will be created. The spreadsheet can then be dragged to a suitable position in the Workpad once the Spreadsheet layer is selected. Each Spreadsheet on the layer can be moved and positioned independently. Care should be taken to ensure that the spreadsheets remain within the boundaries of the page size selected if the document is to be published.

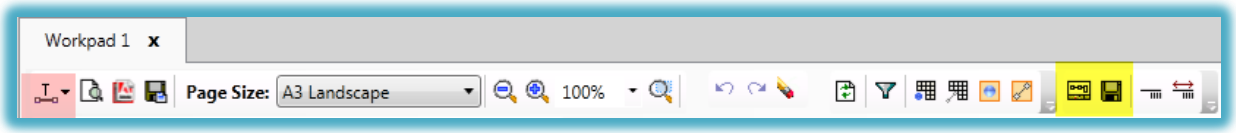
17.10 Select All Components

The Select All Components Icon will select all components that are displayed on the current Workpad layer. Once they are selected (highlighted Orange) a variety of functions can be accessed via the Right Click menu while pointing to any one of the highlighted components. The options provided on the Right Click menu will vary depending on which layer is currently active.

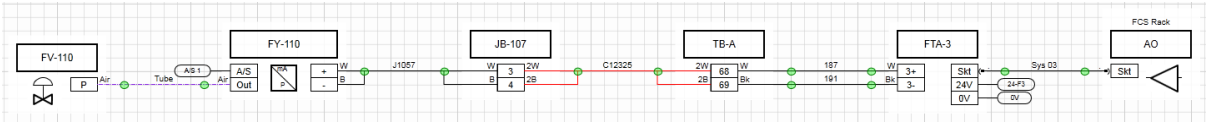
17.11 Select All Connectors

The Select All Connectors Icon will select all connectors that are displayed on the current Workpad layer. Once they are selected (ends are highlighted Orange) a variety of functions can be accessed via the Right Click menu while pointing to any one of the highlighted connector ends. The options provided on the Right Click menu will vary depending on which layer is currently active.

17.12 Manage Layouts



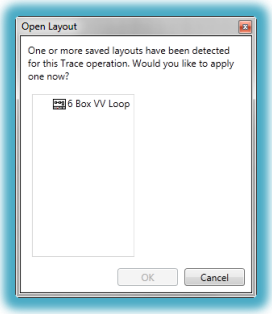
The Manage Layouts Icon is only displayed on a Termination Layer together with the Save layouts Icon dealt with in the next section. This function allows specific layouts of components to be saved based on the relative positions on the current Workpad. For example if the connectors from one component is traced through a variety of intermediate devices to create a typical loop diagram as shown below, these components and connectors could be arranges in a specific way to format a Standard Loop Drawing



Once the objects have been arranged in a suitable position that may be based on an underlying diagram layer that defines the different areas that are applicable to Loop Drawings, then the Layout of these components can be saved using the Save Layout Icon. This will open a “Save Layout” window requesting a Name for the layout to be saved as. The user is required to specify a suitable name that identifies this particular layout format. For example the above loop diagram could be defined as a “6 Box Loop” as there are 6 components from left to right. Another Loop for a different type of Field device may only include 5 devices from left to right and may be saved as a “5 Box Loop”.

Manage layout will display a list of any saved layouts that could be applied to the current workpad layer. The system will only permit another similar loop with 6 devices to make use of the “6 box loop” layout that has been saved. This facility allows the standardisation of layouts for many different loops that have the same basic requirements without the need to shift individual components and connectors around for each diagram.

If a field component such as FV-110 above is positioned on a blank Termination Layer on a Workpad and the Right Click Menu is used to “Trace Full circuit” once the traced results are displayed a window will open as shown below.



This prompts the user by letting them know that the traced diagram matches one of the previously saved layouts. There may be more than one saved layout that could be applicable. The user is able to select one of the saved layouts and select OK to apply that standard layout to the objects that are

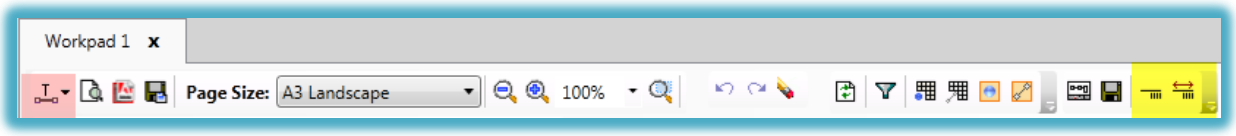
displayed on the Workpad. The components and their connectors will immediately shift to the assigned positions within the Workpad. Once they are in place the user is able to move them again if they need to be adjusted to suit individual circumstances.

If there is no suitable layout that may apply to the current circuit then this option will not be displayed. If the new arrangement is finalised then the new layout could be saved and given an appropriate name.

17.13 Save Layouts

As discussed in the previous Section – Manage Layouts.

17.14 Show Wiremarkers



Wiremarkers are intended to represent the type of ferrules that are often used to label individual wires within a system, often adjacent to the terminals that the wires are connected to. The format of the wiremarkers are usually defined by some company standard and the length of the numbers can vary from site to site and even within sites and systems.

Wiremarkers are different to the core markings that will be defined for every Connector Folder that is listed in the Connector View. Core markings are the colours and/or letters and/or numbers that are an integral part of the manufactured cable. E.g. a 6 pair cable may have pairs cores that are White and Black and each pair may be marked 1, 2, 3, 4, 5 and 6. We may then define the cores as Wh1, Bk1, Wh2, Bk2, Wh3, Bk3 etc. Core markings will be always be displayed above each core very close to the terminal that the core / wire is connected to.

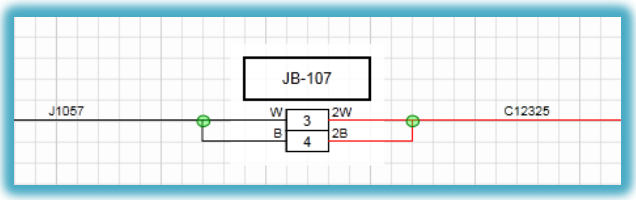
The wiremarkers are often associated with the terminals that individual cores will be terminated on. They are usually intended to provide sufficient detail to allow the core/wire to be reconnected to the correct terminal in the event that these wires have been disconnected for any reasons e.g. maintenance / fault finding etc.

DAD makes provision for a system to manage applicable wiremarkers for every core or individual wire that may be terminated on any terminal on any component. There are two Icons highlighted above that will only appear on a termination layer of a Workpad.

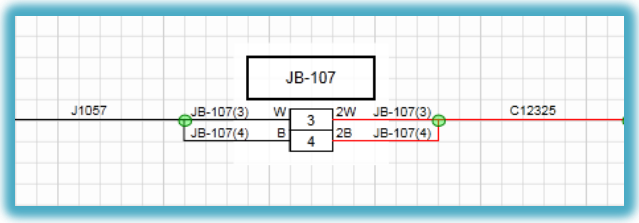
The Show Wiremarkers Icon will switch on the display of any wiremarkers that have been specified for the cores / wires in the current Workpad.

If no wiremarkers have been entered selecting this Icon will simply stretch the length of each wire at the point where the wire is terminated on a specific terminal. If wiremarkers have already been defined for each wire then these will be displayed in the space that is provided on each wire. Depending on the length of the wiremarker strings the space required to display these wiremarkers may not be adequate initially but can be expanded to provide additional room to display longer string. The Resize Wiremarkers Icon will permit this to be done for the active Termination layer on the Workpad. The setting does not affect other documents that may also display wiremarkers.

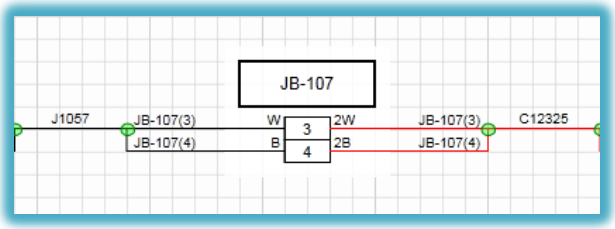
In the image below you can see a standard Termination Layer with cores connected to terminals in a Junction Box with the relevant core markings displayed alongside each terminal.



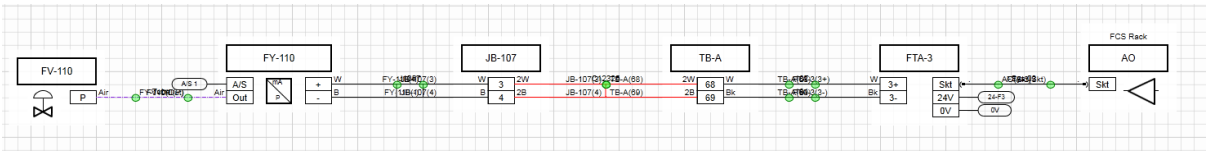
In the next image the same Junction Box is displayed after selecting the Show Wiremarkers Icon.



In the third image the standard default 3 character width setting for the wiremarkers has been increased to 5 to provide additional space for long wiremarkers.



The wiremarkers can be hidden on some documents and made visible on other documents depending on individual requirements. The amount of space needed for displaying a circuit is increased if wiremarkers are displayed so this may affect how objects are laid out. The earlier example of a Typical Loop Diagram is shown below with wiremarkers visible. The result is obviously not acceptable with all wiremarkers overlapping one another. The components would need to be shifted to provide additional space on the relevant document. This may force the user to select a larger page size to fit the circuit in from left to right.



Wiremarkers are accessed by selecting all the connectors in a Termination Layer and then selecting a Cores Spreadsheet from the right click menu.

The cores spreadsheet will be opened in a new window and will show columns for wiremarkers to be entered. These will initially be blank and the text can be entered into the individual cells to create the required wiremarkers or they can be copied and pasted from a list that has been created in a separate spreadsheet. The wiremarkers can even be copied directly from the From and To columns

in the Cores spreadsheet if that is all that is required. See empty fields below and then the same fields once populated with the data copied from the From and To columns.

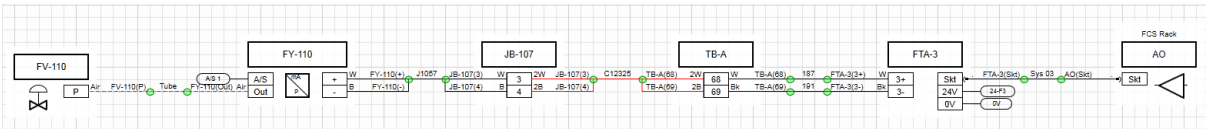
Cores Spreadsheet

Name	Core	Screen	Wiremarker From	Wiremarker To	From	To
187	W				TB-A(68)	FTA-3(3+)
191	Bk				TB-A(69)	FTA-3(3-)
C12325	2W				TB-A(68)	JB-107(3)
C12325	2B				TB-A(69)	JB-107(4)
J1057	W				JB-107(3)	FY-110(+)
J1057	B				JB-107(4)	FY-110(-)
Sys 03	.				FTA-3(Skt)	AO(Skt)
Tube	Air				FY-110(Out)	FV-110(P)

Cores Spreadsheet

Name	Core	Screen	Wiremarker From	Wiremarker To	From	To
187	W		TB-A(68)	FTA-3(3+)	TB-A(68)	FTA-3(3+)
191	Bk		TB-A(69)	FTA-3(3-)	TB-A(69)	FTA-3(3-)
C12325	2W		TB-A(68)	JB-107(3)	TB-A(68)	JB-107(3)
C12325	2B		TB-A(69)	JB-107(4)	TB-A(69)	JB-107(4)
J1057	W		JB-107(3)	FY-110(+)	JB-107(3)	FY-110(+)
J1057	B		JB-107(4)	FY-110(-)	JB-107(4)	FY-110(-)
Sys 03	.		FTA-3(Skt)	AO(Skt)	FTA-3(Skt)	AO(Skt)
Tube	Air		FY-110(Out)	FV-110(P)	FY-110(Out)	FV-110(P)

The end result can be seen in the example below with wiremarkers displayed and the components spaced to allow them to fit without overlapping.

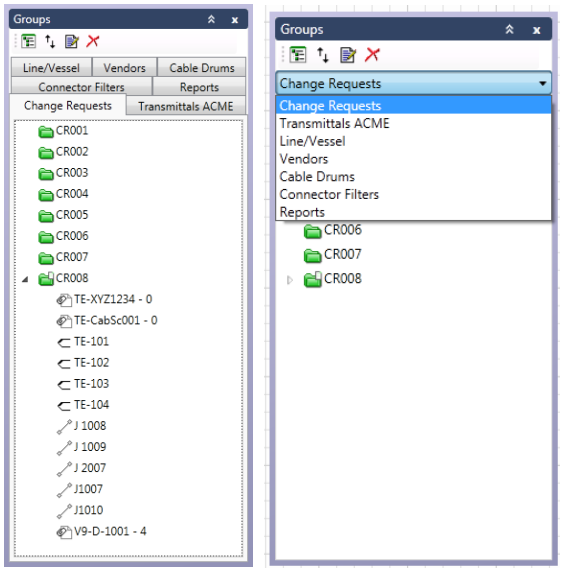


17.15 Resize Wiremarkers

As per section above on Show Wiremarkers

18 Groups

Groups can be utilised to define relationships between objects in the model. In DAD all Group related information is shown with a Green colour code to make it easy to identify that the information is related to Groups.



The Group shown here use folders named for drives to define those components belonging to the drive. Each group is independent. You can create and delete them at any time.

Groups can contain any of the object types in the model whether they are components, connectors or documents.

Depending on the option selected in the Workspace Options menu the Group Views may be displayed with a pull down list as shown in the right hand image if this display format is preferable.

You will find Groups very powerful and useful. They are easier to learn in practice than to define precisely. So we won't attempt to describe them here. Later in this Manual there are many examples of how Groups can be used.

18.1 Group Views

All Group information is based around user defined Group Views. In the image above the Group Views that have been created in this model are listed on the Tabs at the top of the Groups window.

New Group View Tabs are created and named using the "Create New Group View" Icon at the top left of this window. Once a Group View is created then individual Group Folders can be created within the Group View.

There are two types of Group Folders that can be created to suit specific requirements. These are Conventional Group Folders and Group Filtered Folders. The two types are dealt with below.

Group Folders make use of Group Attributes and separate lists of attributes are used for each Group View. These attributes are configured using the same approach defined in section 13 starting on page 27.

18.2 Group Folders

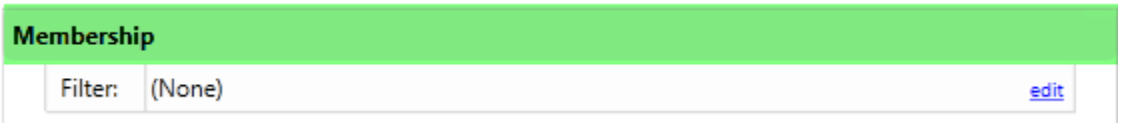
Group Folders can be used to "group" together any collection of components, connectors and documents. These different objects can be dragged into the Group Folder and dropped to make them members of the Group. Any Object that is added to a group will result in a Confirmation window opening that will indicate that the object(s) are being added to the selected Group. It is necessary to select OK to complete the task.

Objects can be dragged from one Group Folder to another Group Folder however this will not remove the Object from the first Group Folder, it will simply make it a member of the second Group Folder as well as the one that it was dragged from.

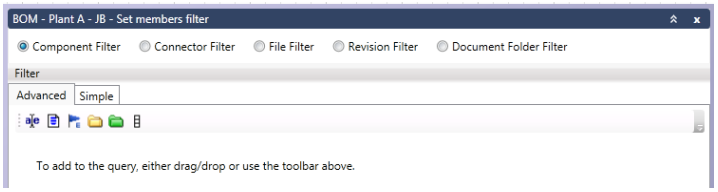
To remove an object from a Group Folder it is necessary to select the object(s) within the Group Folder and then using a Right Click Menu the option “Remove from Group” is selected. No confirmation is necessary to remove an object from a Group. Every action of adding an object to a Group or Removing from a Group will be recorded in the system logs for each individual object and for the Group. These logged events will be visible in the history logs for the objects and the Group folders. These events can be used in a filter to report on activities if required.

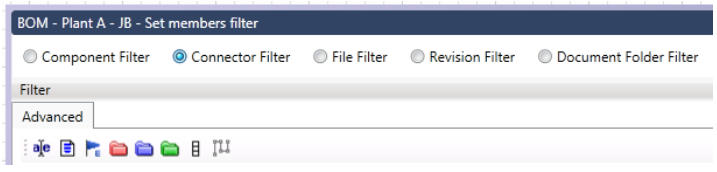
18.3 Group Filtered Folders

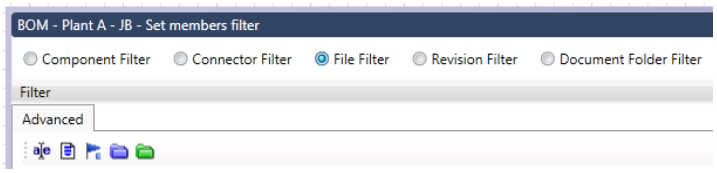
Group Filtered Folders are configured using the Edit mode display of the Details View of the Group Filtered Folder. In the Details view there is a heading for Membership and a link to edit the Membership filter as shown below.



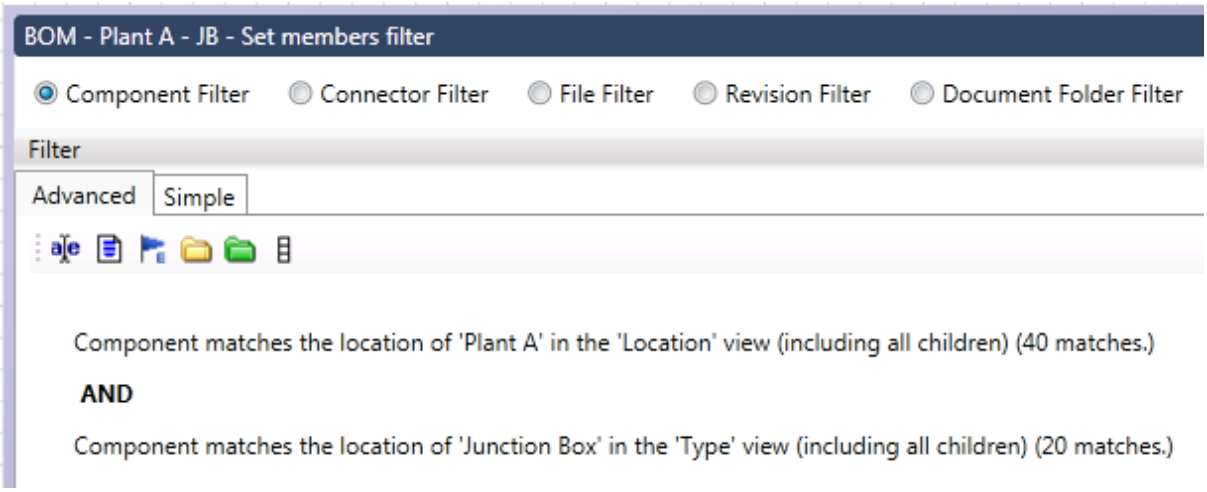
Once this link is selected a Set Members filter window is opened to allow the user to define a filter that will automatically define the members of this filtered folder. The Filter must initially be selected to be a Component Filter, Connector Filter, File Filter, Revision Filter or a Document Folder Filter using the radio buttons provided. Depending on which Filter type is selected the available options will change to indicate what categories of objects can be used in the filter as shown in the 3 images below.





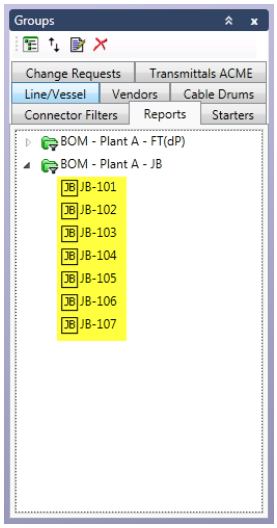


A typical Filter for a specific Bill of Materials is shown below.



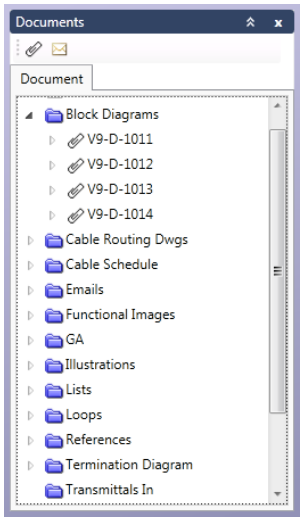
In this Filter the system will locate any components (Component Filter Selected) that are to be found in Plant A and that match the Type “Junction Box” Once the filter has been defined it is saved and the system will update the membership of this folder to include all components that meet the criteria that are defined by the filter. In this case there are only 7 Junction Boxes that are within Plant A.

The image below shows these members with the BOM Group that was defined by the above filter. If additional Junction Boxes are added to Plant A then the Group membership will increase to include these new Junction Boxes that meet the criteria in the Group Filter for this Bill of Materials.



19 Documents

This contains the documents published from the model and any documents or files that are imported into DAD. This View is used to manage the documents.



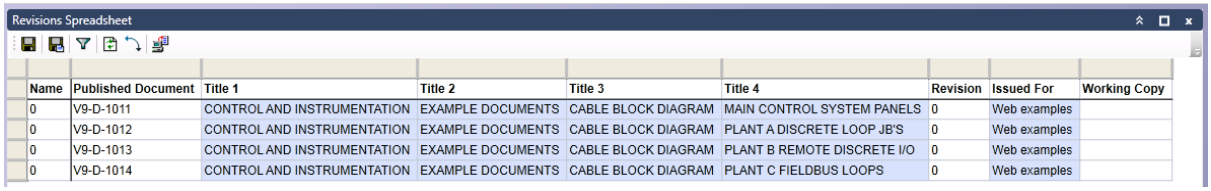
Documents in DAD are in two major types:

- Documents published from the model
- Imported files from other applications.

Documents are nested within Binders (icon – paper clip) so that you can store a series of revisions of the same document together. It is the binder that holds the title and other document attributes.

All documents are shown in the Documents View where you can find them by number/title or according to how you have arranged the folders.

If you know the type of document you are looking for then you can display the details of the documents in that folder using the RCM command "Quick Spreadsheet". A Quick Spreadsheet (Revisions) is shown below.

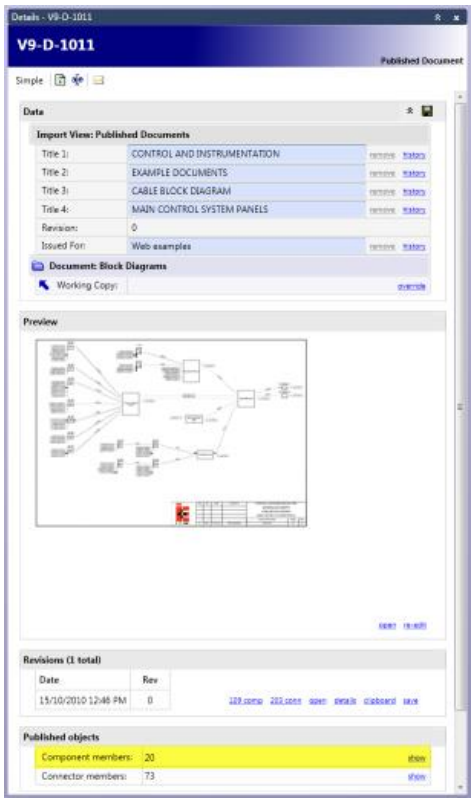


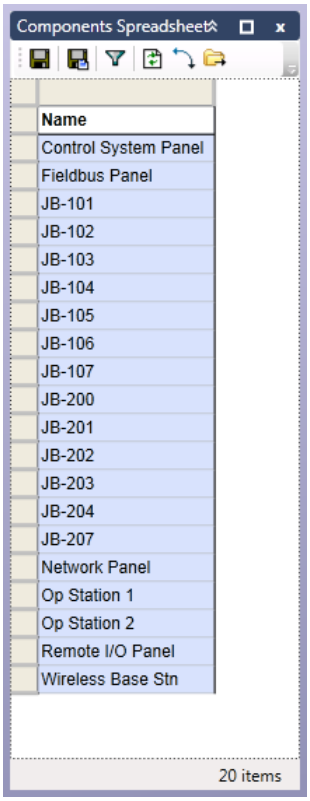
Name	Published Document	Title 1	Title 2	Title 3	Title 4	Revision	Issued For	Working Copy
0	V9-D-1011	CONTROL AND INSTRUMENTATION	EXAMPLE DOCUMENTS	CABLE BLOCK DIAGRAM	MAIN CONTROL SYSTEM PANELS	0	Web examples	
0	V9-D-1012	CONTROL AND INSTRUMENTATION	EXAMPLE DOCUMENTS	CABLE BLOCK DIAGRAM	PLANT A DISCRETE LOOP JB'S	0	Web examples	
0	V9-D-1013	CONTROL AND INSTRUMENTATION	EXAMPLE DOCUMENTS	CABLE BLOCK DIAGRAM	PLANT B REMOTE DISCRETE I/O	0	Web examples	
0	V9-D-1014	CONTROL AND INSTRUMENTATION	EXAMPLE DOCUMENTS	CABLE BLOCK DIAGRAM	PLANT C FIELDBUS LOOPS	0	Web examples	

A Document can be found by using Quick Search and entering the name of the document or part of the name. Information in a Title Block field can be found using the Quick Search with the names and data selection enabled.

Documents can also be identified based on the components/connectors that they contain. Each component/connector Details View has a section that lists all the published documents that contain some reference to it. This is a completely novel way of finding documents. Se Section 14.1.7 on page 37 for more information.

The reverse path for these relationships will provide listings of components and connectors that appear on each document. It is therefore possible to find all the components and connectors contained in every document. Se example below with list of components opened from the highlighted link in the Document Details image.



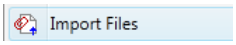


19.1 Folders

Document Folders can be created and nested within the Document View to suit specific requirements. Documents that are not assigned to a specific folder when they are published will be placed in the Unknown Documents Folder. They can be moved from there to any other folder that exists in the Documents View.

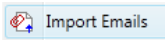
The Unknown Folder should never be deleted as it is always required.

19.2 Import Files

Once a Documents Folder has been created any external files can be imported into the Model and saved within the specified folder. The 

option on the Right Click Menu is used to import files. When selected this will open a normal Windows View to browse the file directories on the PC to locate files that are to be imported. Any format of file can be imported and saved. Imported files can only be opened if the necessary application is installed on the PC that is running the DAD Client. For example a PDF file can be imported and saved but is may only be opened if a suitable PDF Reader is available on the PC.

19.3 Import e-mails

Once a Documents Folder has been created any e-mails files can be imported into the Model and saved within the specified folder. The 

option on the Right Click Menu is used to import e-mails. When selected this will open a small window into which e-mail files can be dragged and dropped to be imported. The e-mails are saved in the folder in a format that can be opened and viewed. The imported e-mail has the title of the imported e-mail Subject.

19.4 Edit / Simple View

Documents each have Details Views that can be displayed in either a Simple View or an Edit View. These two views are shown below. It is possible to edit and save new text in the various Title Block fields in the Edit View on the right. This should be done with caution as the Published PDF document will contain the values that were in these fields at the time it was published. Changing them in the Details View or in a Documents Revision Spreadsheet could create confusion as the values will be different to those contained in the published document. This could be used to rectify earlier errors that will ensure that the document has the correct information if it is re-edited and re-published.

19.5 Assigning Type Attributes

Document attributes can be created in the Attributes View as discussed in Section 13. These Document attributes can be assigned to Document Folders and populated with values that are

related to the individual documents. These attributes can then be assigned to specific cells on a Customised Document Title Block so that the attributes are displayed and published on documents.

19.6 Preview

A small preview of the actual published document is displayed to facilitate identification without needing to open the full document in an external application e.g. a PDF viewer. The Preview will always be the most recent revision of the document when looking at the details of the Document Binder. The Preview displayed for on the Details View for each Revision of a Documents will show the image contained in that Revision.

19.7 Revisions

Any existing Revisions of the Published Document will be listed on the Document Details View. Alongside each revision will be an indication of how many components and how many connectors have been changed since the Revision was published. This provides an immediate confirmation as to the validity of the information on each Revision. If the Revision shows that 0 components and 0 connectors have changed since the Revision was published then one can be confident that the published revision is up to date and will have the latest information contained in the model.

19.8 Published Objects

The components and connectors that appear in the Published Document will be listed in this section. This provides a complete record of every component and connector that is displayed in the latest Revision of the selected Published Document.

19.9 Unique ID

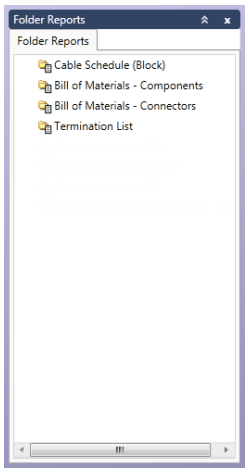
Functionality exists for unique document folder ids for document control purposes. This is only used in rare conditions and further information can be provided if required.

19.10 History

As with every other object within a DAD model, there is a detailed record of every action that is taken by any user from the time when the object is created until the present time. This history Log can be viewed at any time by selecting the “show” link below the History Heading. The length of the History Log is also displayed below the heading. The details are then displayed and can be scrolled through using the scroll bar, cursor control arrows or the wheel on a mouse.

20 Folder Reports

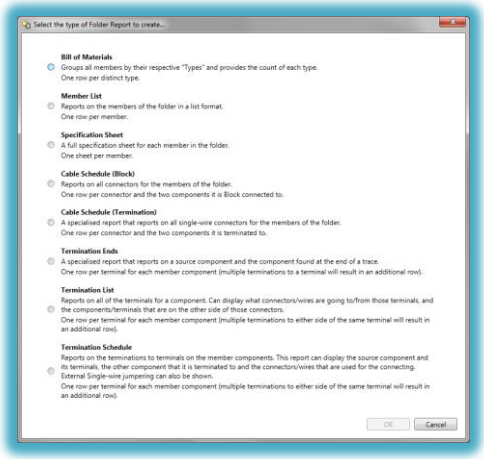
20.1 Designing Folder Reports.



Folder Reports are designed to allow for the generation of customised Reports for a variety of purposes. There are a few standard reports that can be configured by the user however nay custom variations can be developed to suit specific needs in each system design.

Selecting the Folder Reports Icon above will open a Folder Reports View as shown on the left.

Right Clicking in this View will open the Window below that allows you to select the Type of Folder Report that you wish to Create.



Each of these Folder Report Types has a fairly detailed description of the purpose for which it may be created.

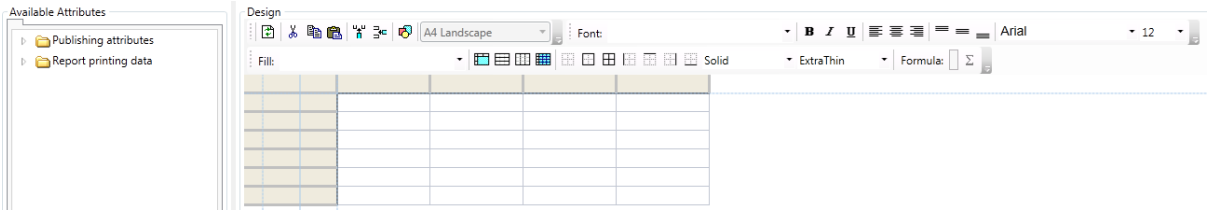
A Specification Sheet Folder Report Design View is shown below:

This will create a Folder Report that produces a full page specification Sheet for each member in a Folder, using a single sheet per member. Provision is made to permit sorting of the Content Section of the Report based on an attribute. A Page size can be selected e.g. A4 Landscape shown above.

Each Folder Report comprises of: A Header - that will appear at the top of each sheet; A Common Data (Top) section - that will appear above the main content section; a (main) Content section - which carries the main content of the report; A Common Data (Bottom) section – that will appear below the main content and a Footer that will appear at the bottom of every page.

20.1.1 The Header

Selecting the design Link for this section will open a "Folder Report Section Designer" window for the Header of a "Specification Sheet" in this instance. The option is also provided to use copy to copy a Header Design for another Report to provide consistency across different report formats.



On the left any available attributes are displayed that can be incorporated into the Header section of this report. These will include attributes that contain data about the Publishing of documents and Some specific Report Printing Data Attributes.

The right hand side the Design form displays Columns and Rows (like a Spreadsheet) that can be used to define where each of the selected attributes is to be displayed. Icons exist that will allow for additional Rows and Columns to be added to the initial default grid that is displayed. Column Widths can be adjusted and Row heights can be varied to suit the specific report design simply by dragging the row and column boundaries to suit.

A light Blue border is shown that indicates the size of the selected page size e.g. A4 Landscape as selected above. The Header columns can be adjusted to make the complete Grid with a user defined number of columns and rows fir from Left to Right across the page.

Individual attributes can be dragged into any of the cells in the Grid to create a layout that suits the desired Specification Sheet appearance. Text can be typed into any cells and cells can be merged to create larger cells within a grid of smaller cells. This is done by selecting the cells to be merged and then choosing the appropriate Merge function from the Icons provided. This works along similar principles to the functions provided in common spreadsheet applications. An example is shown below. The cells with text like <<Folder report name>> have DAD attributes positioned in them based on the list of available attributes provided. When the Header has been designed it should be saved by Selecting OK in the Lower Right Corner.

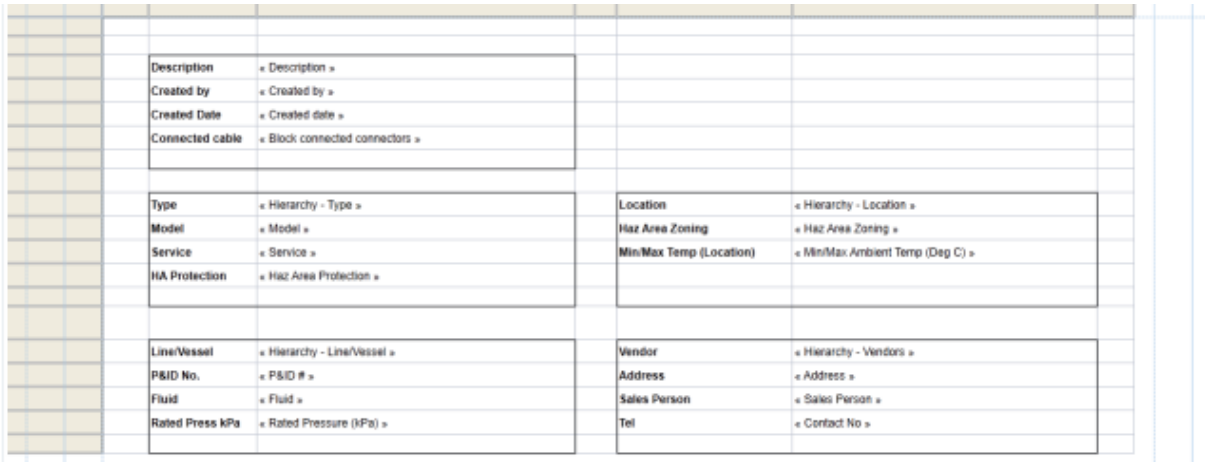
N.B. It is not compulsory that all sections of a Folder Report have to be included in each Report.

20.1.2 The Common Data (Top)

Moving on to the Section Common Data (Top) will display a similar grid and a new list of available attributes. The same procedure is followed using the new attributes. N.B. It is not compulsory that all sections of a Folder Report have to be included in each Report.

20.1.3 The Content

After the Common Data (Top) has been completed (if required) the Common Data section can be designed. This section should be included as it is going to be used to create the Reported data for this specific Report based on a selected Folder of components. An Example of the Content section is shown below.



Description	« Description »
Created by	« Created by »
Created Date	« Created date »
Connected cable	« Block connected connectors »

Type	« Hierarchy - Type »
Model	« Model »
Service	« Service »
HA Protection	« Haz Area Protection »

Location	« Hierarchy - Location »
Haz Area Zoning	« Haz Area Zoning »
Min/Max Temp (Location)	« Min/Max Ambient Temp (Deg C) »

Line/Vessel	« Hierarchy - Line/Vessel »
P&ID No.	« P&ID # »
Fluid	« Fluid »
Rated Press kPa	« Rated Pressure (kPa) »

Vendor	« Hierarchy - Vendors »
Address	« Address »
Sales Person	« Sales Person »
Tel	« Contact No »

20.1.4 The Common Data (Bottom)

Moving on to the Section Common Data (Bottom) will display a similar grid and a new list of available attributes. The same procedure is followed using the new attributes. N.B. It is not compulsory that all sections of a Folder Report have to be included in each Report

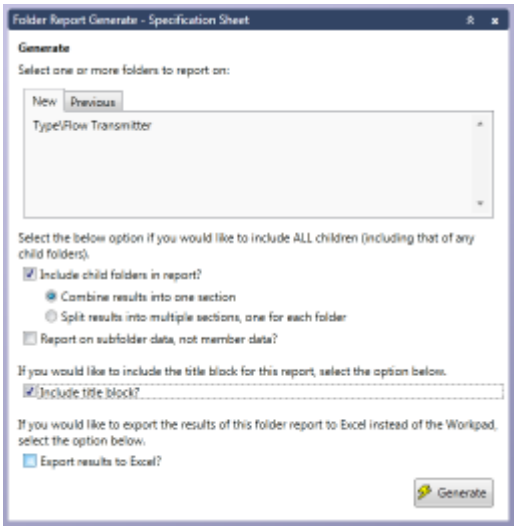
20.1.5 The Footer

The Footer is also configured the same way to provide a standard Footer with Attribute data that is similar to the Header. Obviously data that is contained in the Header would not be included in the Footer and vice versa. N.B. It is not compulsory that all sections of a Folder Report have to be included in each Report.

20.2 Generating Folder Reports.

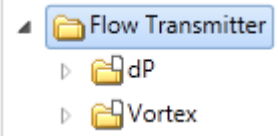
When a Folder Report has been Designed it should be tested to ensure that the result is what was expected. The way to test or run a final folder report is the same. Select the Folder Reports Icon as before and then select the desired Report that is to be tested or run.

Using a Right Click Menu select “Generate”. This will open a Folder Report Generate – Specification Sheet in this case. This window is shown below.



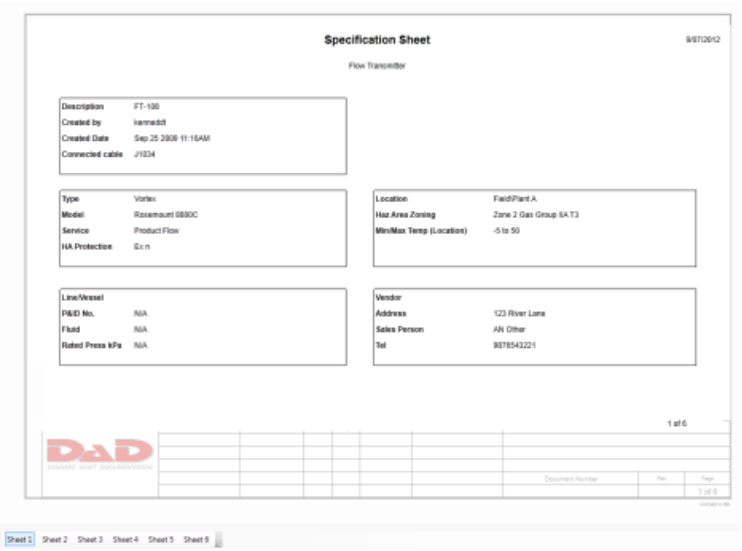
One or more folders can be dragged and dropped into the window as shown on the left.

As a parent Component Type Folder has been used in the window and this has child type folders as shown the selection is ticked to include child folders in the report. If this was not ticked then the report would contain no data as the components all reside in child folders and not the parent folder.



The option is also selected to include the title block that has been specific for the page size selected.

Generating this Folder Report creates a multi-page report that will have as many pages as there are individual components in the parent and child folders i.e. 6 in this case. See 6 sheets below.

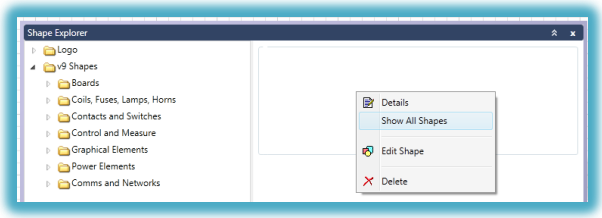


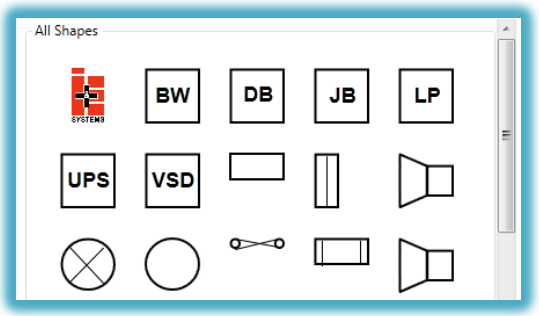
Designing the other Folder Reports uses similar principles, however in each case you should test the results with a typical small folder of components before Generating a Folder Report for a large numbers of components. Once the Workpad are displayed these can be published as PDF files the same way that other documents are published in DAD.

N.B. Publishing the example above will create a single PDF file with 6 pages. It will not create 6 separate PDF files with one page each.

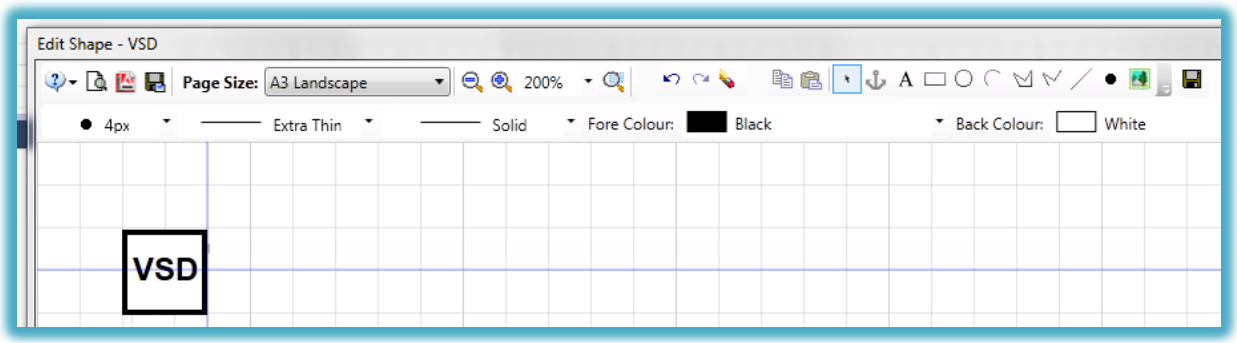
21 Shapes

Selecting the Shapes Icon above will open the Shape Explorer window. The various folders can be opened and explored and new folders created for new customised shapes that you may develop or import. By Right Clicking in the rectangle at the top left of the window the option show all shapes can be selected. This will display up the all shapes and allow an individual shape to be selected for use. A selection of these are shown below right.



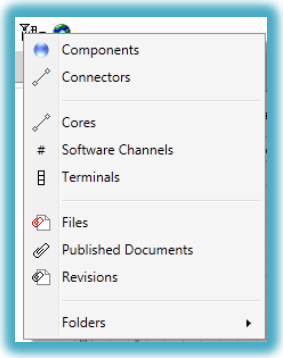


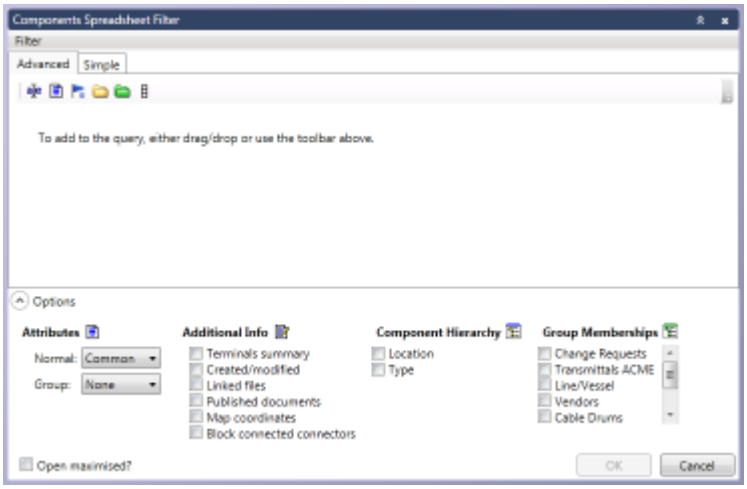
Selecting a Shape on the right will open the folder that contains the shape and will highlight the selected shape file. This file can be cloned and renamed and then edited to produce another similar Shape. This is often easier than creating a shape from nothing. DAD has the editing tools required to edit these shapes. The drawing of shapes is fairly simple and should be attempted to become familiar with the way these tools operate. The principles are very similar to a Diagram Layer.



22 Spreadsheet

Selecting the Spreadsheet Icon will display the Spreadsheet selection window shown below.





Using this menu a specific type of spreadsheet can be created using a Filter as shown on the right.

For a Component Spreadsheet any available Component Folders can be dragged and dropped into the filter window. Logical operands between the individual Filter arguments can be changed from OR to AND or XOR by using the right click menu.

As the filter is constructed there will be an indication of how many components satisfy the specific filter argument. This will indicate whether any results can be expected when the filter is run. i.e. if each argument shows that there are no components that satisfy the criteria in the argument then the end result may have zero results.

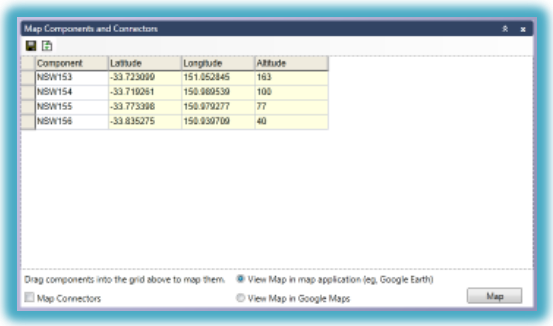
The filter can be tested at any point to see the results and can also be saved using the Filter menu at the top of the window. If a spreadsheet has been generated and the filter is found to be incorrect or incomplete then it can be edited by clicking the filter icon at the top of the spreadsheet. Once the filter opens for editing the previous “test” spreadsheet can be closed. Closing the spreadsheet without opening the filter will result in the filter needing to be rebuilt if it has not already been saved.

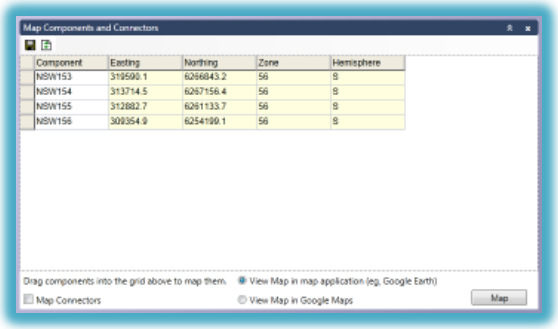
Filters can have various options selected that will add additional columns to the spreadsheet for Type of Location and it is also possible to decide how many attributes are to be displayed. If Manual is selected then a list of available attributes is presented when the filter is run and the required attributes can be checked in the check boxes provided.

The type of filter selected will determine which components or connectors can be used in the filer arguments.

23 Map Components and Connectors

Mapping Components and Connectors is achieved by selecting the Map Components and Connectors Icon shown above. This will open the Map Components and Connectors window shown below. Components that have been assigned Latitude and Longitude coordinates or UTM coordinates can be dragged and dropped in this window. The component name and the coordinates will be displayed in the fields provided. The values will be displayed as Lat / Long or UTM depending on the option selected in the Workspace Options Menu.





The user can select if connectors between components should be included. This will only show existing connectors that are already connected between the actual components and not between child components. The user can also select wether the mapped results should be displayed in Google Earth or Google Maps. When the Mapping function is run, DAD will create a special file (e.g. .KML for Google Earth) that contains the relevant mapping data in the right format. DAD will then open this file which will result in the relevant application opening.

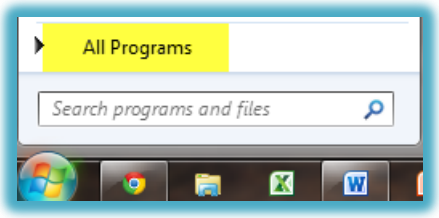
The DAD Client System that is being used must have the appropriate software installed e.g. Google Earth or a valid Browser that can open Google Maps. The system must also have an appropriate network interface that permits an external internet connection to be established with Google Earth or Google Maps.

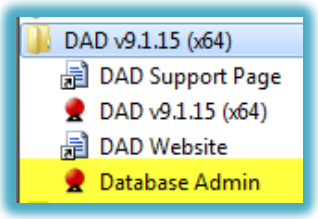
The data that is sent to Google Earth of Google maps contains all the information in the attributes for the components and connections that are being mapped. Selecting one or the components or connectors in the application will open a window that displays the attributes and values received from DAD.

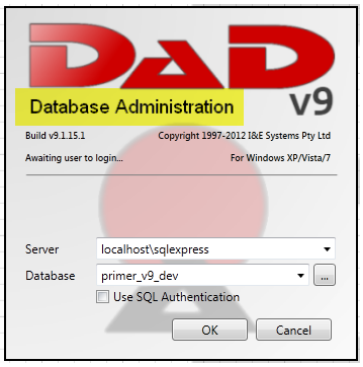
Warning the user must ensure that all components have valid Lat / Long or UTM values before mapping the components and connectors. If any of the mapped components has zero values then the application (e.g. Google earth will open a window that displays the other components together with any zero position components located at Longitude 0 (Greenwich) on the Equator. (0 Latitude)

Lat /Long Values can be +ve or –ve and the absence of a – sign will position the component in the wrong hemisphere.

24 DAD Administration

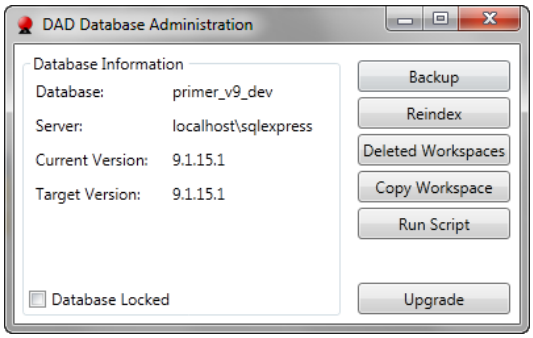






When the DAD client is installed on a PC a separate application will be installed in the same Program Directory for Database Administration. This application may require user rights that are not available to all users and the application should only be used by those users that are authorised to do so. It should potentially be removed from the programs of users that are not authorised to handle Administration Tasks to avoid unnecessary complications or unauthorised activities being carried out on the SQL database for the DAD model.

The Database Administration application will open a login window as shown above. The server name and user name need to be entered to carry out any of the administrative functions on a specific database model. Once these are entered and the application is run the DAD Database Administration window will be displayed.



Authorised users will be permitted to Backup the selected SQL DAD database or Re-index the database. Deleted Workspaces can be restored or purged to restore them to the model or to completely delete them. Workspaces can be copied and script can be run on the database.

Warning: Scripts that are run here have the ability to alter the SQL database. I&E Systems takes no responsibility for the DAD database in the event that non-approved scripts are run on a database. This may result in the database becoming completely unusable. I&E Systems would always be prepared to assist a client to recover a database under these

conditions on an hourly rates basis, however no guarantees can be provided that the damage can always be fixed.

The most frequently used function that is available using this Database Administration Application is to upgrade the DAD database when a new Version of the Client software has been released.

Before running any upgrade it is essential that a complete Backup is made of the database. This backup will be saved in a target directory that is related to the server where the DAD database resides. It will not be saved on the hard drive of the client machine.

Once a backup has been taken the database can be upgraded by an authorised user to match the latest Client Version that is to be used.

The Database version and the Client version must always be the same for the DAD software to operate. The target version is based on the version of the DAD client software that has been used to run the DAD Database Administrator application. i.e. if you wish to upgrade to version 9.1.15 then the DAD Database Administrator Application in the DAD v9.1.15 Program folder should be used.

The Database Administrator window will indicate the current version of DAD on the server and the target version will be based on the Client version and Administrator version that is being used at the time. If the versions are the same then there is no need to run the Upgrade of the database.

Irrespective of the difference in versions the latest Administrator software will run an upgrade to make the database match the latest “target” version. If for example the Database is version 9.1.12 and the target version is 9.1.15 then there is no need to upgrade to 9.1.13 and 9.1.14 before upgrading to 9.1.15. The upgrade to 9.1.15 will include all previous versions in a single upgrade script.

After an upgrade you can confirm that the versions are now correct by running the Database admin program again to confirm that the current and target versions match. You could then run a new backup to save an upgraded copy of the current database.

It is important that backup files are labelled correctly to indicate what they represent. If the name is not changed every backup will overwrite the previous backup and that backup will be lost. The Backup file name can be changed by the user and could be changed to include the version number and date on which the backup was taken. This would help if for any reason a decision was taken to revert to an earlier backup to eliminate some undesirable changes that had been made to the current DAD model.

For example if one user deleted an entire plant area from the model in error and this plant area was very important to the model then a decision may be taken to revert to a previous backup that may have been taken before the database was upgraded to suit a new DAD client. The labelling of the backup files would then be important in understanding that the restored database would need to be upgraded before it could be accessed with the later Client version.

Appendix A. Basic Principles of a DAD Model

Appendix A.1. Make Fewer Attributes.

This particularly applies to the Type tree.

Discretion and preference of users but….

When it comes to making attributes for a model we all have an initial urge to list out everything we think might be useful. You should resist this and only make essential attributes to start with and then add more as and when there is a clear need.

Common issues that arise when there are many attributes are:

- There can be synonyms like “Pressure Test” and “Test Pressure”

Which ones get used in which Forms is variable

The spread of SS gets excessive

Sparse matrix

Confusion over where to enter data

The meaning of data is often easily understood in context and with strings you can write Max xxx Min xxx etc. Or add Lock and paint pink.

Avoid binary attributes as they tend to encourage long lists of silly questions.

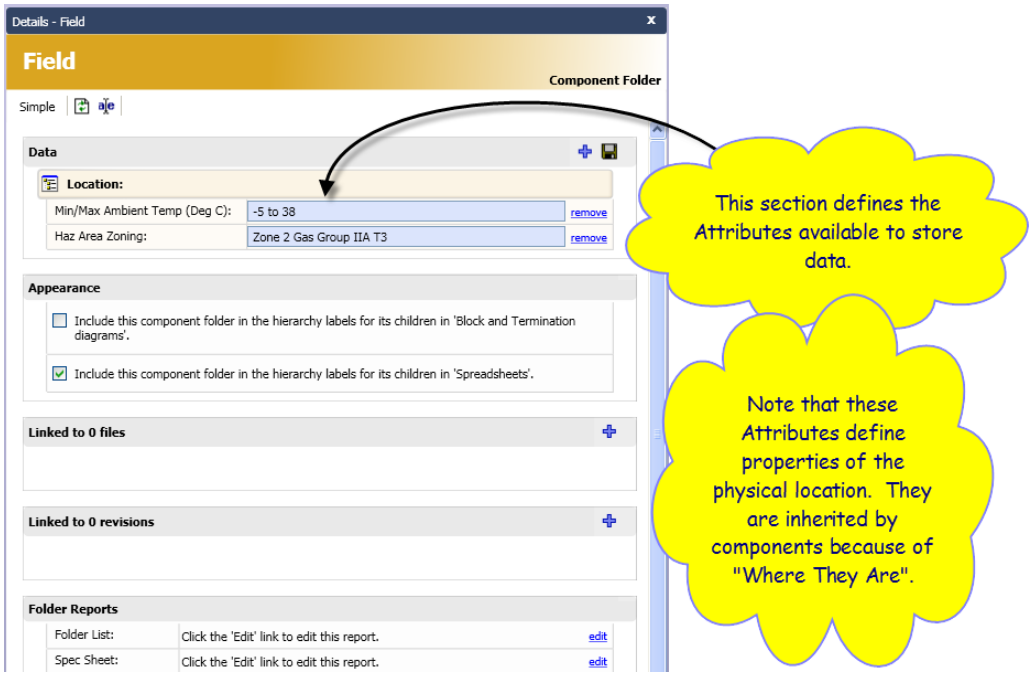
Appendix A.2. Inheritance in DAD.

Every component in the DAD model is classified by:

1. What it is – defined by the folders in the Type view
2. Where it is – defined by the folders and any parent components in the Location view.

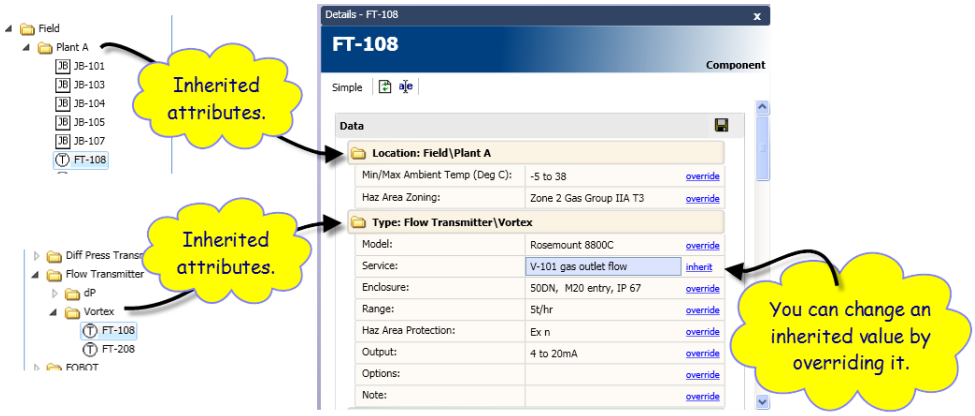
These folders set properties inherited by the members. Here is a typical Type folder:

Location folders also set properties for their members:



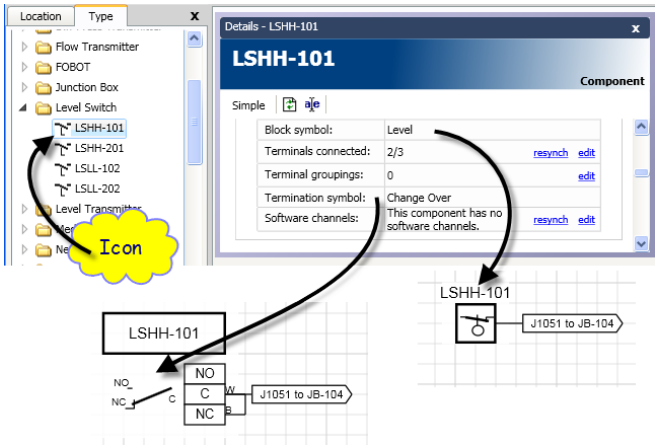
Appendix A.3. Rules of Inheritance.

Rule: Components get their attributes from parent Type and Location folders. This inheritance is constantly maintained.

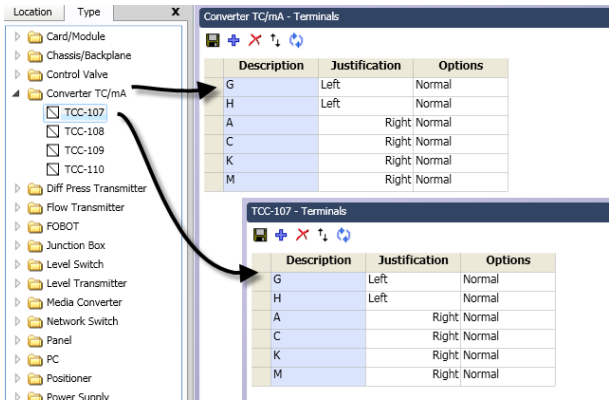


This rule makes it possible to add or delete an attribute in a folder at any time and this will revise all the children components appropriately.

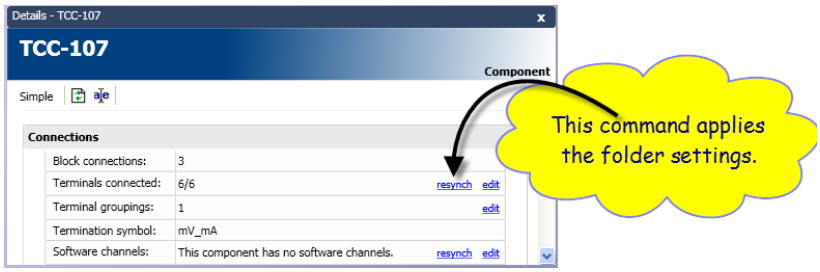
Rule: Components take their Icon and Shapes from their parent Type folder. This inheritance is constantly maintained.



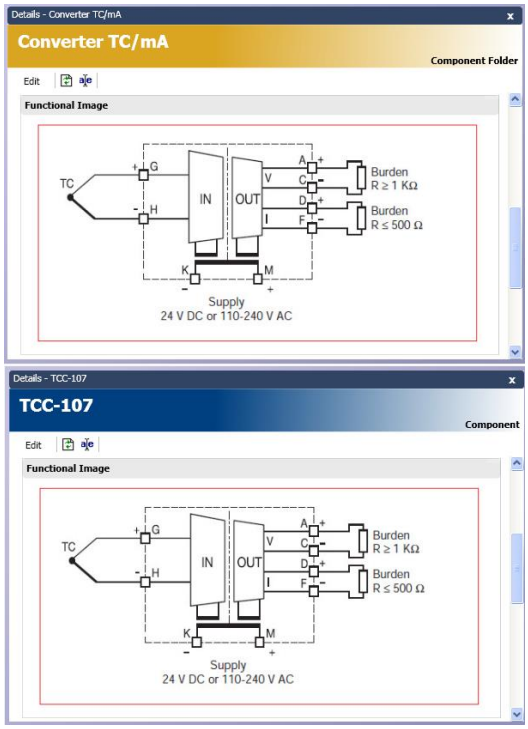
Rule: Components when created take the same terminal arrangement as their parent Type folder. This inheritance is not maintained.



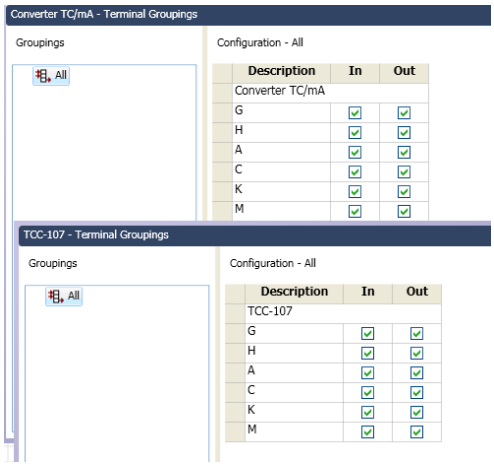
You can modify the terminals in the folders and the individual components. You restore the folder arrangement to components by resync:



Rule: Components get a functional image from their parent Type folder. This inheritance is not maintained.

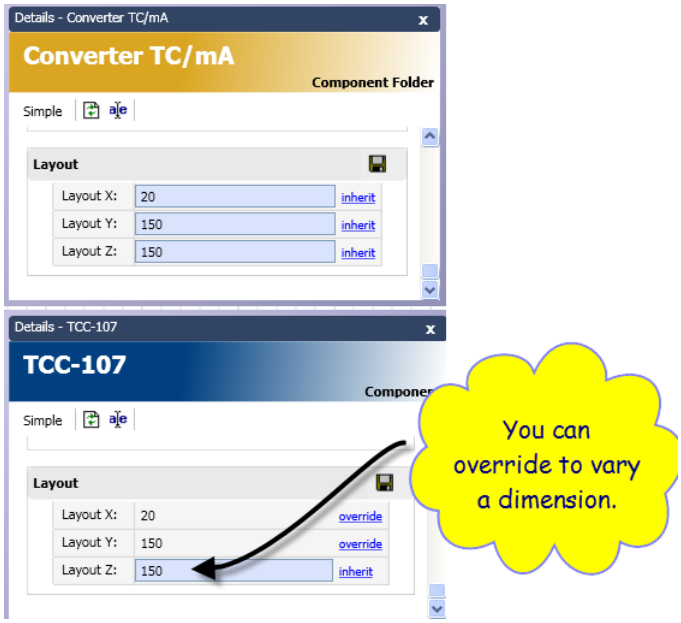


Rule: Components take the same terminal relationship as their parent Type folder. This inheritance is not maintained.

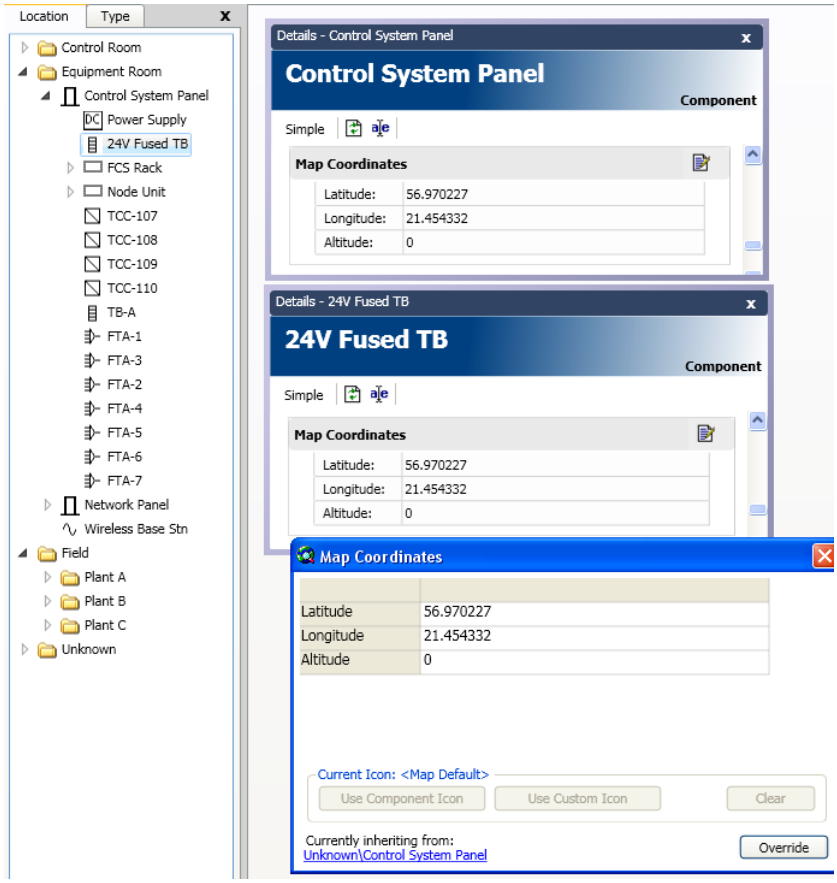


These relationships define the manner in which the Trace command will travel through the component from input to output terminals.

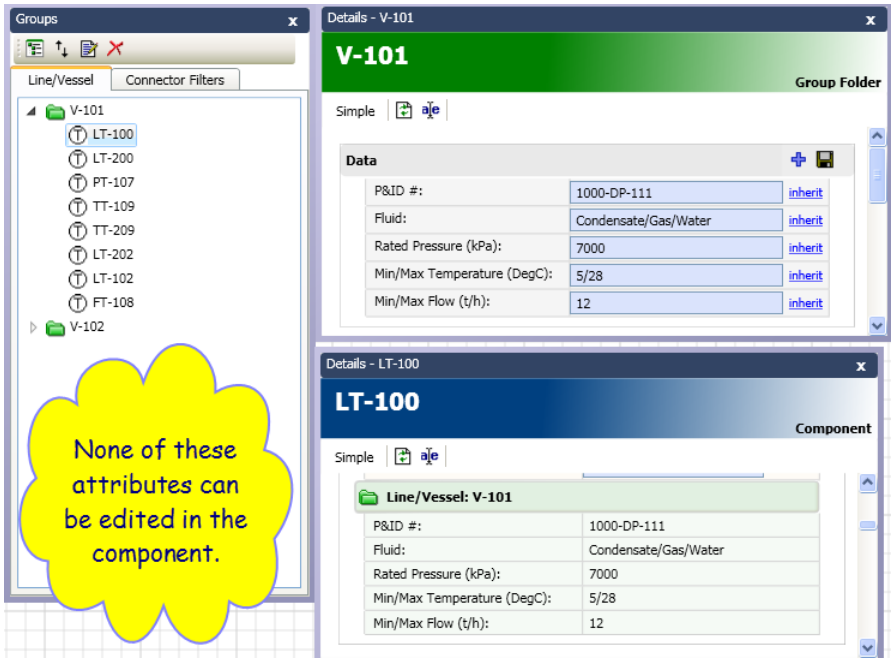
Rule: Components get their parametric dimensions from the Type folder.



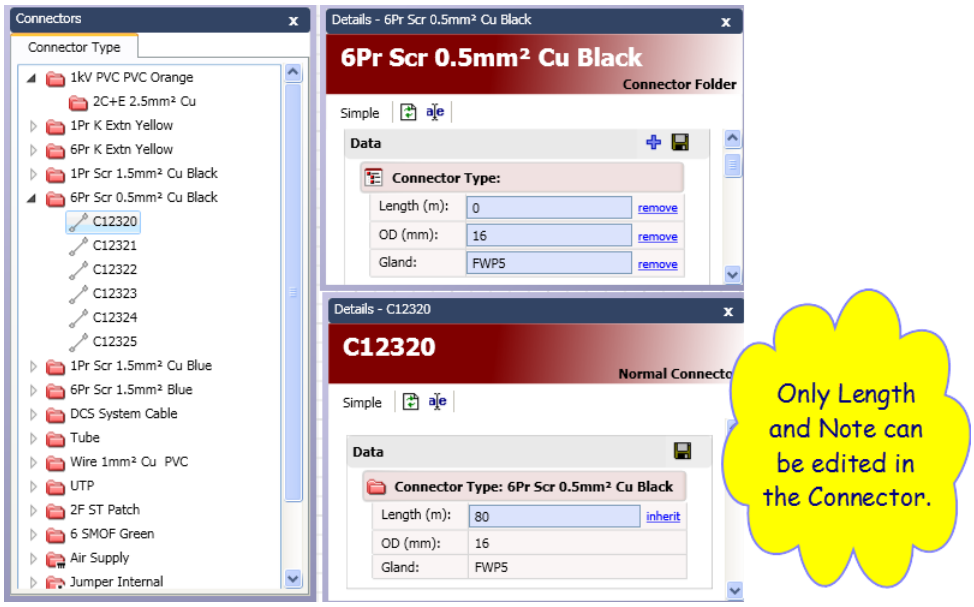
Rule: Components take their map co-ordinates from their parent folder or component in the Location View.



Rule: Components get attributes from Group folders. This inheritance is maintained.

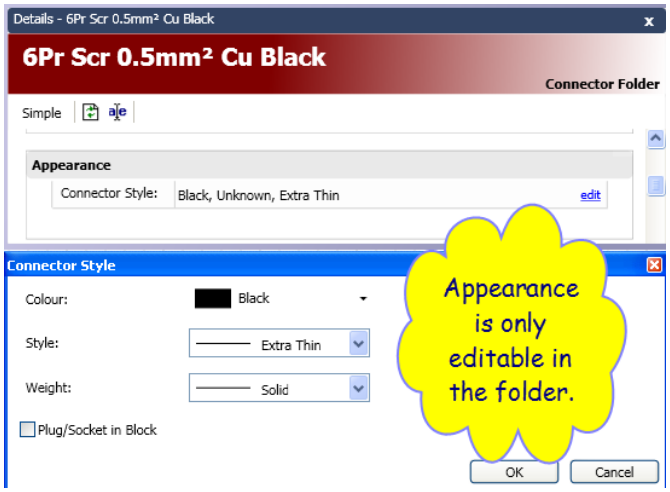


Rule: Connectors get their attributes from the Connector folders. This inheritance is maintained.

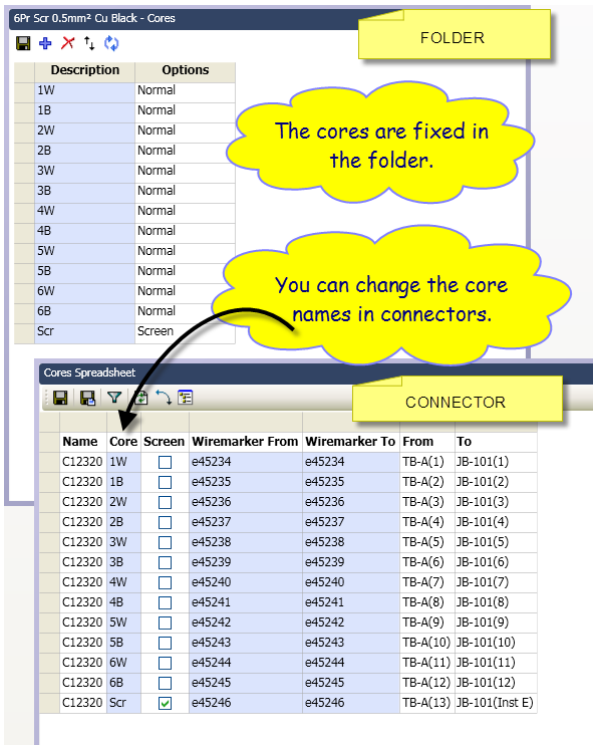


This rule makes it possible to add or delete an attribute in a folder at any time and this will revise all the children connectors appropriately.

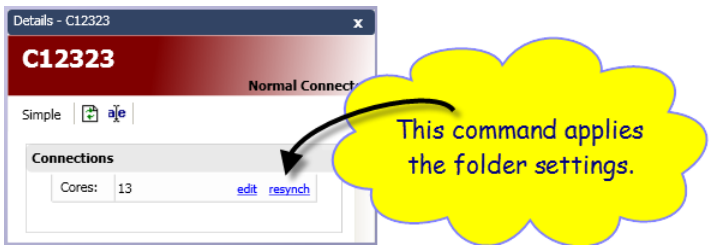
Rule: Connectors get their line type from the Connector folders. This inheritance is maintained.



Rule: Connectors get their internal make up from the Connector folders. This inheritance is maintained.

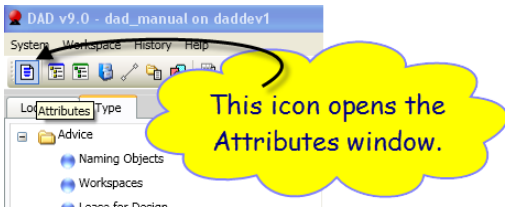


This inheritance is not maintained. If a connector folder with existing members has its cores revised the change will only affect new connectors made from that time on. You can change the existing members by resyncing them against the revised folder.

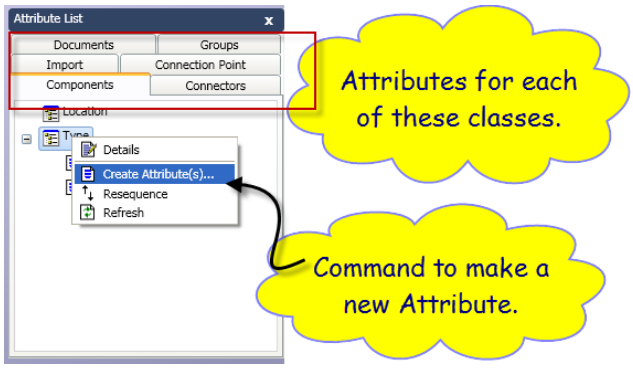


Appendix A.4. Creating Attributes.

Attributes are only place holders for data. You can create Attributes and also rename or delete them at any time.

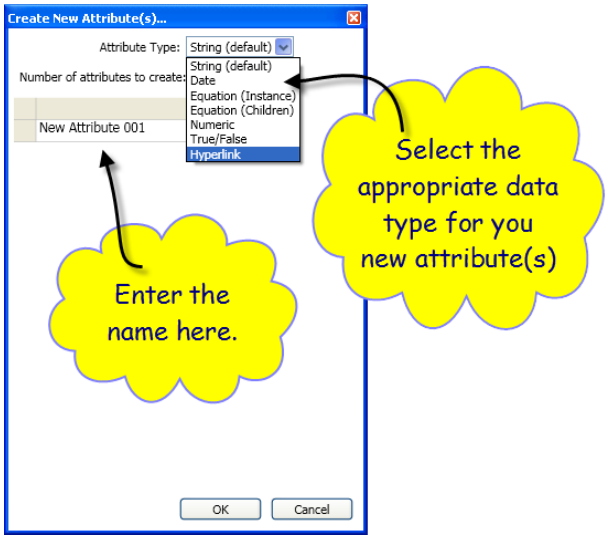


Clicking the Main Toolbar icon shown here opens the Attributes List window



Attributes apply to specific classes of objects. Components have specific attributes for Location and Type.

You can use the same name for different attributes – however if you do this you must take care that all users will be able to distinguish between them in the model context.



This is the create window.

HINT

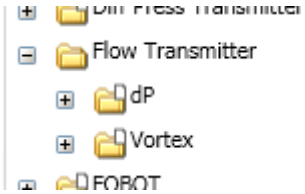
Strings are very useful as each can contain up to 8000 characters.

When you make Numerics it is advisable to add the units in the name like this

Power (kW.)

Appendix A.5. Create Type Folders.

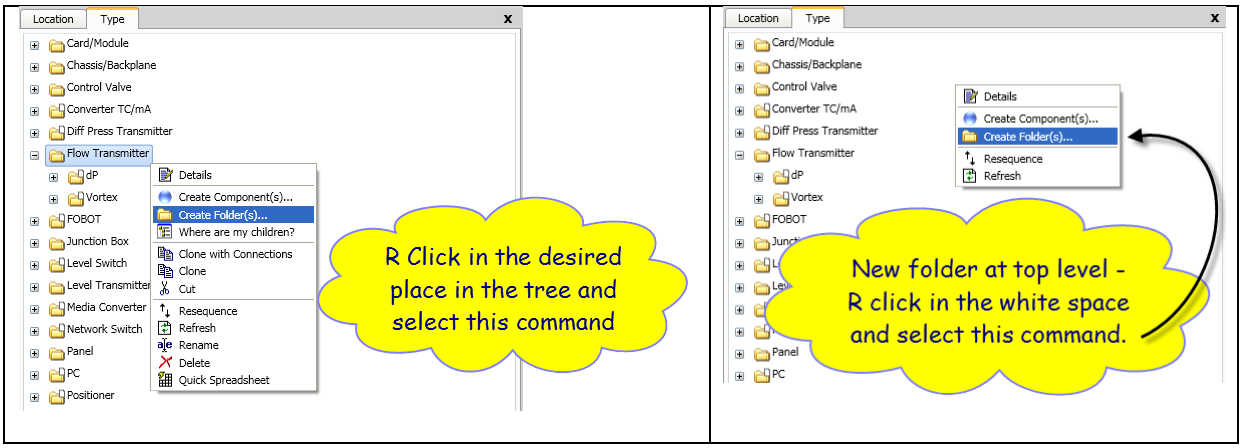
You should make a folder in the Type View for each type of component. You can nest folders within one another where this seems appropriate, e.g.:



HINT

This nesting reduces the number of top level folders making navigation simpler.

To create a folder:

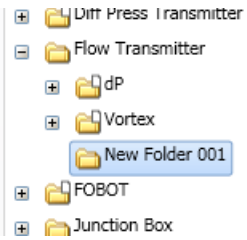


And then name the folder in this pop up window:

NOTE

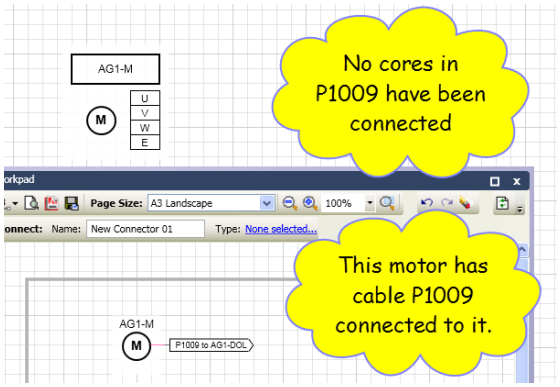
You can make many folders at once.

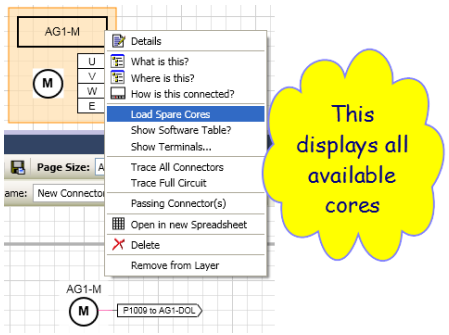
The new folder appears in the View:

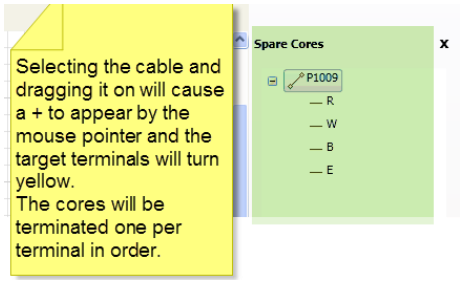


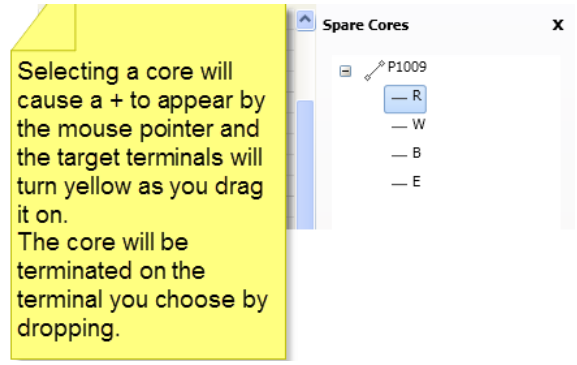
Appendix A.6. Connect Cable Cores.

You can only terminate cores in a cable to the terminals of a component (or a component that is a location child) to which the cable sheath has been connected (glanded).









If you have a problem with these operations watch the DAD training videos. It is a simpler process in practice than it sound here.

Appendix B. Better Handling of Design Changes.

It would be rare for a design to be done in an environment where no changes were made that involved some reworking due to changes in requirement or early stage errors. So rework is common and this need clashes with the usual set up for software – decide what you need at the outset and then never change this.

Personally I think that this emphasis on following business plan and setting the steps in concrete at the outset never works even if it is now cracked up to be good practice. It is not.

It is not to say that changes are always good. But the original objective is better understood as the design progresses and the more impediments there are to appropriate change the worst it is.

There are many design projects which involve a considerable amount of innovation or interfacing to existing equipment. Often these projects can evolve as the work progresses and new information comes to light. Such late changes are much easier to handle in DAD. It is comparatively easy to make significant changes without loss of data. Here are some examples of this:

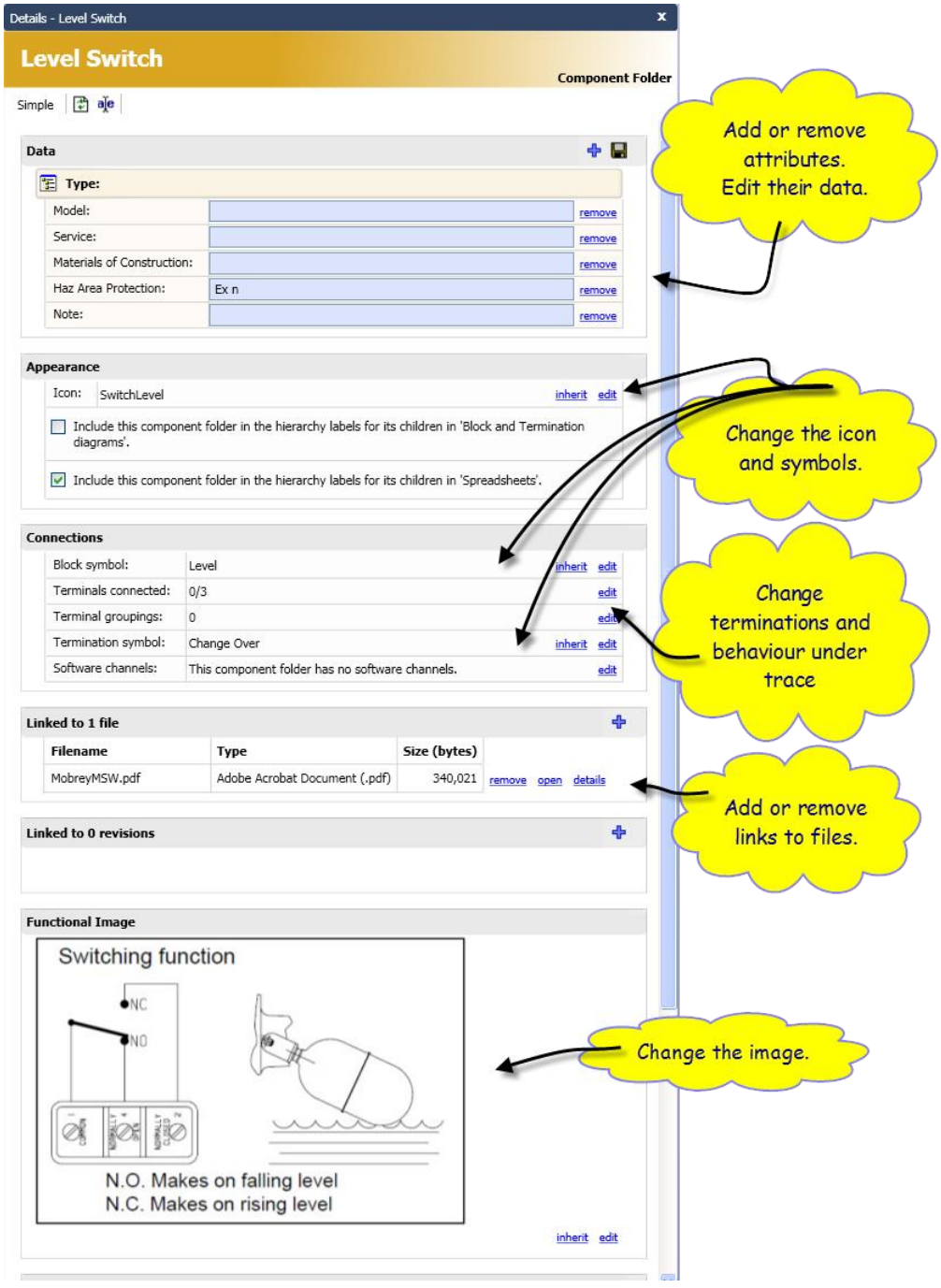
- Changing locations
- Changing type
- Adding terminals
- Changing transfer function
- Renaming
- Revising cabling and connections

If you set out to drive across an unknown city without adequate maps you cannot enforce strict adherence to directions unless they contain sufficient leeway for them to be varied in the light of better knowledge or change conditions. The obscurity of the documentation means that something like this is enforced in system design. It does not have to be.

Appendix B.1. Change Folder Properties

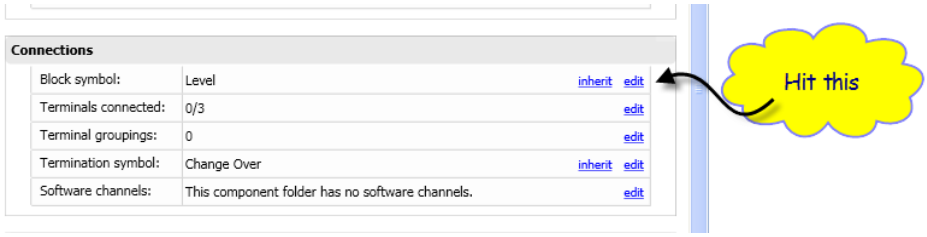
In this discussion we deal with Type Folder but the general principles apply to the other folder types in DAD.

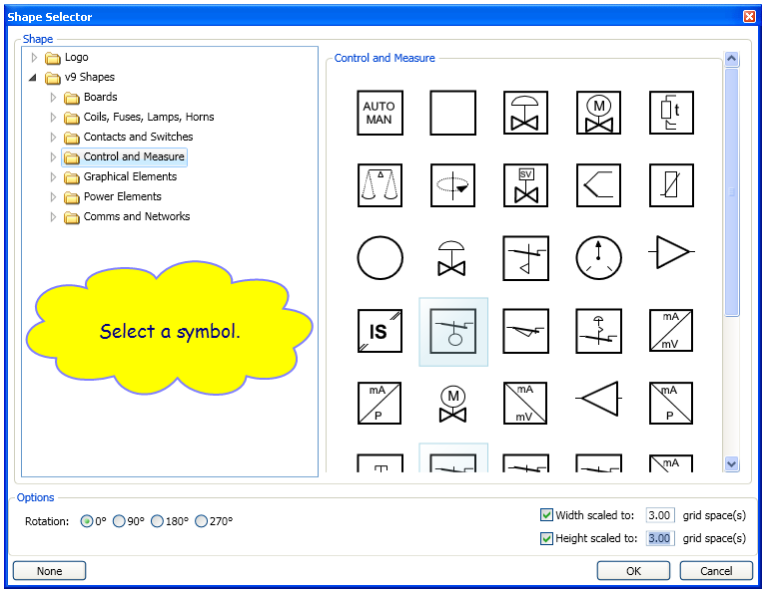
You can change the features defined by folders at any time.



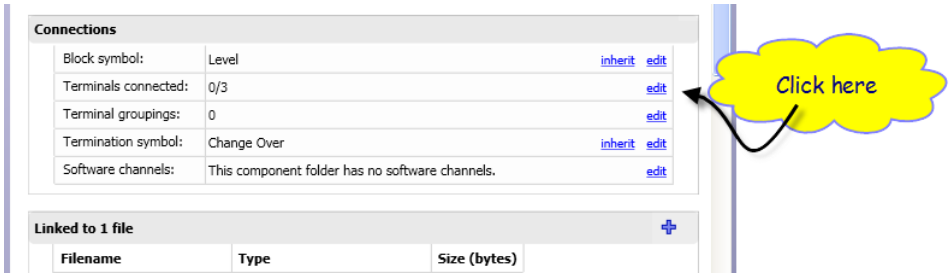
Adding or removing attributes affects all children immediately. Editing attribute data affects all children except when the attribute value has been overridden.

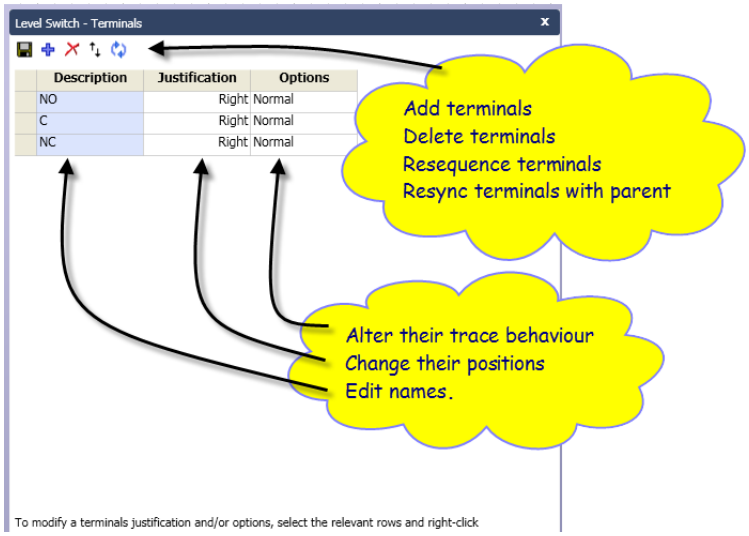
Changing the icon or symbol affects all children immediately. These are the steps to change a symbol:





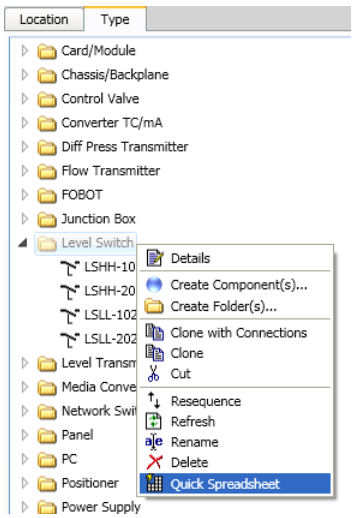
Terminals are changed like this:

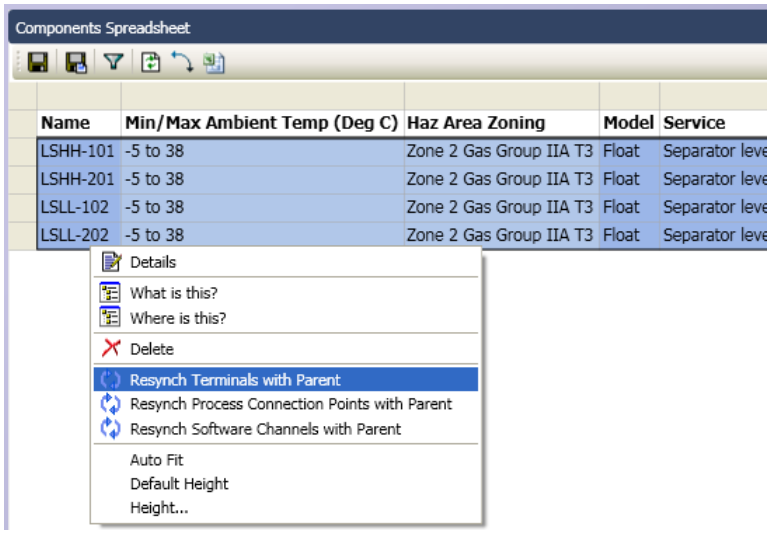




When you make changes to the terminals in a Type folder any existing children are not automatically affected. Only new components made in the folder will take up the new terminal arrangement.

Any existing children must be resynced with the folder to give them the new terminal arrangement. The above screenshot shows how this is done for an individual component. To resync many components perform these steps:

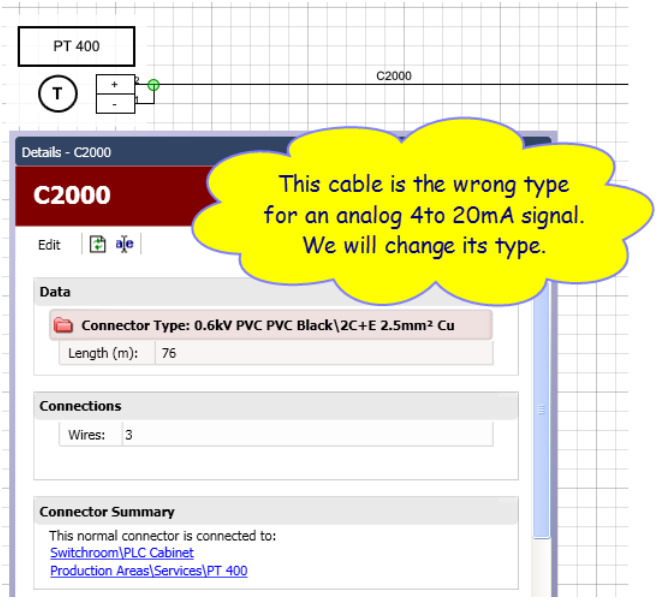


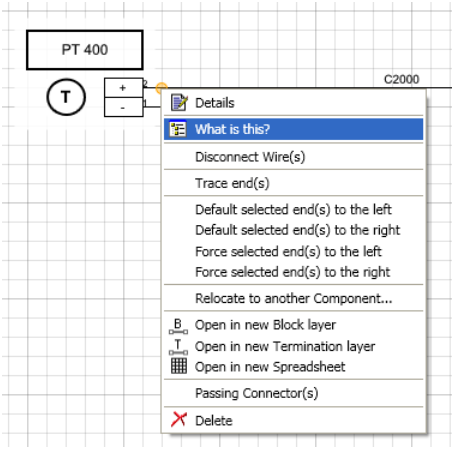


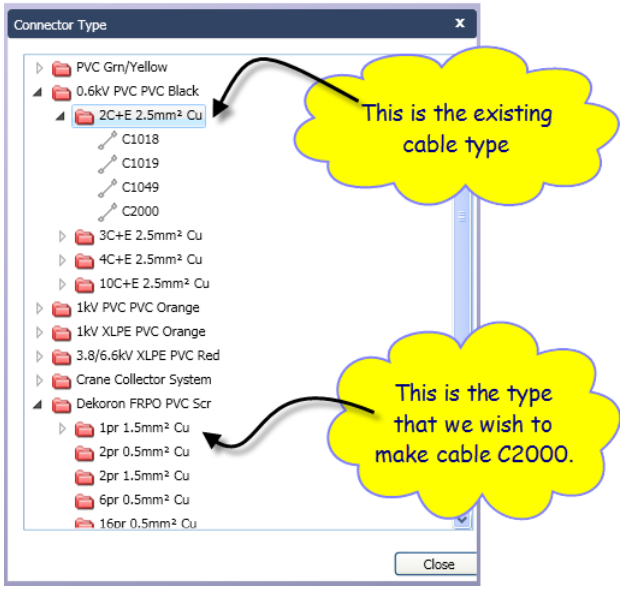
Appendix B.2. Change a Connector Type

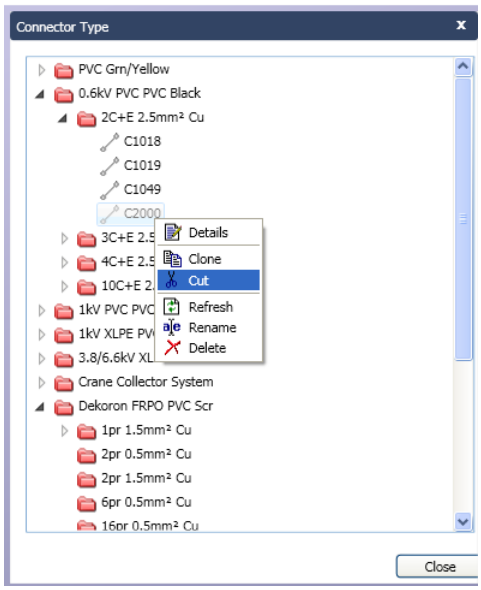
When you have connected a cable and then find that it is the wrong type you can change the type and retain the existing connections provided the patterns match.

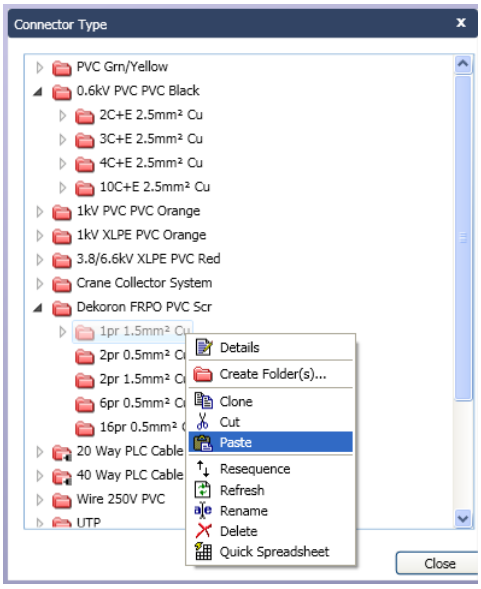
This is how you change connector type -

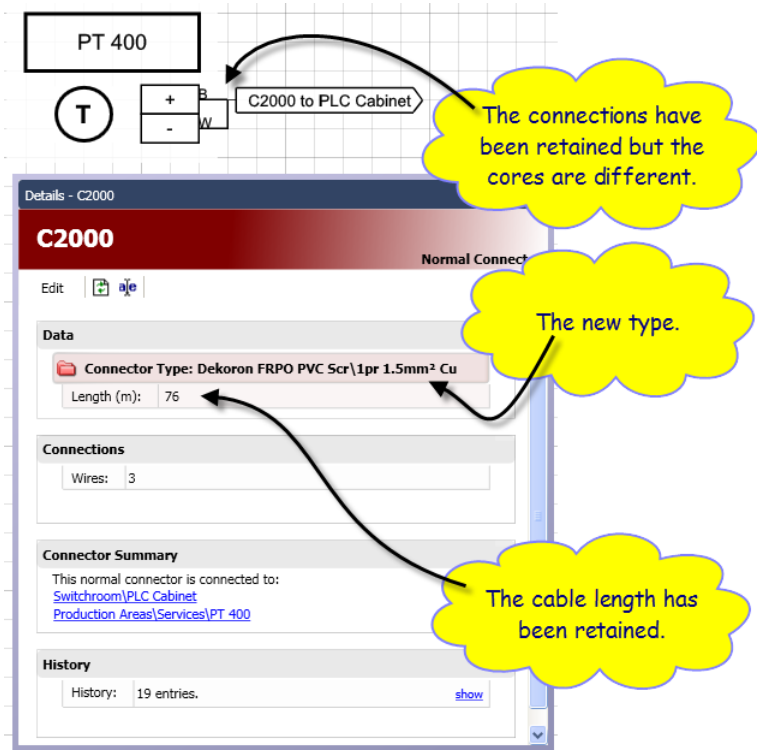







Connector Type
PVC Grn/Yellow
0.6kV PVC PVC Black
2C+E 2.5mm² Cu
C1018
C1019
C1049
C2000
Details
Clone
Cut
Refresh
Rename
Delete
Crane Collector System
Dekoron FRPO PVC Scr
1pr 1.5mm² Cu
2pr 0.5mm² Cu
2pr 1.5mm² Cu
6pr 0.5mm² Cu
Close


Connector Type
PVC Grn/Yellow
0.6kV PVC PVC Black
2C+E 2.5mm² Cu
3C+E 2.5mm² Cu
4C+E 2.5mm² Cu
10C+E 2.5mm² Cu
1kV PVC PVC Orange
1kV XLPE PVC Orange
3.8/6.6kV XLPE PVC Red
Crane Collector System
Dekoron FRPO PVC Scr
Details
Create Folder(s)...
Clone
Cut
Paste
Resequence
Refresh
Rename
Delete
Quick Spreadsheet
Close

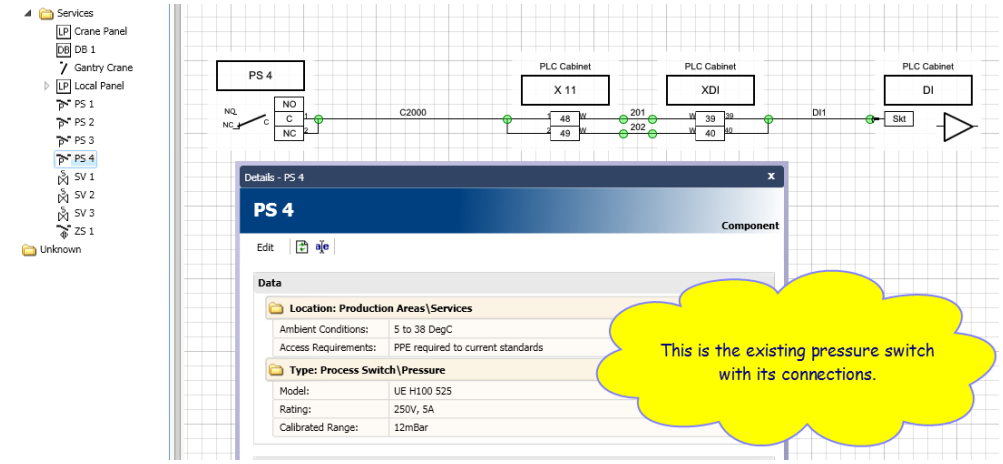

PT 400
T
C2000 to PLC Cabinet
The connections have been retained but the cores are different.
Details - C2000
C2000
Edit
Data
Connector Type: Dekoron FRPO PVC Scr\1pr 1.5mm² Cu
Length (m): 76
The new type.
Connections
Wires: 3
Connector Summary
This normal connector is connected to:
Switchroom\PLC Cabinet
Production Areas\Services\PT 400
The cable length has been retained.
History
History: 19 entries. show

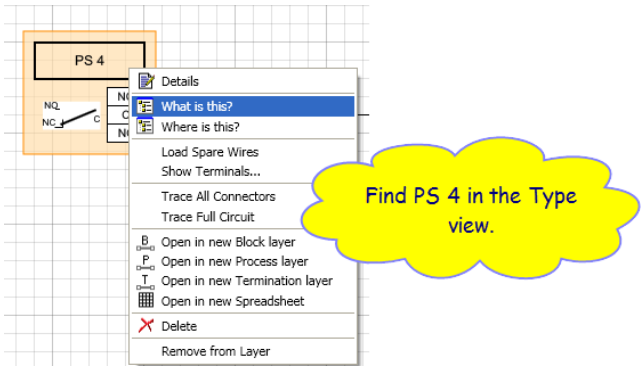
Appendix B.3. Change a Component Type

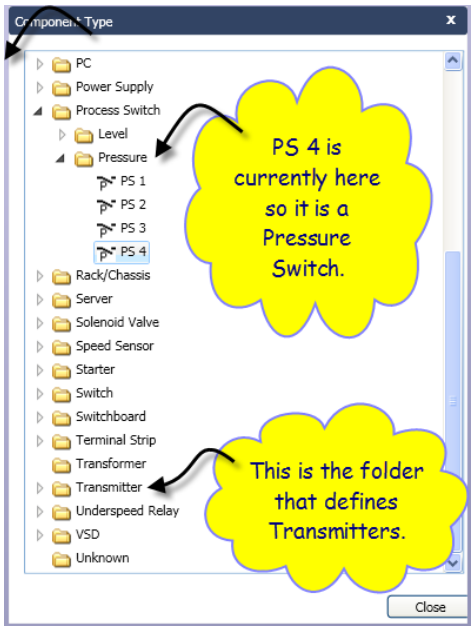
Changing equipment from one type to another is simple.

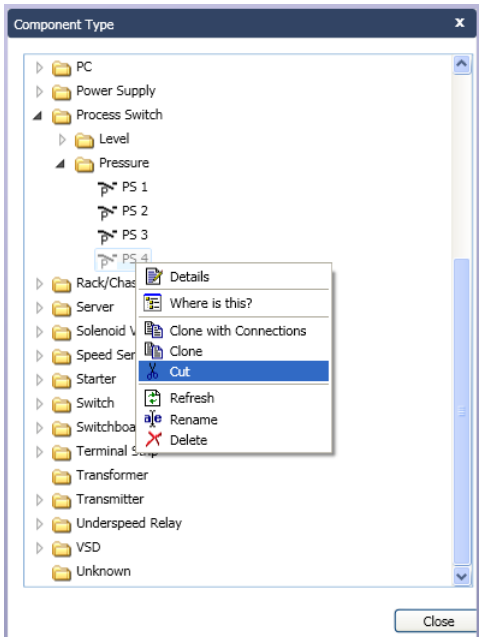
Assume that you have used a pressure switch for some duty then it is decided a transmitter would be better.

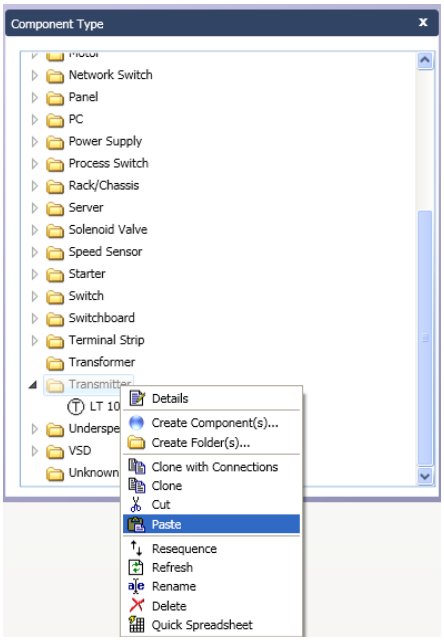
You might delete the pressure switch and create a new transmitter, but in DAD you can change the switch for a transmitter which can be quicker. The way in which you do this is shown below:



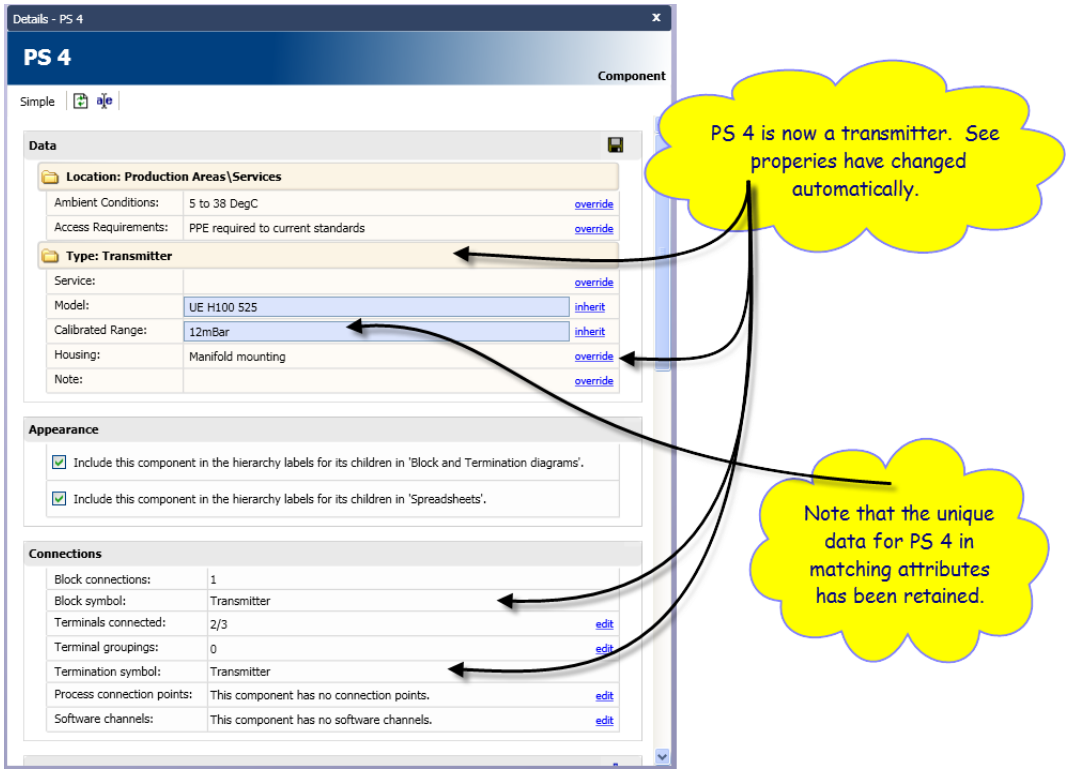




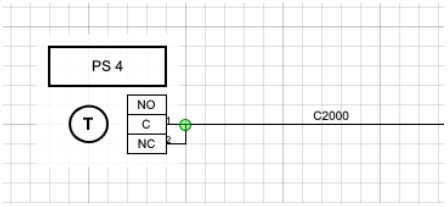




The cut and paste operations result in PS 4 changing to a transmitter –

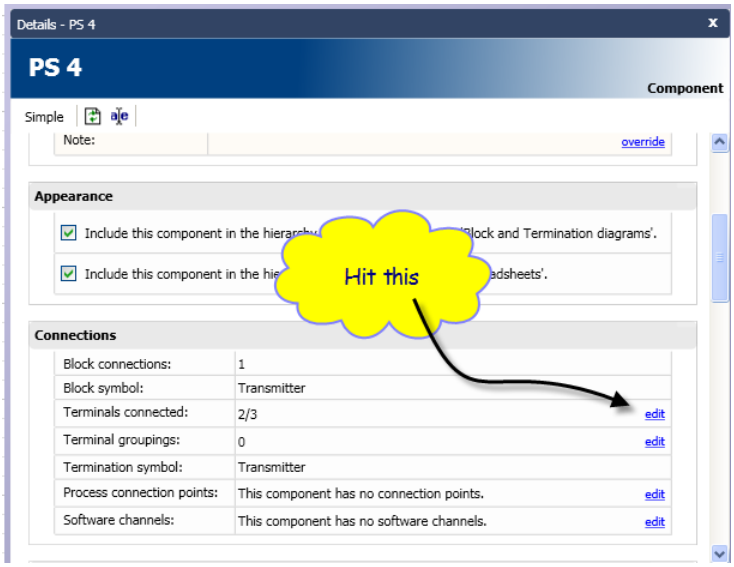


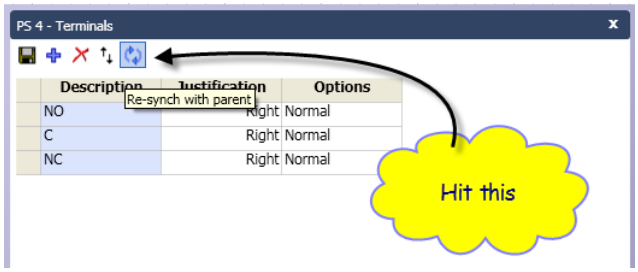
Now you might rename PS 4 to something more appropriate such as PT-01. You can also edit any other attribute data that was appropriate.

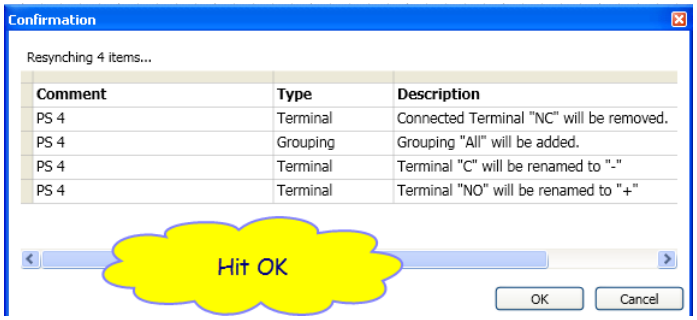


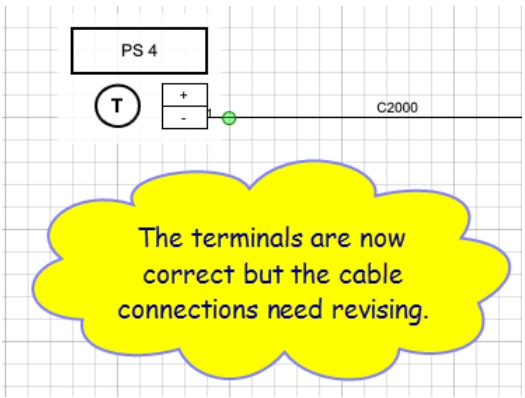
None of the connection properties were affected by the type change so far so the terminals on PS 4 are still:

To change the terminals to a standard transmitter open PS 4 Details, enter Edit mode and -





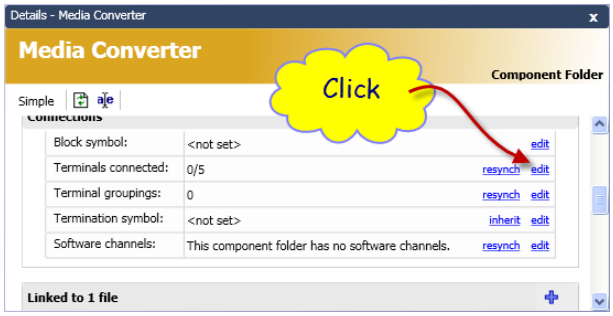




Appendix B.4. Adding Terminals to Components.

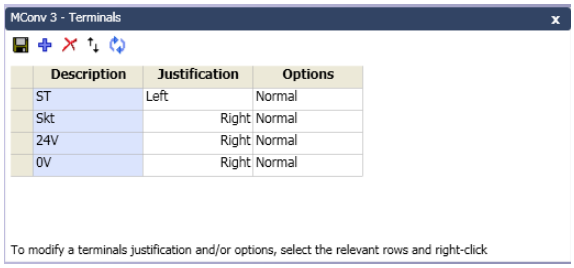
You can do this in both the Type folders and in components.

For Type folders you open the Details and then click the Edit button:



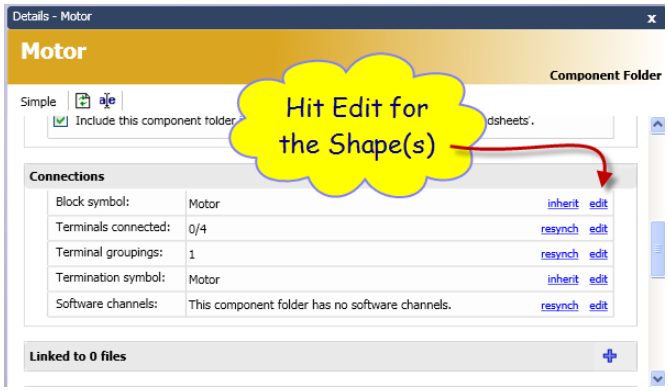
For Components you open the Details and click the Edit button:

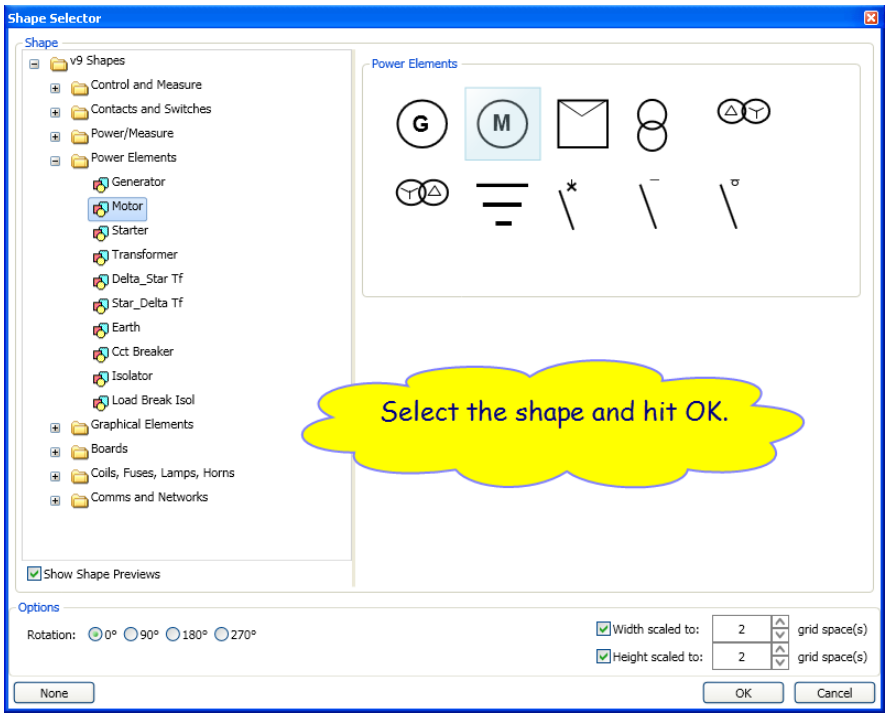
In every case the Terminals window will appear:



Appendix B.5. Adding Shapes to Type Folders.

Open the type folder Details form and then click the Edit button:

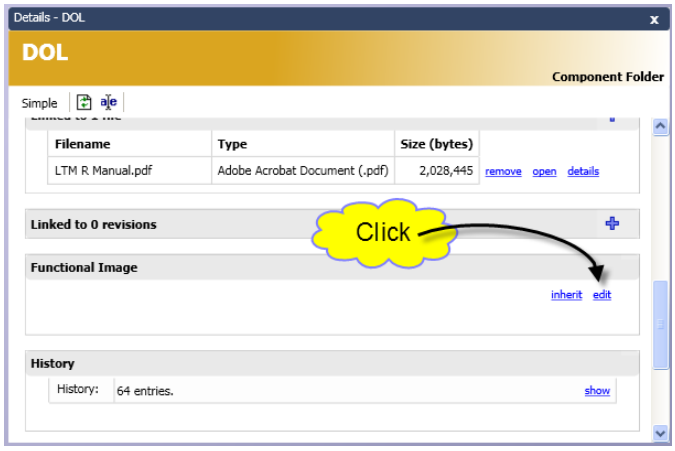


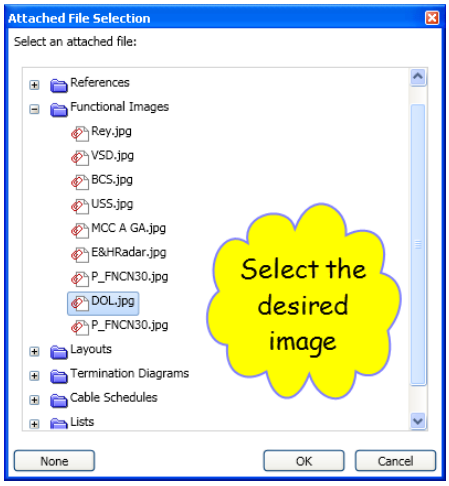


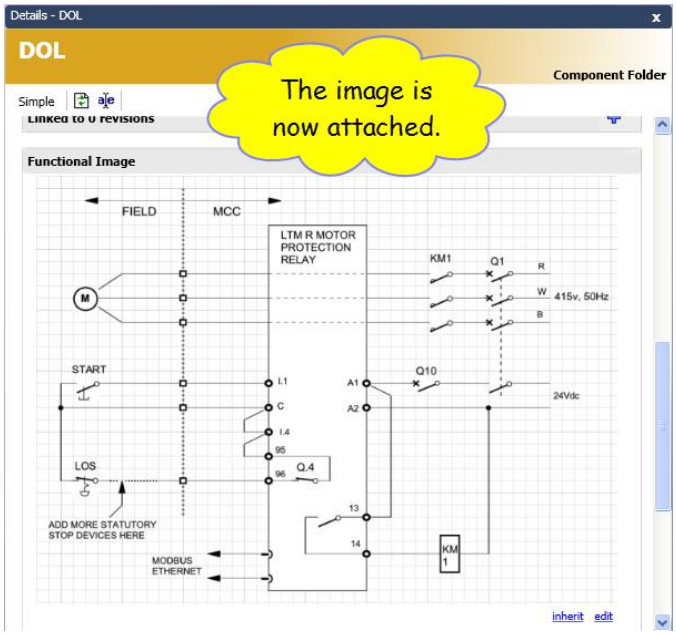
Appendix B.6. Adding Functional Image to Type Folders.

Only an image (JPG file) in the DAD Document Manager can be added.

Open the type folder Details form and then click the Edit button:

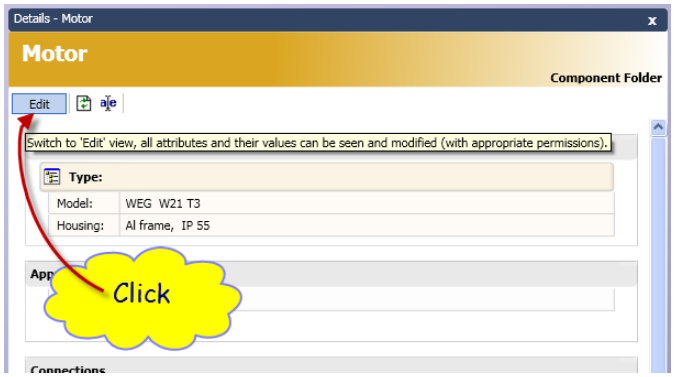


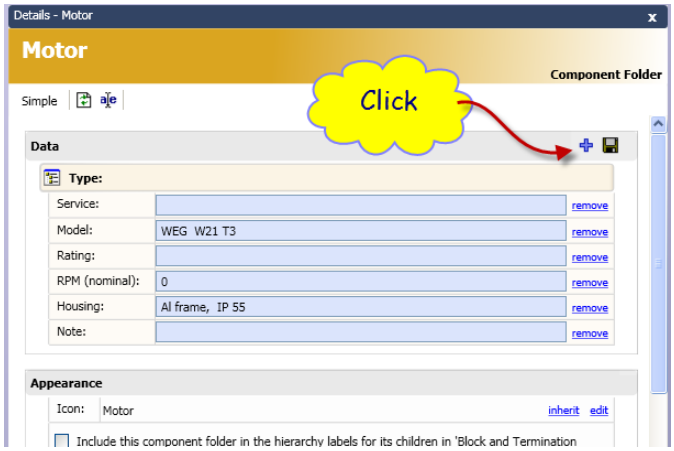


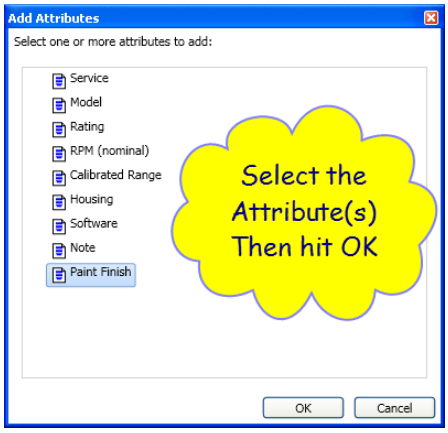


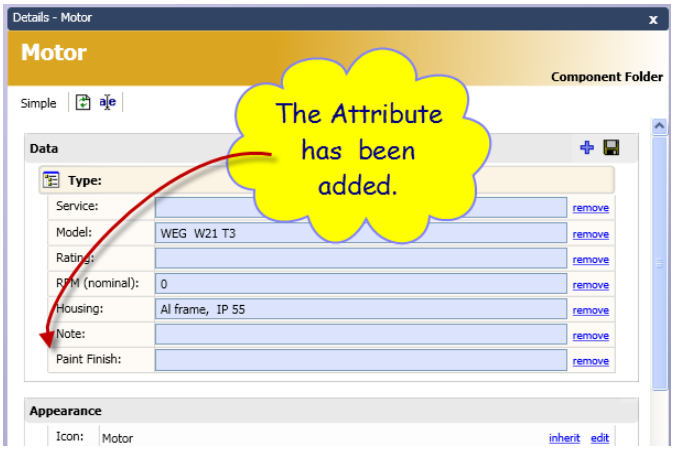
Appendix B.7. Adding Attributes to Type Folders.

Open the type folder Details form and then click the Edit button:



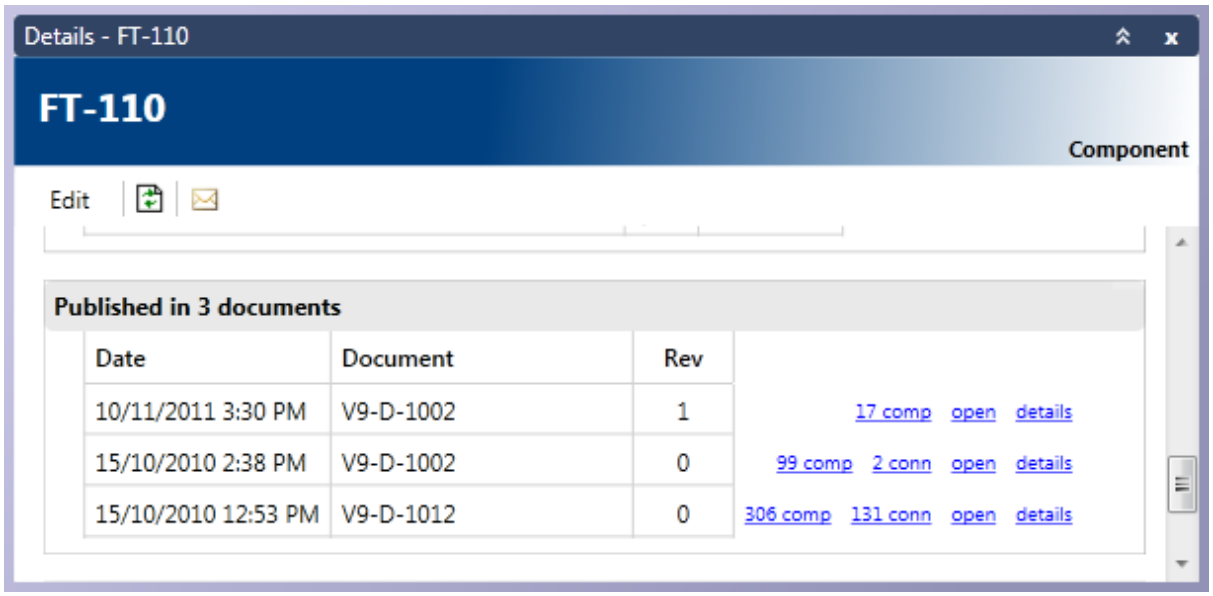




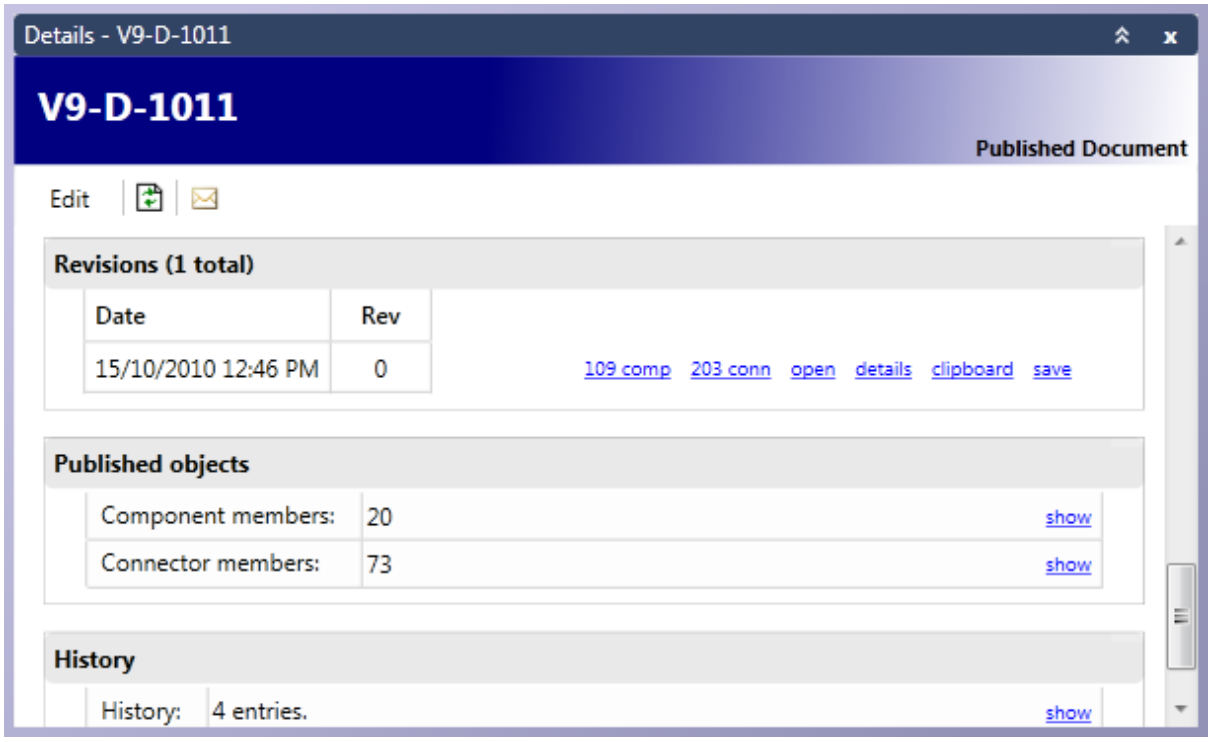


Appendix B.8. Documents that need revising

When the data in an object is changed you should look to see which documents might be affected by the change. The documents that contain the object by are shown on its Published in … document on the details page for the component.



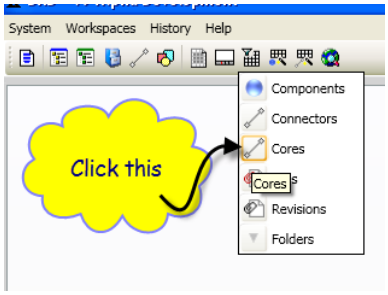
Each document lists the objects it contains on its details View under the heading Published Objects. You can see what changes have taken place to the collection of objects since it was published if you click the link for the changes to 109 comp or 203 conn shown below

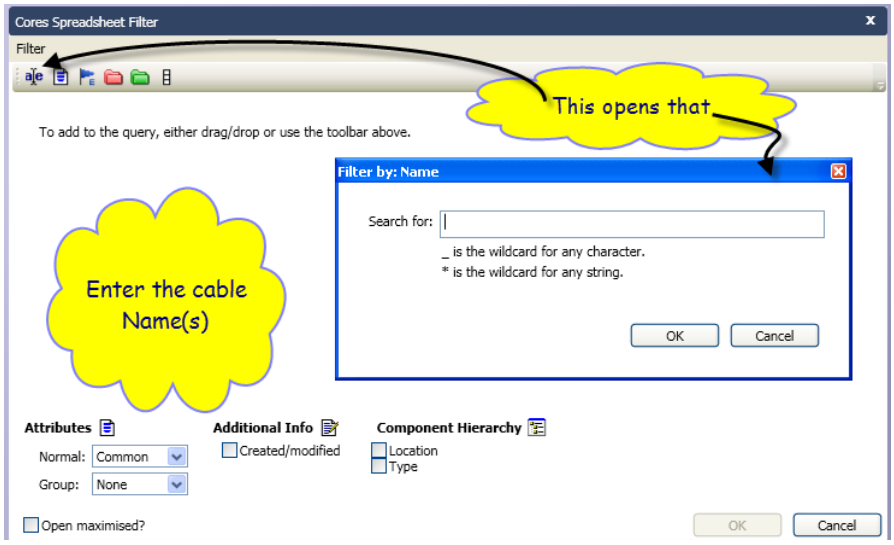


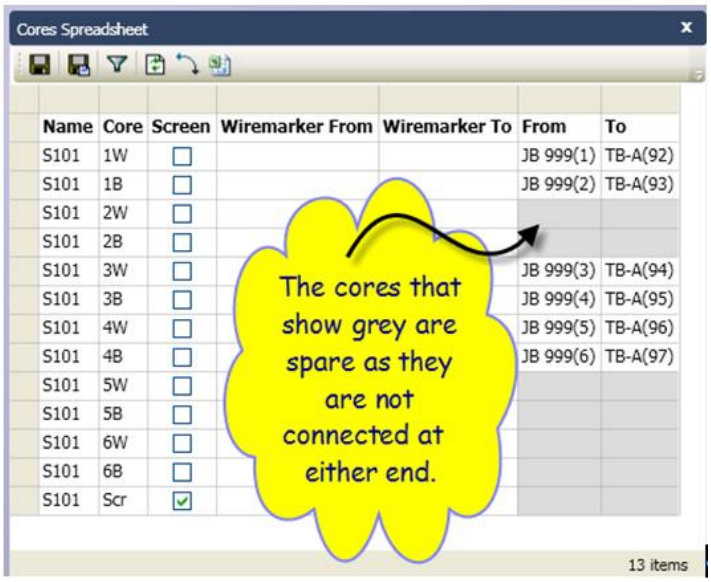
Appendix B.9. Find spare cores

This first set of screenshots illustrates how to find spare cores: spares because they are not terminated at one or both ends:

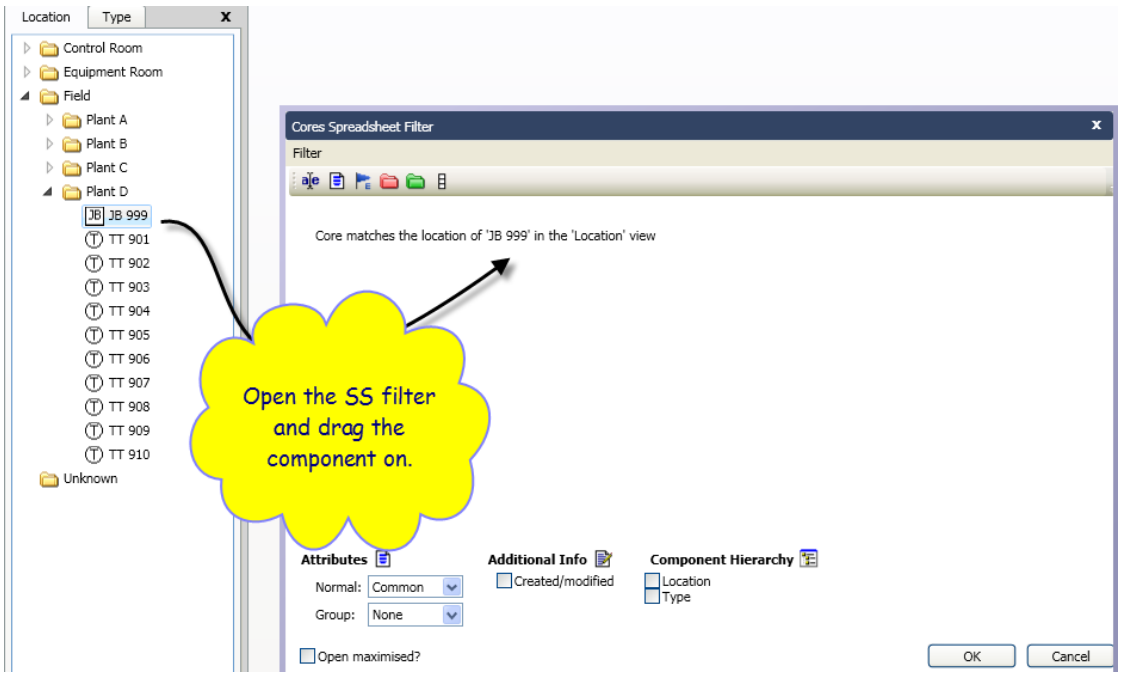
First decide which cable you want and then open it in a Cores Spreadsheet:



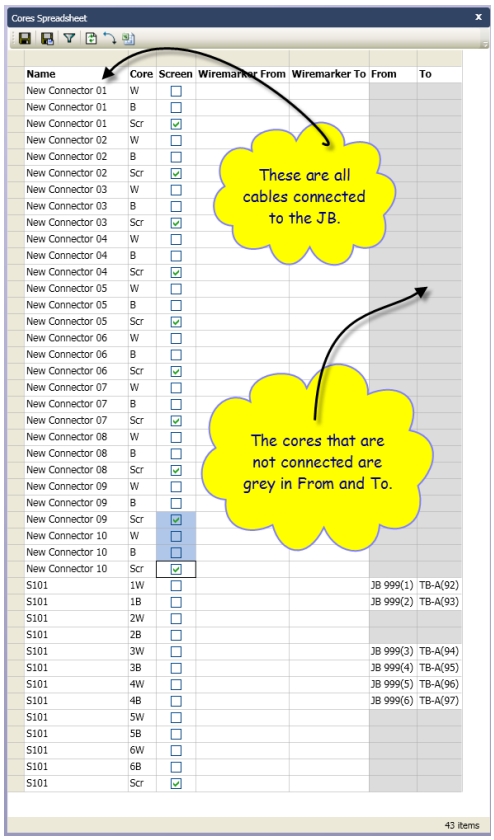




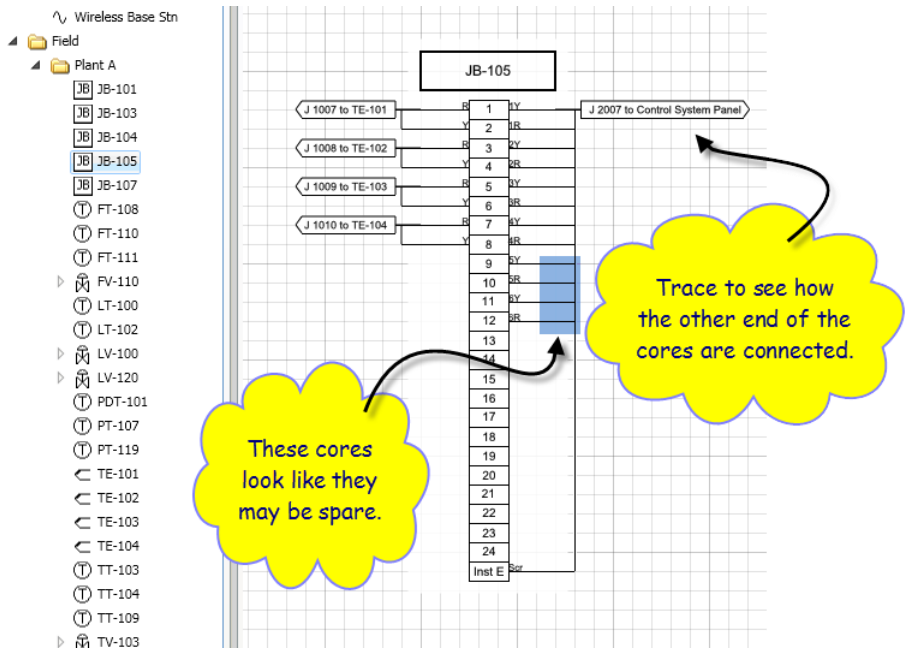
Or as is often the case you are looking for spare cores terminated on a device, this is how you do it:

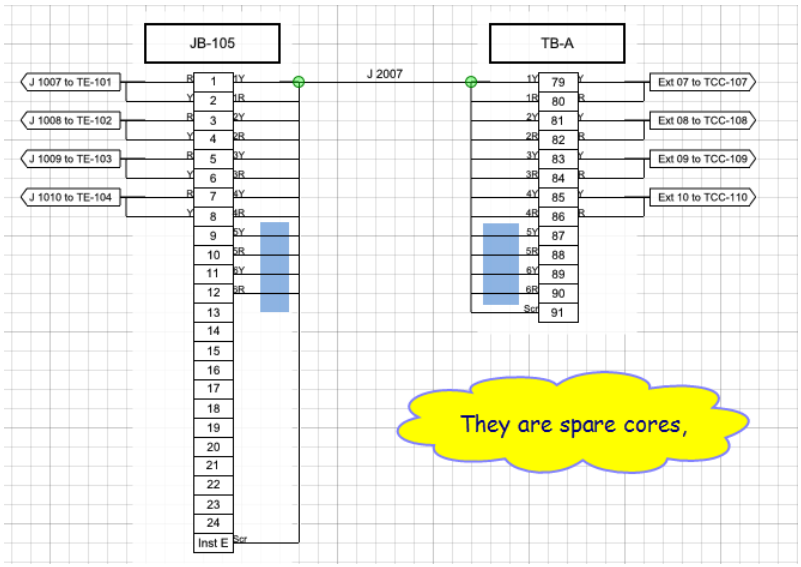


This lists all the cores in all the cables glanded to JB 999:



This second set shows how to find where the spare cores are connected at both ends. In this case you must decide which cores are spare by inspection of the connections:



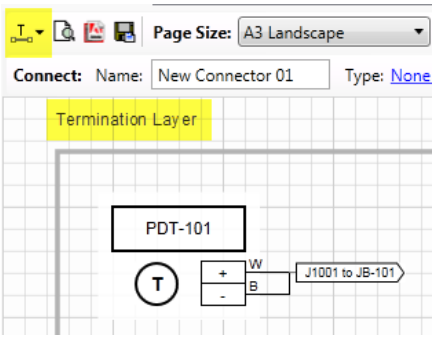


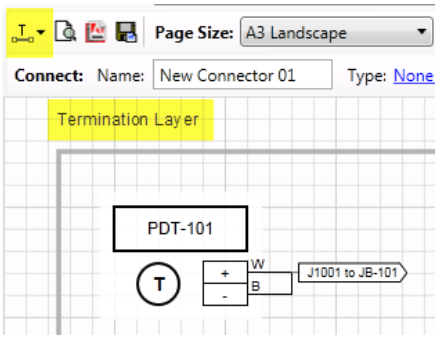
Finding spare cores is usually a lengthy exercise of accessing drawings and then comparing the cores shown on them with the total number of cores available in the cable. Often then there will have to be a site inspection as well. It may take many days to find (or fail to find) spare cores which as you have just seen can be found pretty well instantaneously with DAD.

Appendix B.10. Have Components been connected?

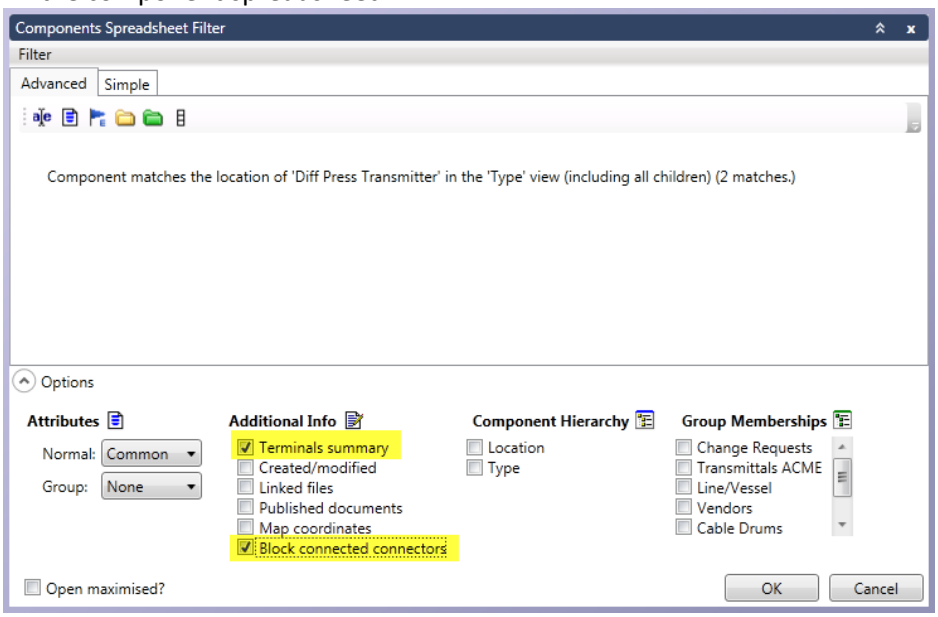
You can do this in a number of ways:

1. by dragging the component on to the Workpad block or termination layer. *Check that the Mask settings are not set to hide any connector that is of interest here*.

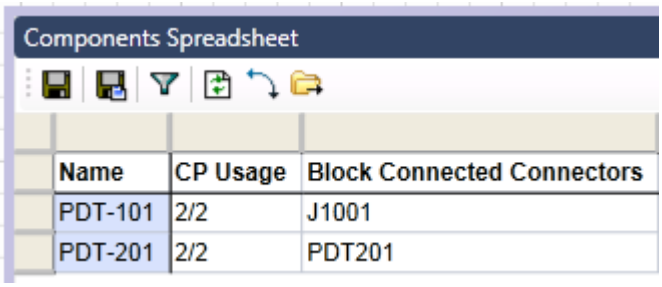




2. in the component spreadsheet.



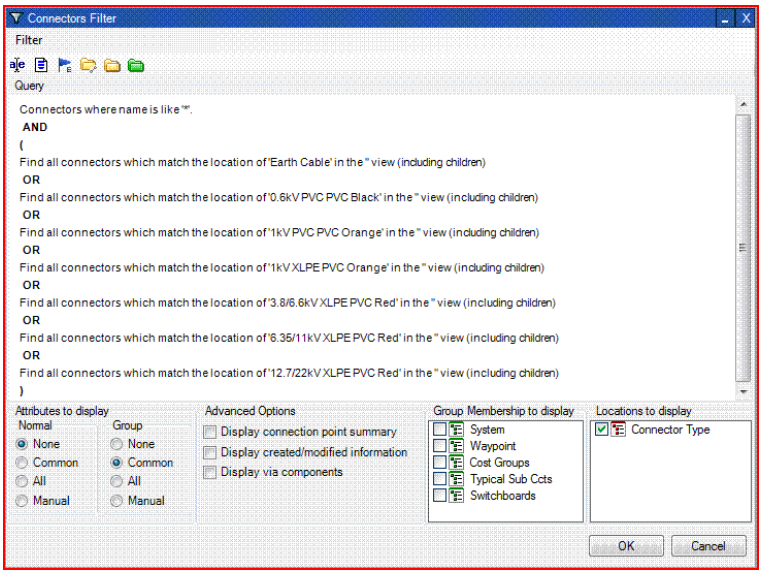
Results in Component Spreadsheet.



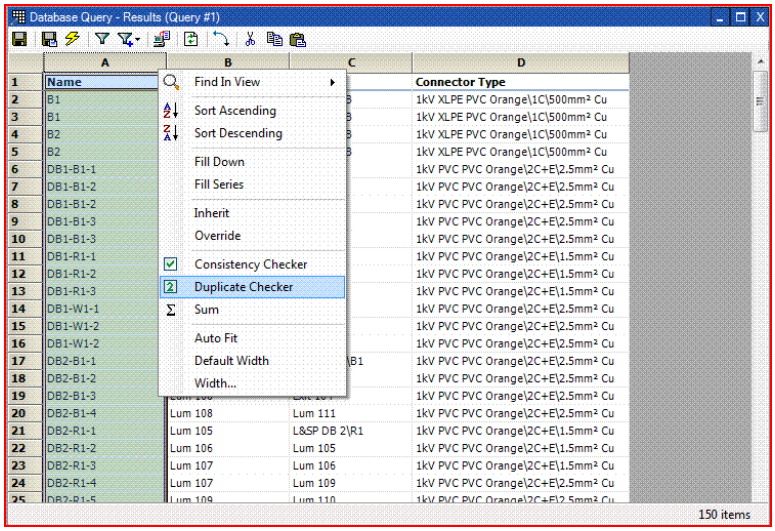
Name	CP Usage	Block Connected Connectors
PDT-101	2/2	J1001
PDT-201	2/2	PDT201

Appendix B.11. Duplicate Names

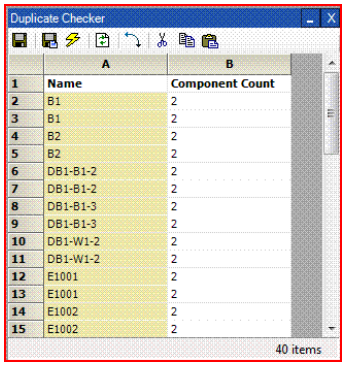
Duplicate names may be appropriate in certain cases but usually they are undesirable. You can search for and then edit to eliminate duplicate names.



This filter setting will return all the power cables for this particular model.



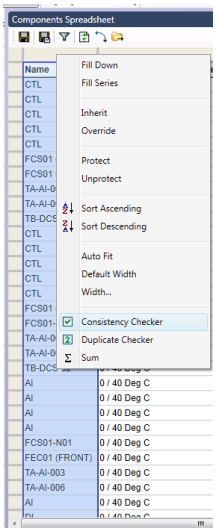
Select the name column and then RCM as shown



There are 40 duplicates.

Appendix B.12. Consistency Checking in Names.

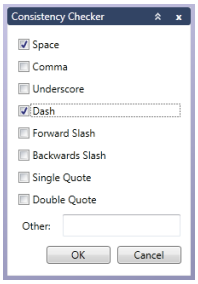
Some organizations tag their instruments with each category numbered independently, e.g. FT-001, FT-002, etc. – and then PT-001, PT-002. You can check that against this scheme if you use the method shown below where there is a tool to break up the Name into its constituent parts (parse) it.

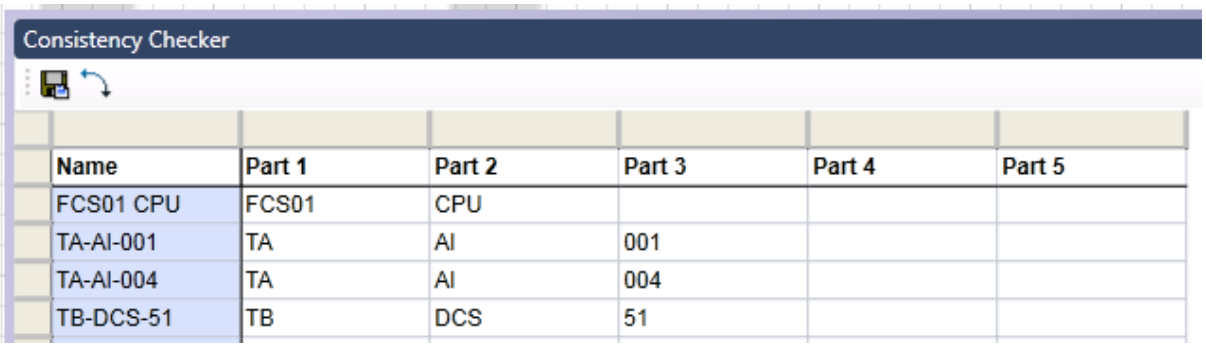


This is a spreadsheet of instruments.

Select the Name column and RCM to select the Consistency Checker

When this window opens you select the character(s) that are used to separate the Name into its parts.





Name	Part 1	Part 2	Part 3	Part 4	Part 5
FCS01 CPU	FCS01	CPU			
TA-AI-001	TA	AI	001		
TA-AI-004	TA	AI	004		
TB-DCS-51	TB	DCS	51		

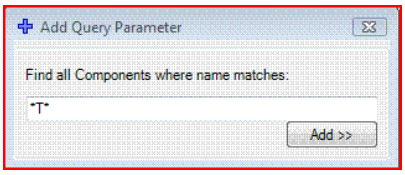
Here is the result. With this command you can decide whether duplication of the numbers is valid or not.

You can use consistency checker to break up any attribute string into up to 5 parts. This can sometime be useful when you have a need to compare strings.

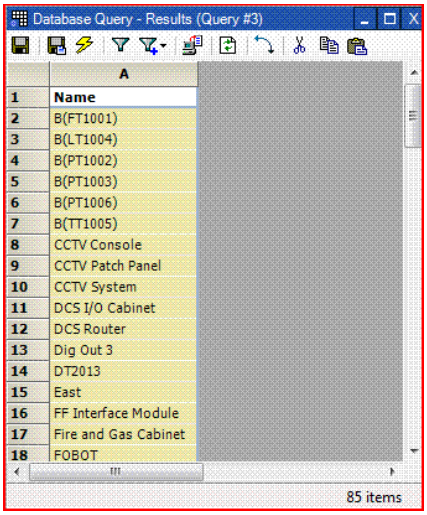
Appendix B.13. Wildcard characters in Filters

When you are performing string searches you should know the wildcard characters:

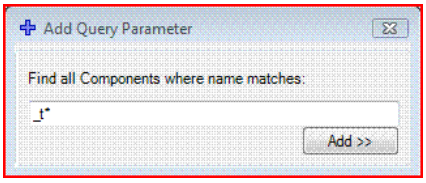
- % or * matches any number of characters and _ matches a single character.
- So this name search



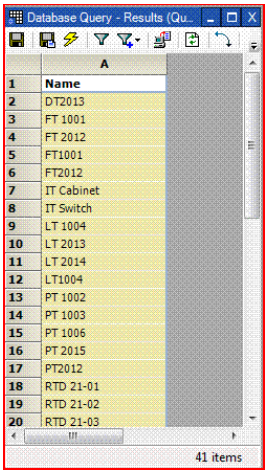
Returns any component with T (or t) in the name.



- And this name search



Returns any component with t (or T) in the second character of the name.



Appendix B.14. Re-editing existing Published Documents

When a document is published we store:

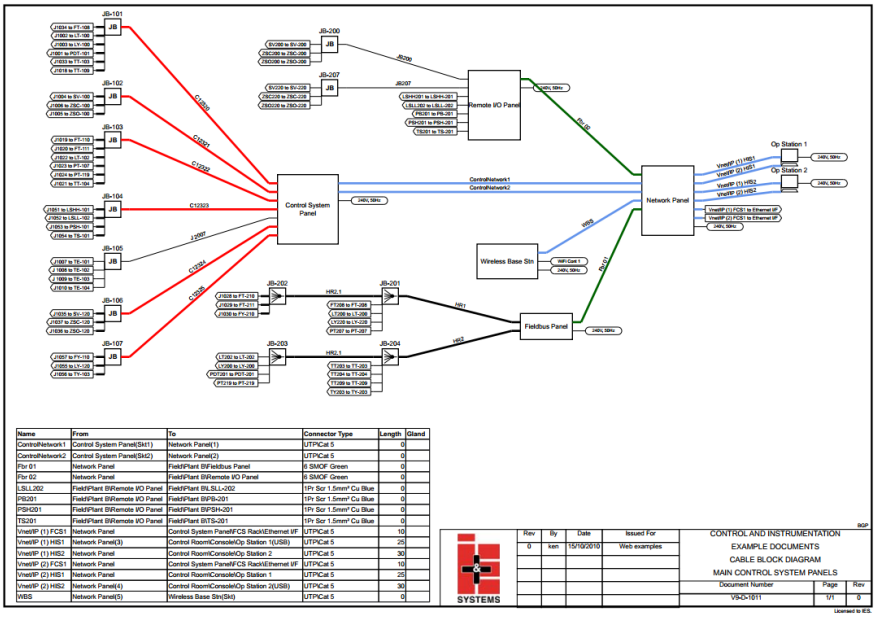
- The PDF file in the Document View of DAD
- Details of the document in the summary of every component which it contained some information from so that you can track the impact of changing an object on the published documents
- The layout details for the Workpad or Spreadsheet that was published so that we can restore this when you open a published document for "editing".

Note "re-editing" may appear to be altering an existing drawing but it is not. What you are in fact doing is restoring a set of data displayed in the layout that was published.

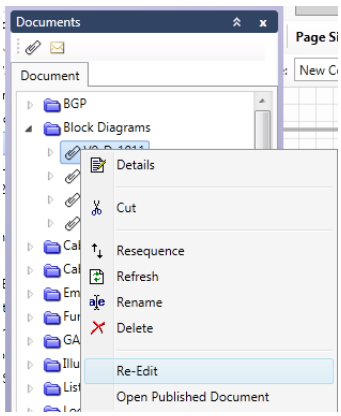
So this feature allows you to:

- Update a document with data that has been edited since the previous publication
- Store data so that it can be recovered in a particular format ready for instant modification.

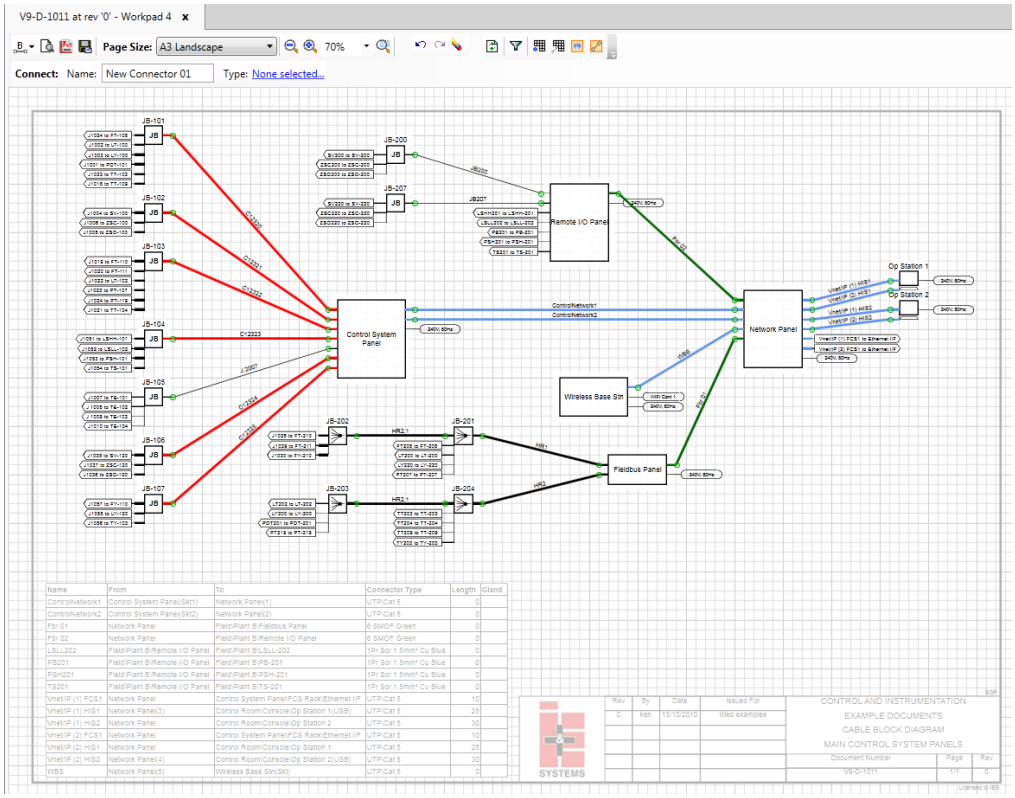
Here is a published document.



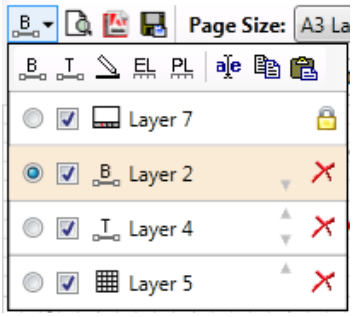
You select it for re-edit in the Document View Types like this:



This opens the Workpad. Note that it is in the Block layer

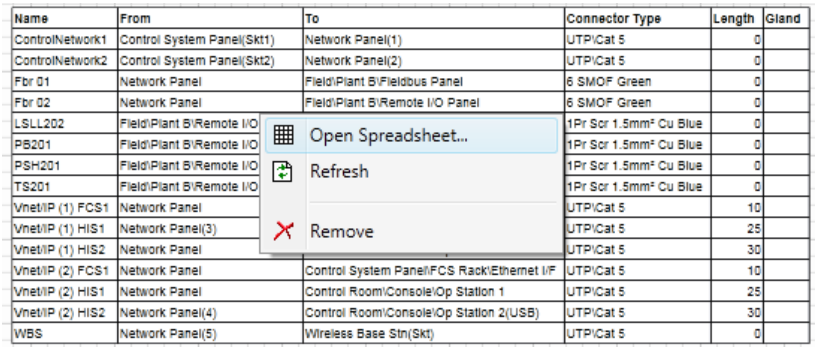


When you select either the Termination or Block layers using their radio buttons these will automatically refresh and display the current state of the data.



The active layer is the darker image.

Spreadsheets embedded in a Workpad are not automatically updated. These must be selected and opened as shown here with a Right Click Menu. This will open the Spreadsheet with current data. You must then republish this back on to the Workpad and delete the previous spreadsheet layer.



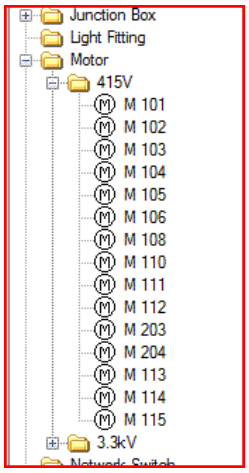
Name	From	To	Connector Type	Length	Gland
ControlNetwork1	Control System Panel(Skt1)	Network Panel(1)	UTP\Cat 5	0	
ControlNetwork2	Control System Panel(Skt2)	Network Panel(2)	UTP\Cat 5	0	
Fbr 01	Network Panel	Field\Plant B\Fieldbus Panel	6 SMOF Green	0	
Fbr 02	Network Panel	Field\Plant B\Remote I/O Panel	6 SMOF Green	0	
LSLL202	Field\Plant B\Remote I/O		1Pr Scr 1.5mm² Cu Blue	0	
PB201	Field\Plant B\Remote I/O		1Pr Scr 1.5mm² Cu Blue	0	
PSH201	Field\Plant B\Remote I/O		1Pr Scr 1.5mm² Cu Blue	0	
TS201	Field\Plant B\Remote I/O		1Pr Scr 1.5mm² Cu Blue	0	
Vnet/IP (1) FCS1	Network Panel		UTP\Cat 5	10	
Vnet/IP (1) HIS1	Network Panel(3)		UTP\Cat 5	25	
Vnet/IP (1) HIS2	Network Panel		UTP\Cat 5	30	
Vnet/IP (2) FCS1	Network Panel	Control System Panel\FCS Rack\Ethernet I/F	UTP\Cat 5	10	
Vnet/IP (2) HIS1	Network Panel	Control Room\Console\Op Station 1	UTP\Cat 5	25	
Vnet/IP (2) HIS2	Network Panel(4)	Control Room\Console\Op Station 2(USB)	UTP\Cat 5	30	
WBS	Network Panel(5)	Wireless Base Stn(Skt)	UTP\Cat 5	0	

Appendix C. V9 Application Notes

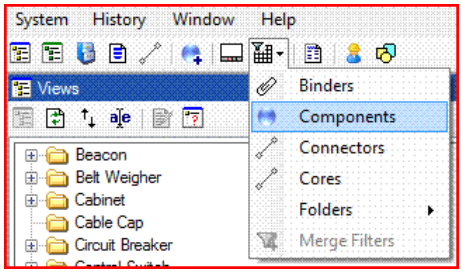
Appendix C.1. Finding Components & Connectors in the model

As all components are classified according to what type they are and where they are located. So if you know either of these you can find a component. So if you were looking for a 415V motor you might refine your search in steps as shown below.

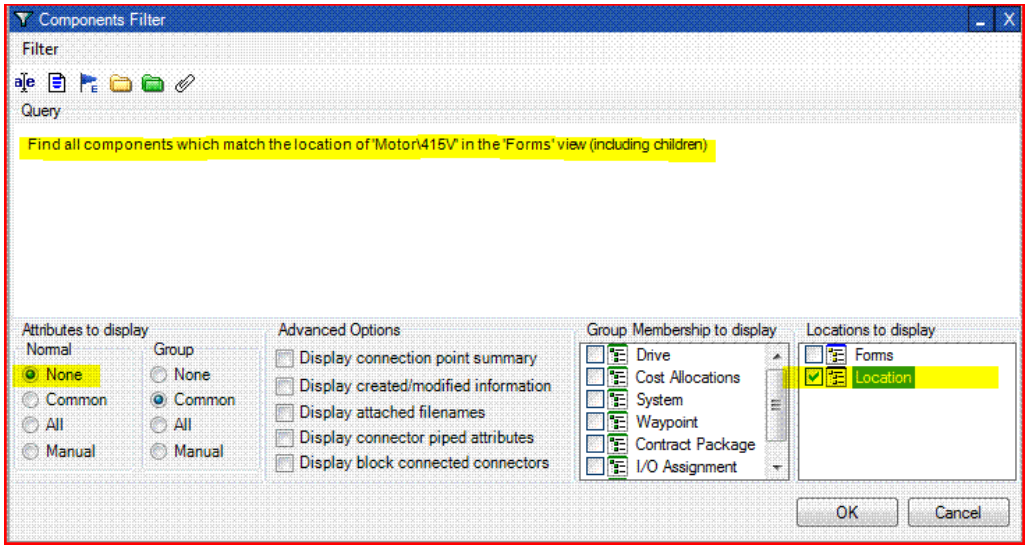
First you expand the relevant folder in the forms view.



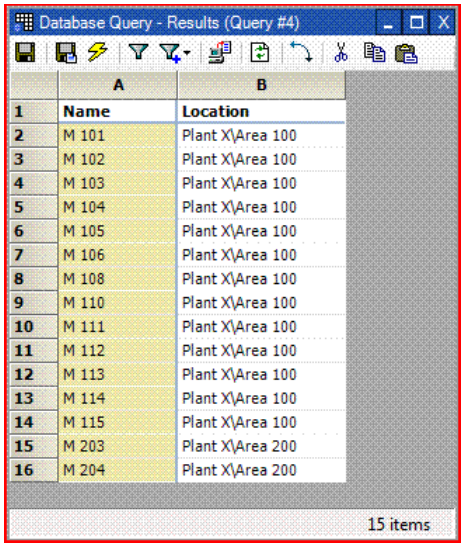
If however you cannot identify your motor this list then you might open the component filter to get more detail about these motors. You do this by opening the spreadsheet filter -



Now drag in the folder Motor/415V and make the settings shown to return only the names and their locations.

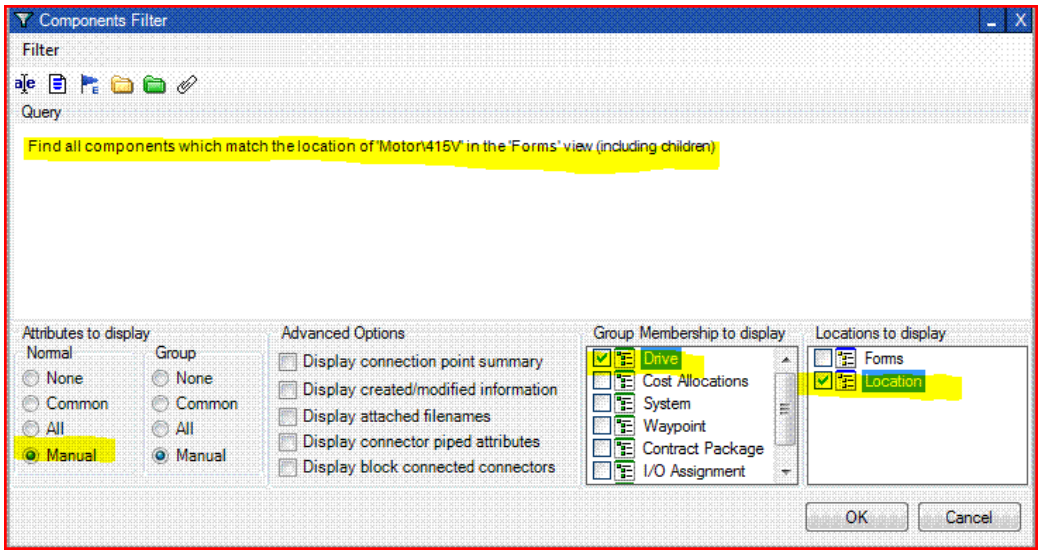


This is the resulting spreadsheet. It lists the motors (names only) and their locations.

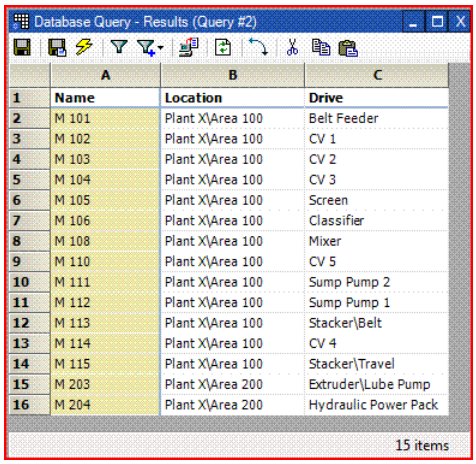


	A	B
1	Name	Location
2	M 101	Plant X\Area 100
3	M 102	Plant X\Area 100
4	M 103	Plant X\Area 100
5	M 104	Plant X\Area 100
6	M 105	Plant X\Area 100
7	M 106	Plant X\Area 100
8	M 108	Plant X\Area 100
9	M 110	Plant X\Area 100
10	M 111	Plant X\Area 100
11	M 112	Plant X\Area 100
12	M 113	Plant X\Area 100
13	M 114	Plant X\Area 100
14	M 115	Plant X\Area 100
15	M 203	Plant X\Area 200
16	M 204	Plant X\Area 200

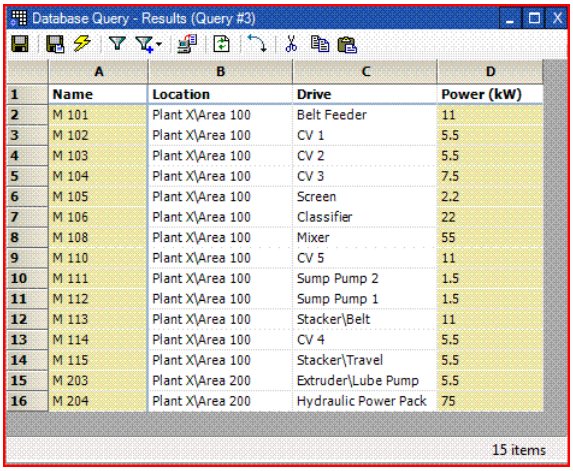
But still you do not recognize the motor you want so look harder - you modify the filter to show the drive names.



And now in the resulting (left) spreadsheet you are still uncertain which motor so you modify the filter to show Power (kW) and then in the (right) spreadsheet you recognize you motor.



	A	B	C
1	Name	Location	Drive
2	M 101	Plant X\Area 100	Belt Feeder
3	M 102	Plant X\Area 100	CV 1
4	M 103	Plant X\Area 100	CV 2
5	M 104	Plant X\Area 100	CV 3
6	M 105	Plant X\Area 100	Screen
7	M 106	Plant X\Area 100	Classifier
8	M 108	Plant X\Area 100	Mixer
9	M 110	Plant X\Area 100	CV 5
10	M 111	Plant X\Area 100	Sump Pump 2
11	M 112	Plant X\Area 100	Sump Pump 1
12	M 113	Plant X\Area 100	Stacker\Belt
13	M 114	Plant X\Area 100	CV 4
14	M 115	Plant X\Area 100	Stacker\Travel
15	M 203	Plant X\Area 200	Extruder\Lube Pump
16	M 204	Plant X\Area 200	Hydraulic Power Pack

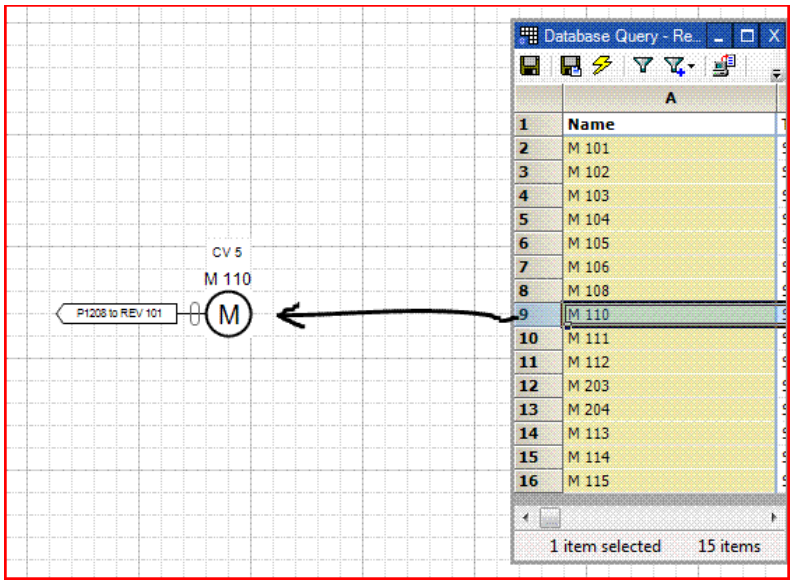


	A	B	C	D
1	Name	Location	Drive	Power (kW)
2	M 101	Plant X\Area 100	Belt Feeder	11
3	M 102	Plant X\Area 100	CV 1	5.5
4	M 103	Plant X\Area 100	CV 2	5.5
5	M 104	Plant X\Area 100	CV 3	7.5
6	M 105	Plant X\Area 100	Screen	2.2
7	M 106	Plant X\Area 100	Classifier	22
8	M 108	Plant X\Area 100	Mixer	55
9	M 110	Plant X\Area 100	CV 5	11
10	M 111	Plant X\Area 100	Sump Pump 2	1.5
11	M 112	Plant X\Area 100	Sump Pump 1	1.5
12	M 113	Plant X\Area 100	Stacker\Belt	11
13	M 114	Plant X\Area 100	CV 4	5.5
14	M 115	Plant X\Area 100	Stacker\Travel	5.5
15	M 203	Plant X\Area 200	Extruder\Lube Pump	5.5
16	M 204	Plant X\Area 200	Hydraulic Power Pack	75

The motor was found using the partial information that is often available. It did not depend on knowing a strictly defined name or tag. If you had that you could have gone straight to the relevant motor. This reflects the real world where we often have to work with limited information.

Connectors are all listed by their types in the Connector View. It is often easier to find a connector if you know what components it joins together and then dragging either of these into the Workpad where all its connectors will be shown.

So to find the connector for a motor in the above list you would drag and drop it on to the Workpad where the cable will be shown

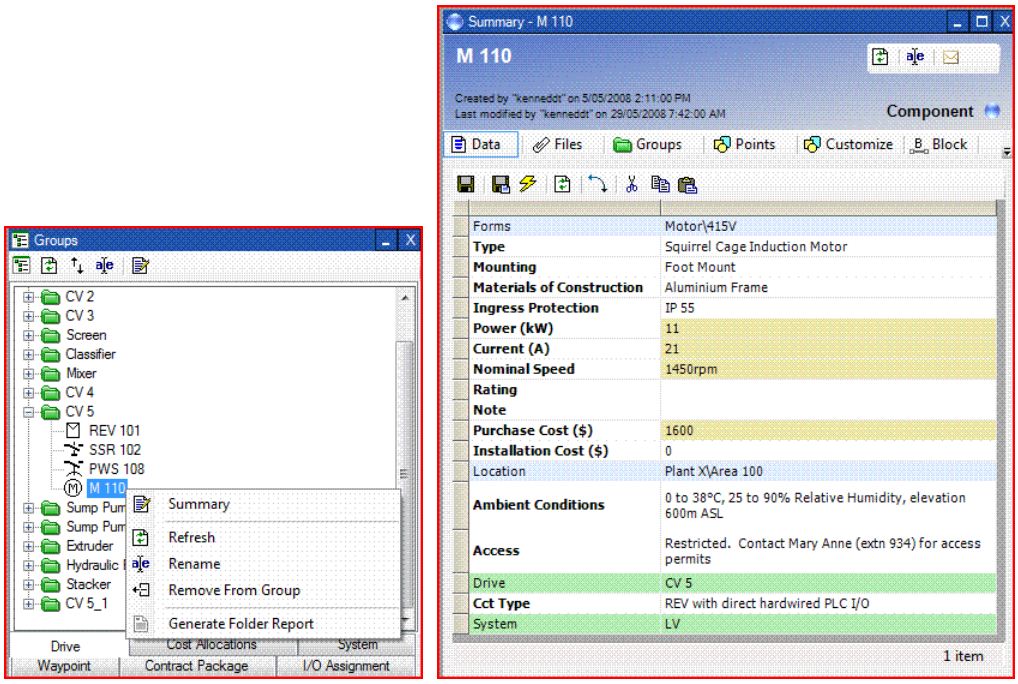


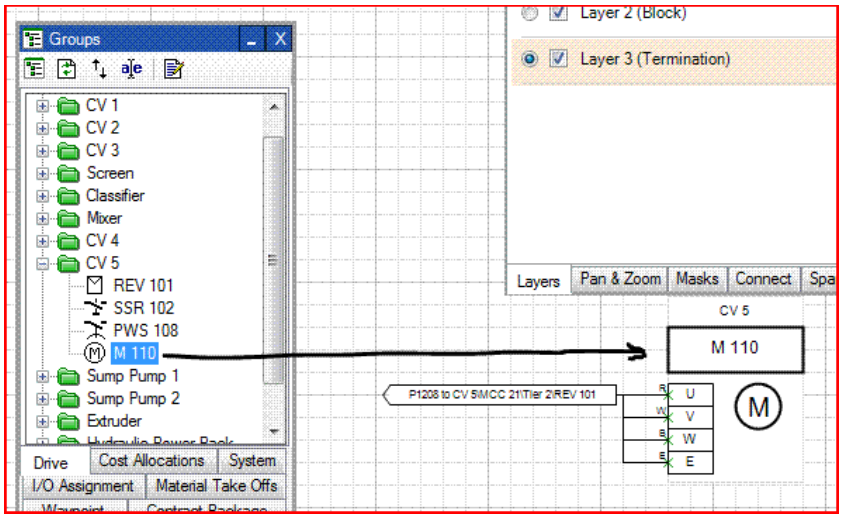
	A
1	Name
2	M 101
3	M 102
4	M 103
5	M 104
6	M 105
7	M 106
8	M 108
9	M 110
10	M 111
11	M 112
12	M 203
13	M 204
14	M 113
15	M 114
16	M 115

Appendix C.2. Finding Components (Connectors) in Groups

In a large model the view folders will contain large quantities of objects so it is often quicker to find object if they are in Groups. Take the example above of the motor M 110:

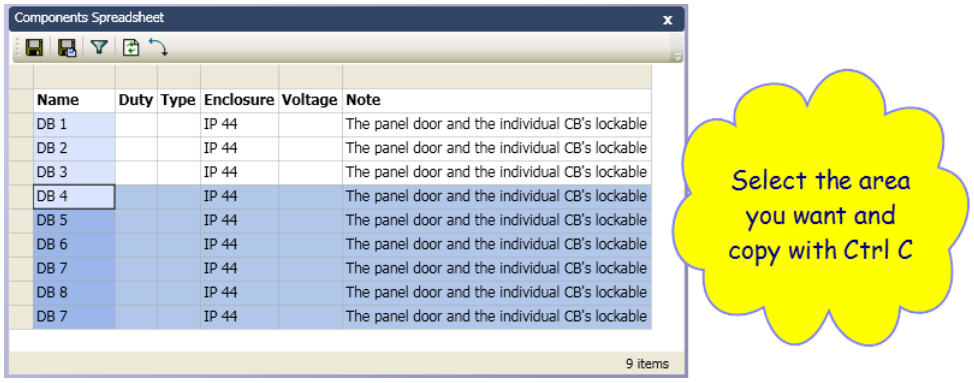
- you could have gone directly to it in the group folder Drive/CV5
- and from there opened the motor summary data page or dragged into the workpad to see its connections



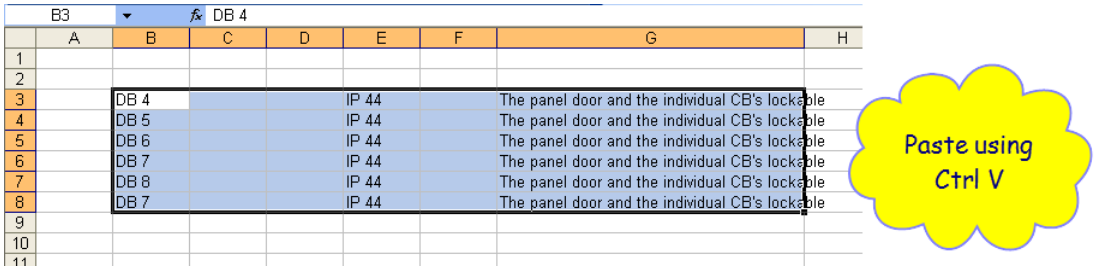


Appendix C.3. Sharing Data via Excel.

You can copy and paste between the DAD spreadsheets and Excel. Ctrl C and V work within DAD and any other Windows application.

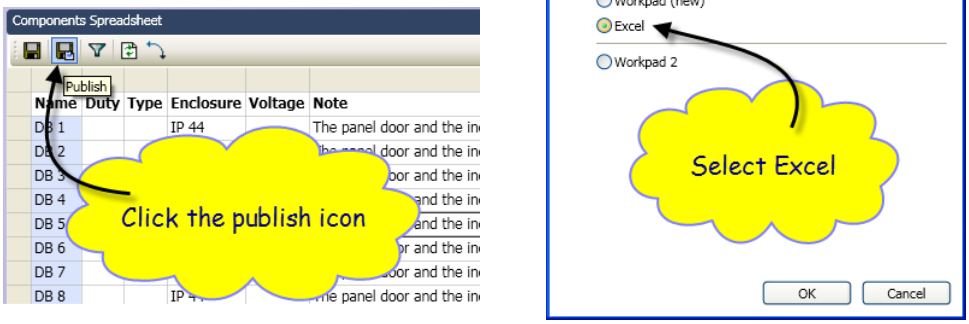


Then in Excel:



Use the same procedure in reverse to copy data from Excel into DAD.

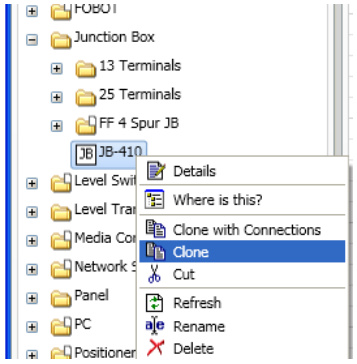
You can export complete spreadsheets from DAD to Excel like this:

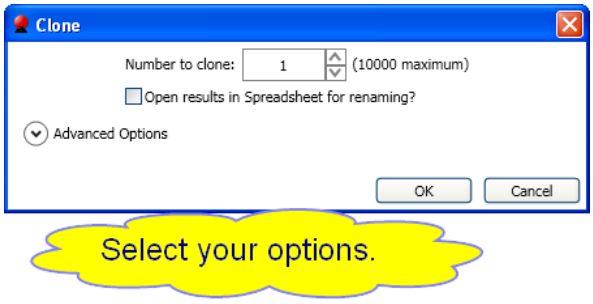


Appendix C.4. Clone Components

You can re-use existing components by cloning (copying) them. You can clone single component and assemblies of components.

Select the desired component and:





Select your options.

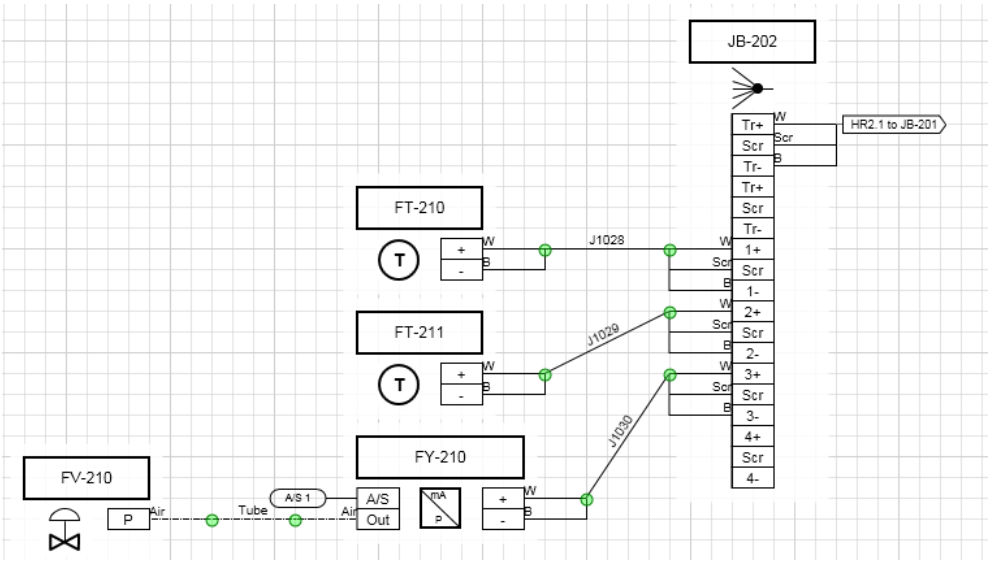
Here is your cloned JB

JB-410_1 will also be in the same Location and Group folders as the original.

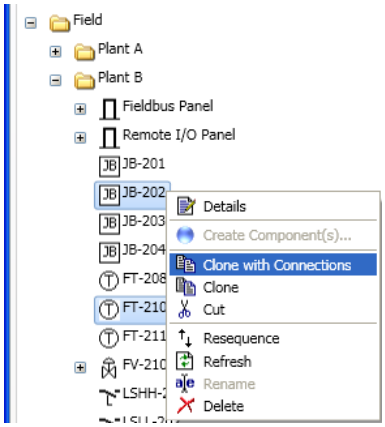
Appendix C.5. Clone with Connections

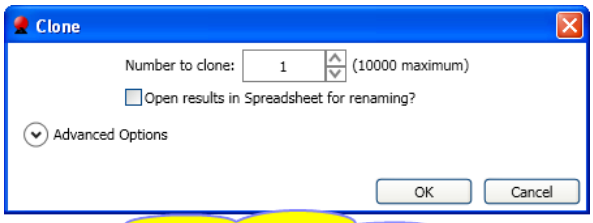
You can re-use existing connected assemblies with this command.

Select the desired components. In this example we wish to clone JB-202 and FT210:

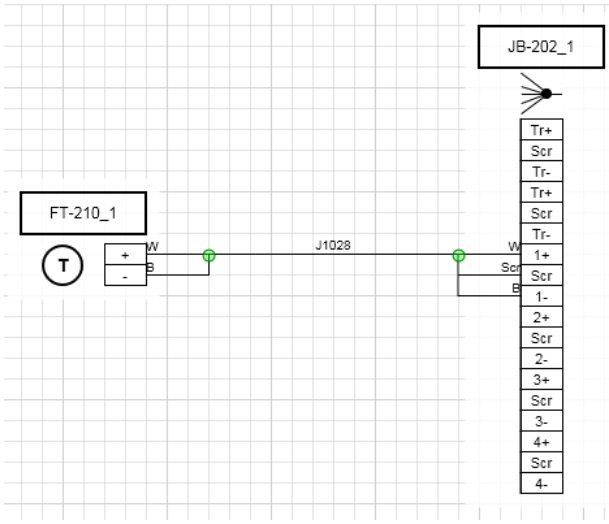


In this case select them in the Location View and:





Select your options.

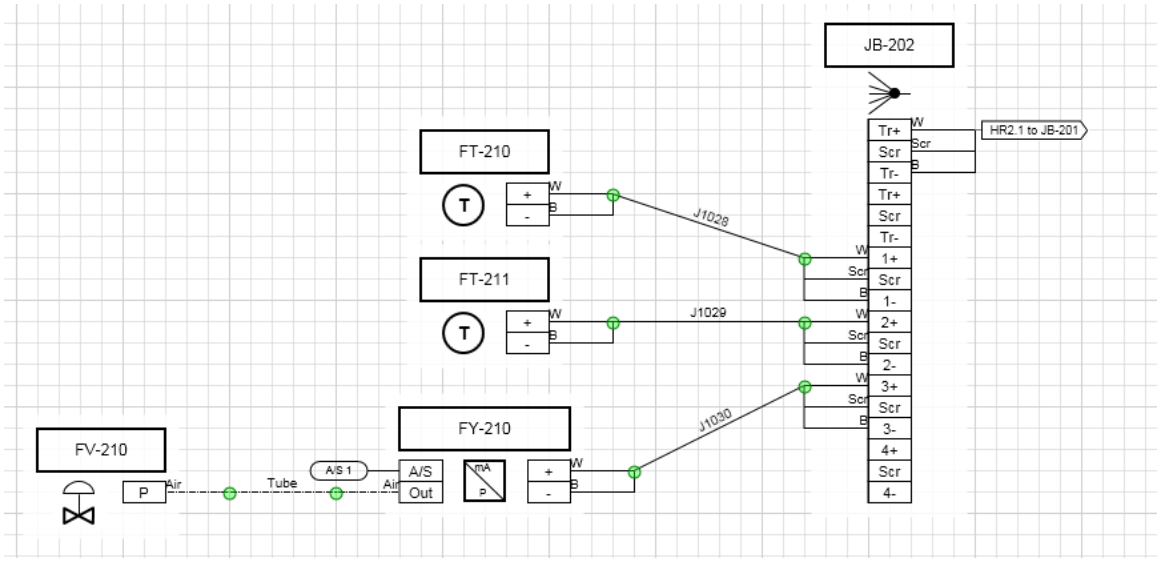


This is the result:

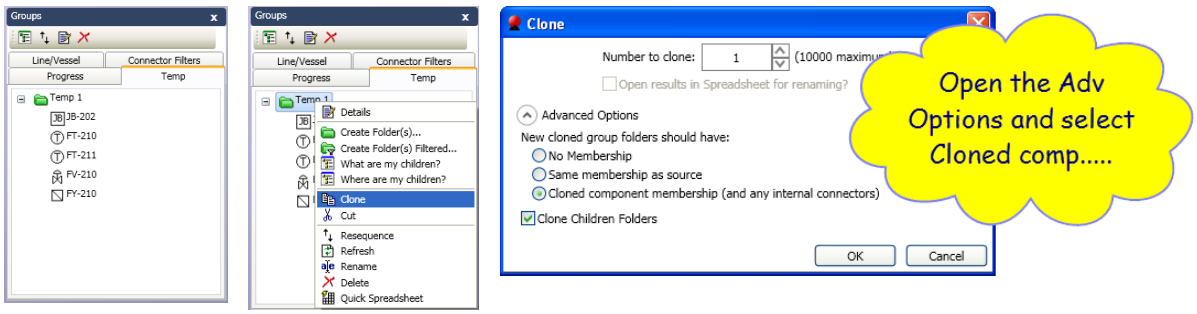
HINT.

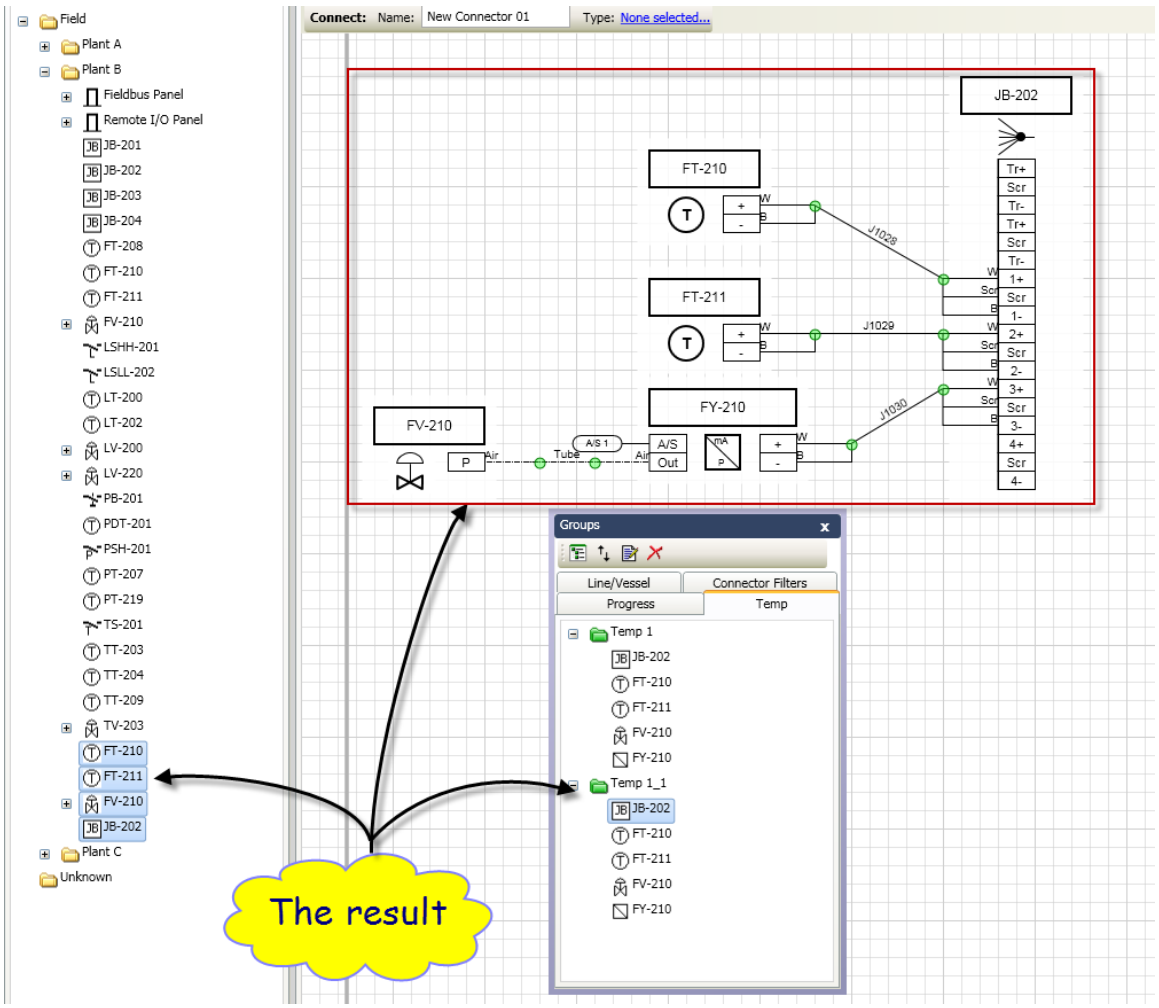
Some combinations of component will not be in the same tree branch in the Location View and cannot be selected. When this happens make a temporary group and pull all the components into a folder then proceed like this:

With the assembly shown below it is impossible to select all components because of tree restrictions:



So you can them place into a temporary Group Folder:



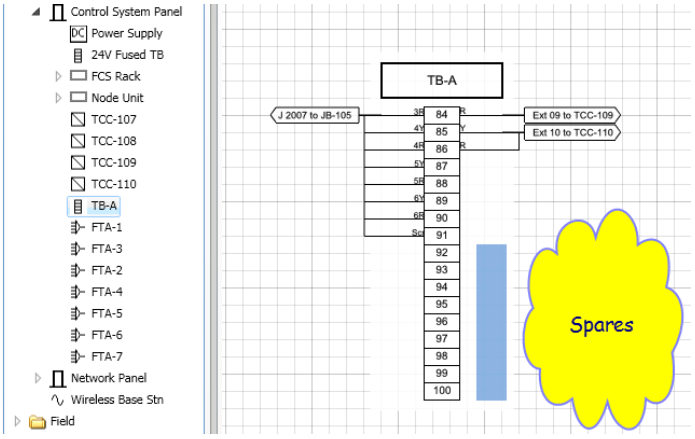


Maybe needs a warning to rename components to avoid duplicates as no "_1" suffix is added automatically as per other cloning.

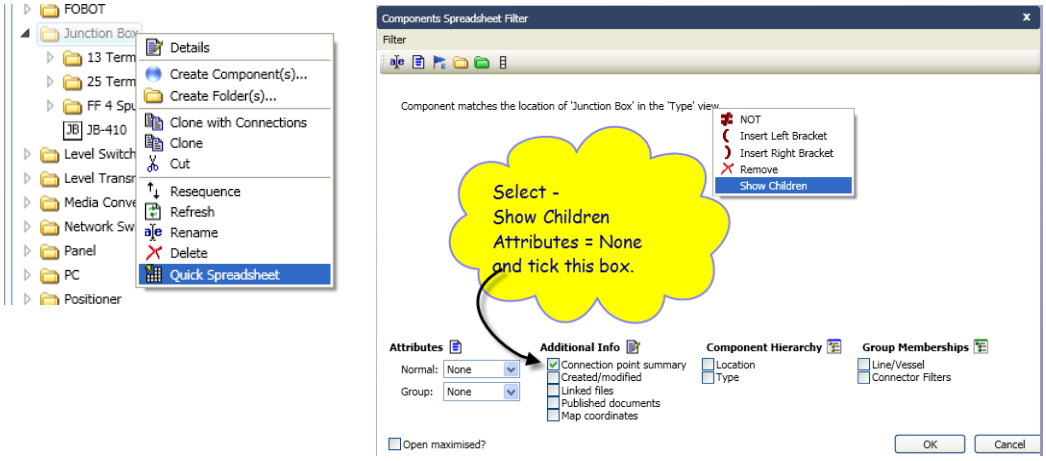
Appendix C.6. Find spare terminals

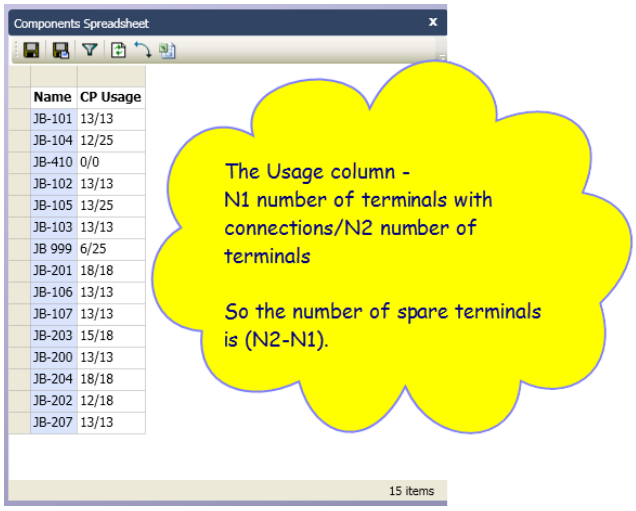
With conventional documentation finding spare terminals means searching drawings. One common problem arises as the drawing may not show empty terminals. So finding spares often involves site inspection.

With DAD finding spare terminals is a near instant task:



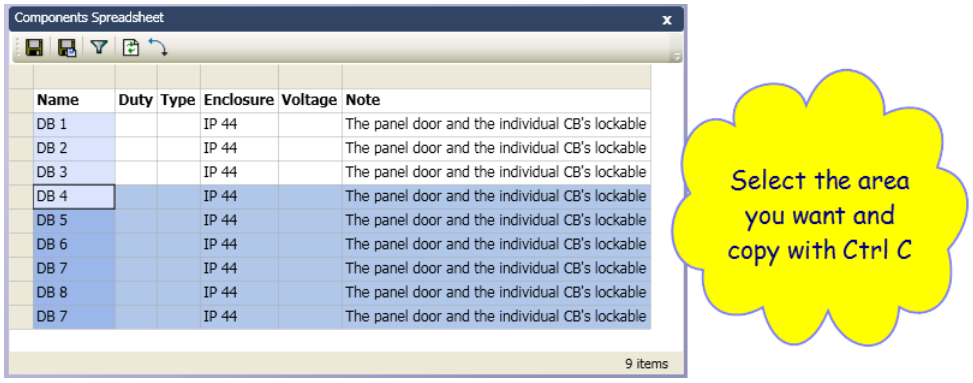
Or you can use the spreadsheet to look for spares in components like JB's:



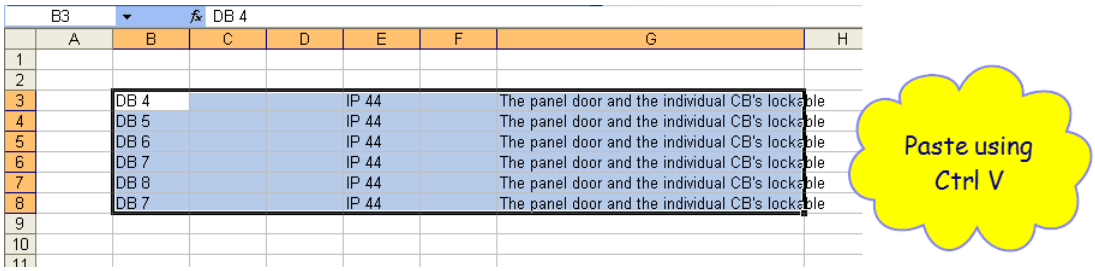


Appendix C.7. Sharing Data via Excel.

You can copy and paste between the DAD spreadsheets and Excel. Ctrl C and V work within DAD and any other Windows application.

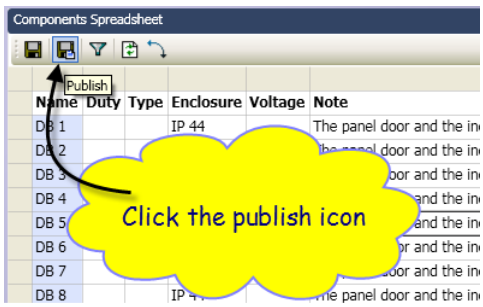


Then in Excel:



Use the same procedure in reverse to copy data from Excel into DAD.

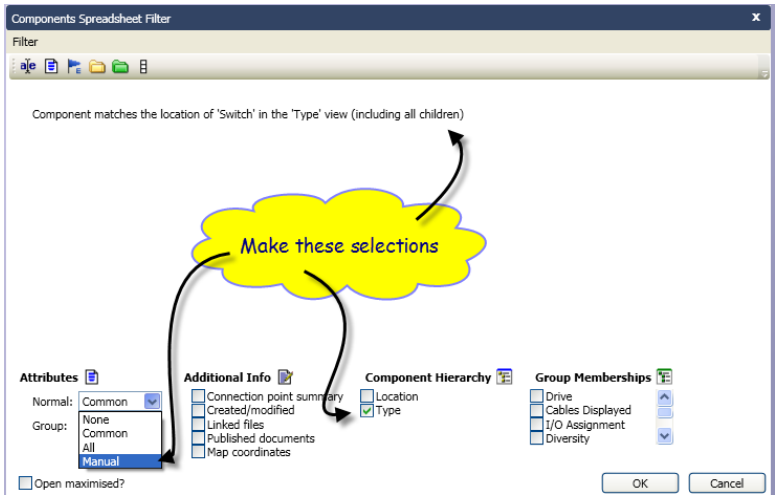
You can export complete spreadsheets from DAD to Excel like this:



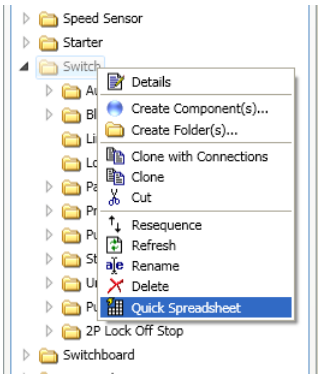
Appendix C.8. Take Off For Equipment

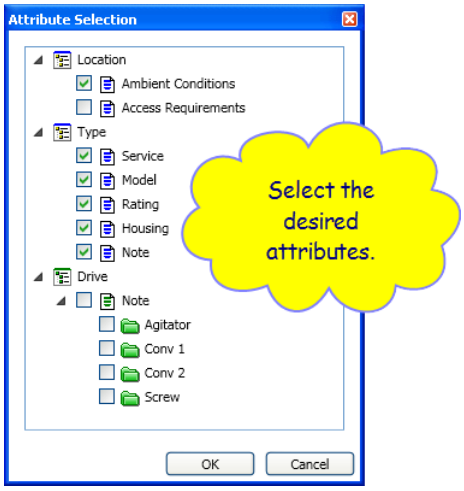
Material take offs are complicated with conventional documentation. You must find all the equipment shown in the drawings and elsewhere and their necessary information to fully describe them. Then you prepare a list, check and issue it.

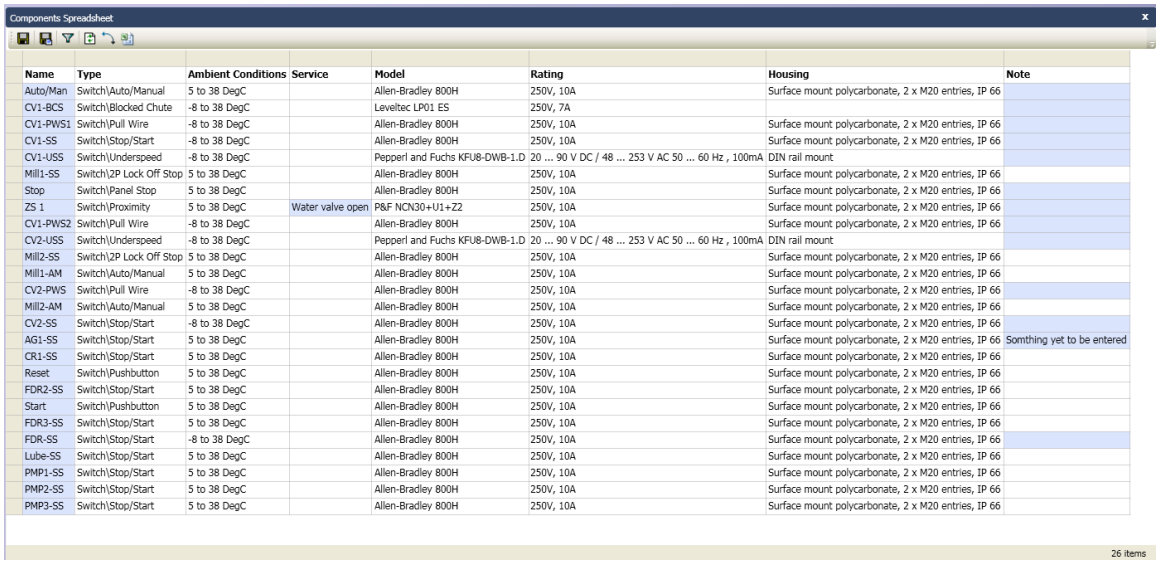
The Type view in DAD is a sorted list of components and can be instantly accessed:



So if you need a list of all the switches in the model these are the simple steps required:







Components Spreadsheet

Name	Type	Ambient Conditions	Service	Model	Rating	Housing	Note
Auto/Man	Switch\Auto/Manual	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
CV1-BCS	Switch\Blocked Chute	-8 to 38 DegC		Leveltec LP01 ES	250V, 7A		
CV1-PWS1	Switch\Pull Wire	-8 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
CV1-SS	Switch\Stop/Start	-8 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
CV1-USS	Switch\Underspeed	-8 to 38 DegC		Pepperl and Fuchs KFU8-DWB-1.D	20 ... 90 V DC / 48 ... 253 V AC 50 ... 60 Hz , 100mA	DIN rail mount	
Mill1-SS	Switch\2P Lock Off Stop	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
Stop	Switch\Panel Stop	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
ZS 1	Switch\Proximity	5 to 38 DegC	Water valve open	P&F NCN30+U1+Z2	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
CV1-PWS2	Switch\Pull Wire	-8 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
CV2-USS	Switch\Underspeed	-8 to 38 DegC		Pepperl and Fuchs KFU8-DWB-1.D	20 ... 90 V DC / 48 ... 253 V AC 50 ... 60 Hz , 100mA	DIN rail mount	
Mill2-SS	Switch\2P Lock Off Stop	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
Mill1-AM	Switch\Auto/Manual	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
CV2-PWS	Switch\Pull Wire	-8 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
Mill2-AM	Switch\Auto/Manual	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
CV2-SS	Switch\Stop/Start	-8 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
AG1-SS	Switch\Stop/Start	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	Somthing yet to be entered
CR1-SS	Switch\Stop/Start	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
Reset	Switch\Pushbutton	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
FDR2-SS	Switch\Stop/Start	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
Start	Switch\Pushbutton	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
FDR3-SS	Switch\Stop/Start	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
FDR-SS	Switch\Stop/Start	-8 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
Lube-SS	Switch\Stop/Start	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
PMP1-SS	Switch\Stop/Start	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
PMP2-SS	Switch\Stop/Start	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	
PMP3-SS	Switch\Stop/Start	5 to 38 DegC		Allen-Bradley 800H	250V, 10A	Surface mount polycarbonate, 2 x M20 entries, IP 66	

26 items

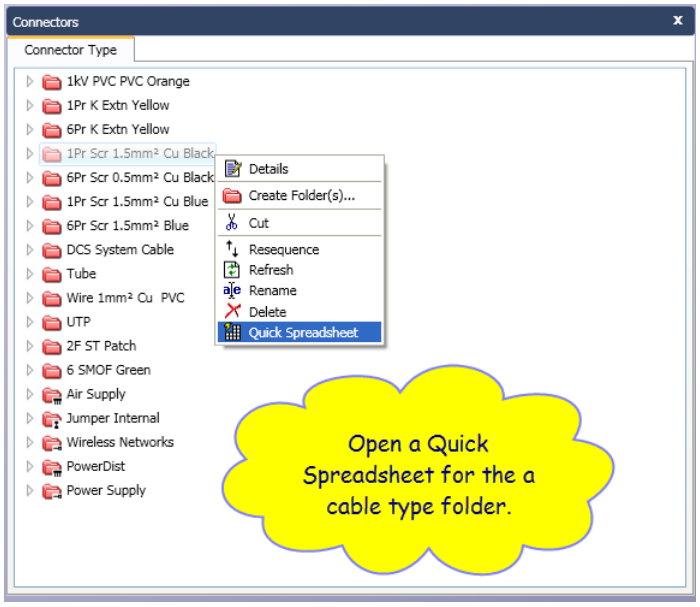
This is a list of all the switches for the job. It is current up to date data. You can publish this list as a PDF for issue or you can copy and paste the data into another application or you can export it as a CSV file.

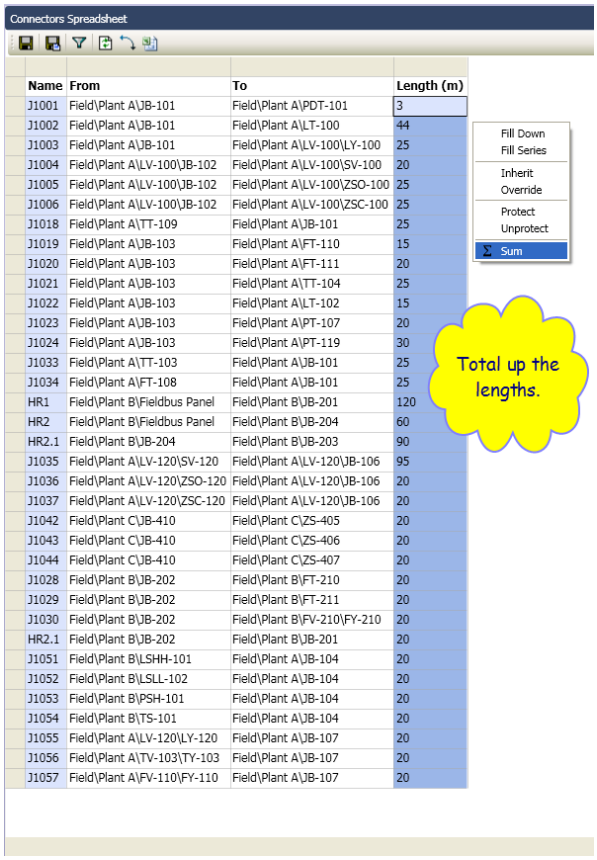
Material management is now simple, accurate and instantly available.

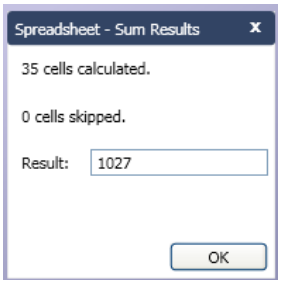
Appendix C.9. Take off Cables (Connectors)

Cable quantities must be assessed by counting the total for each type of cable in the cables schedules which is a time-consuming task.

The totals for cables are instantly obtained in DAD as follows:





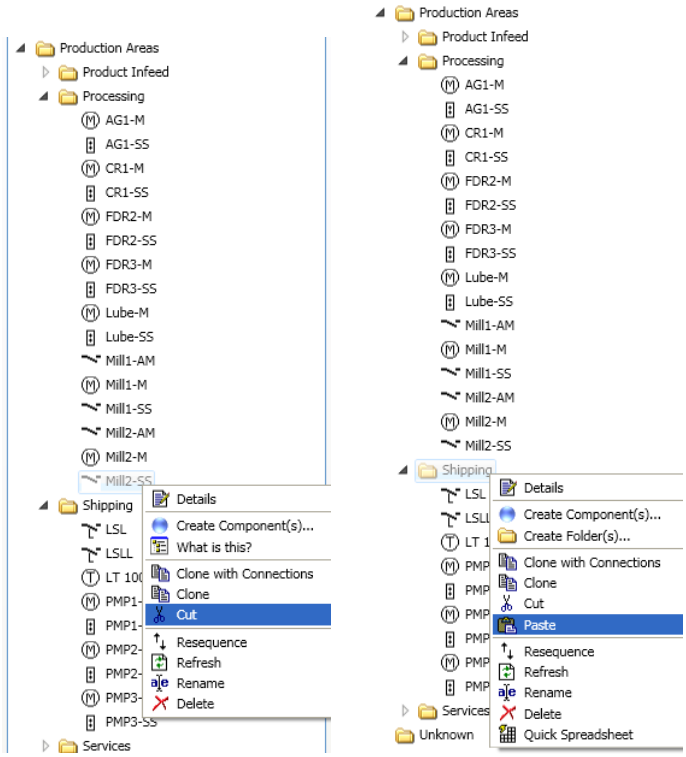


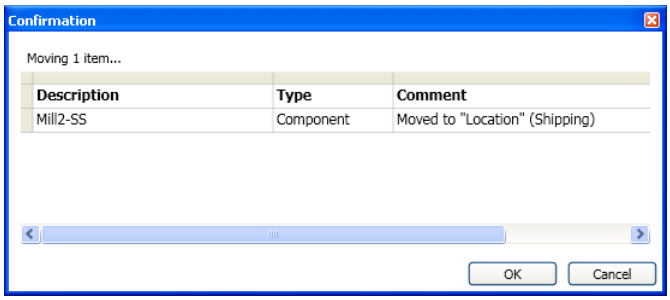
In this case there is a total of 1027m of this cable type in the project model.

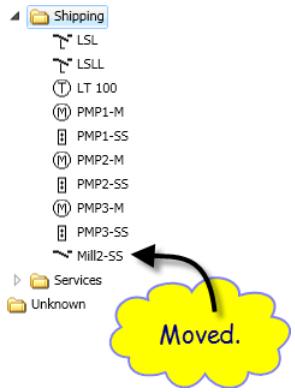
Appendix C.10. Move Component to New Location

To move a component just reposition it as desired in the location view.

Has no affect other than perhaps on the attributes. You may need to revise any layouts that show the component in its old or new positions.

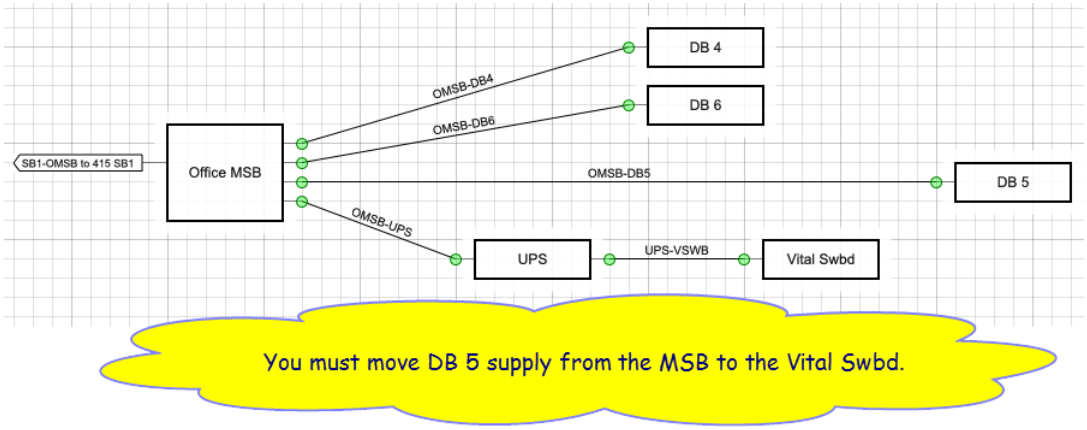


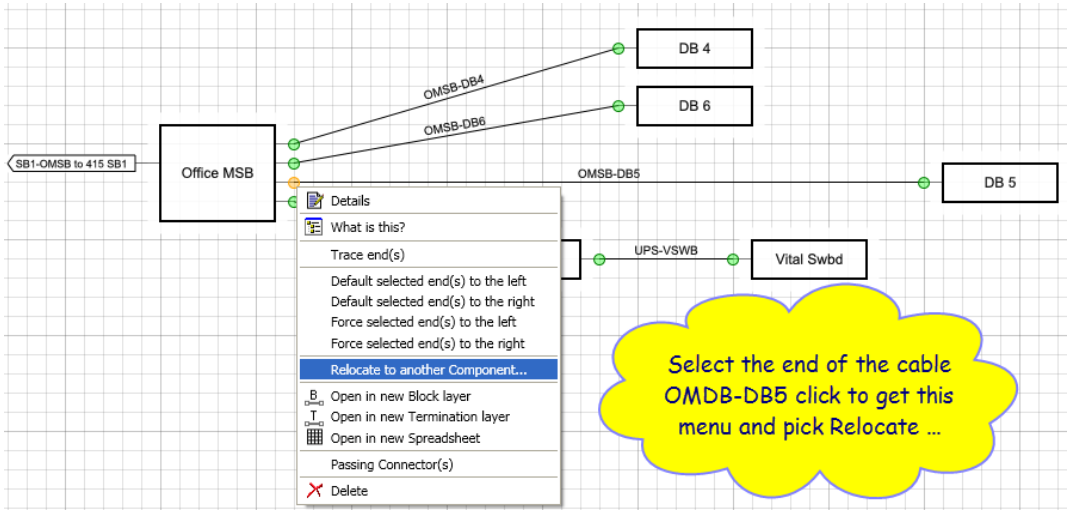


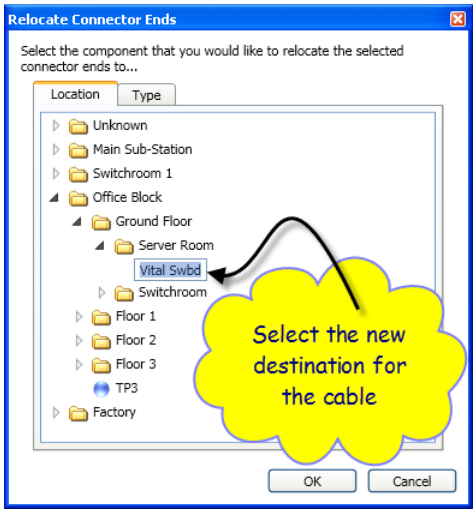


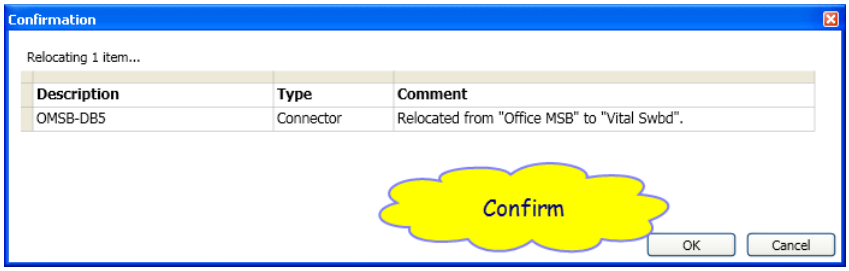
Appendix C.11. Move Cable End

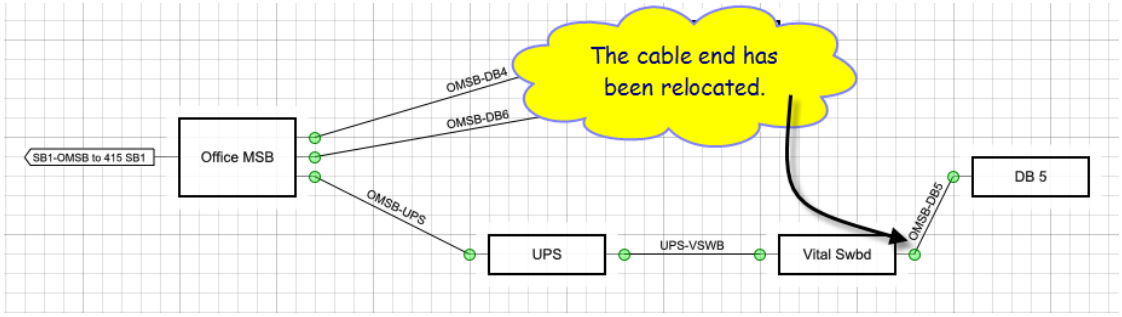
You can revise existing connections easily as this example shows:



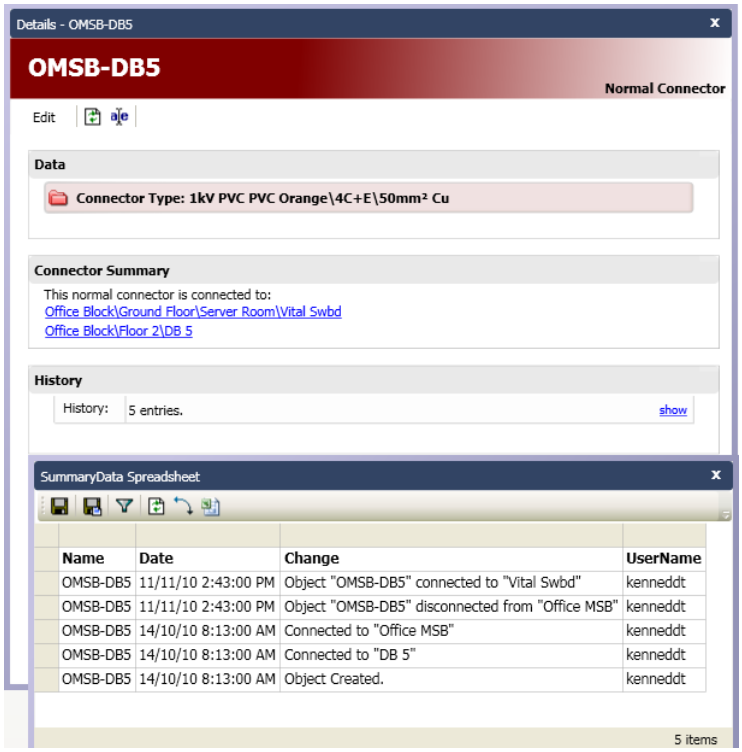








If you were to inspect the history for the cable you will see that it shows these transactions:

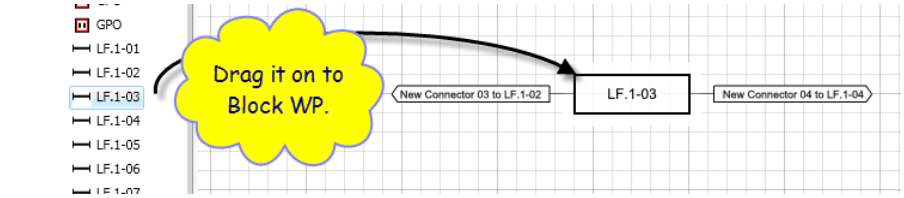


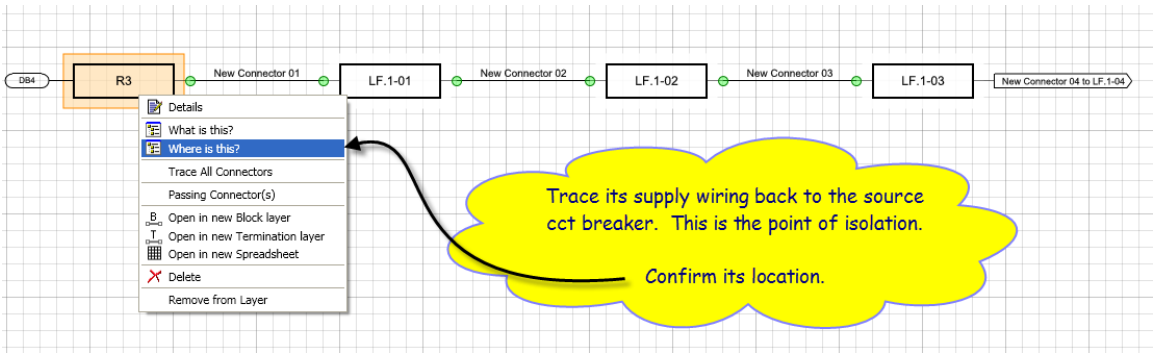
Appendix C.12. Find where to isolate circuits

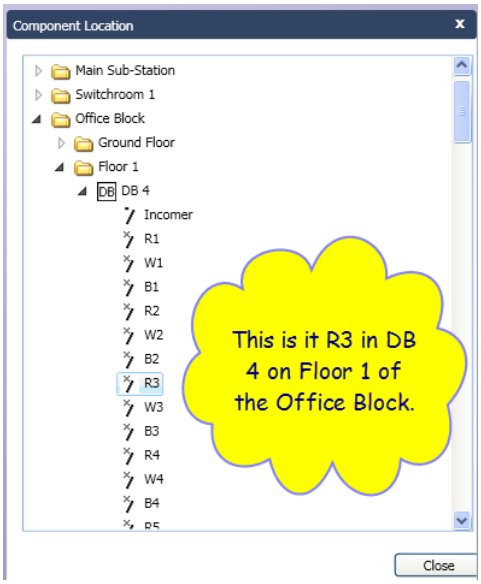
Isolating equipment before working is safety critical. Often the documentation available does not contain sufficient information and isolations are performed:

- By trial and error
- At a higher level in the system than strictly necessary which can disrupt normal business as many circuits lose power.

Lighting is often poorly documented. With DAD you can fully document small power circuits: here is an example of finding the point of supply for a light fitting:



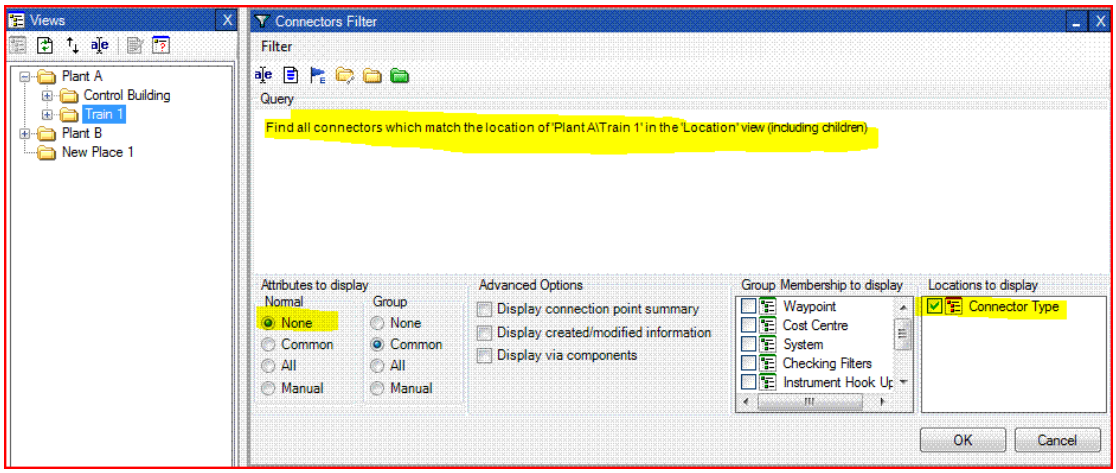




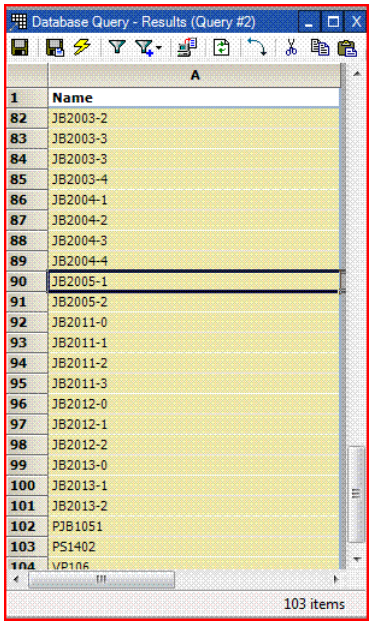
Appendix D. EXPORTING DATA

Appendix D.1. Cable Numbers

This is very easy.



The connector filter returns all the cable numbers for Train 1 only.



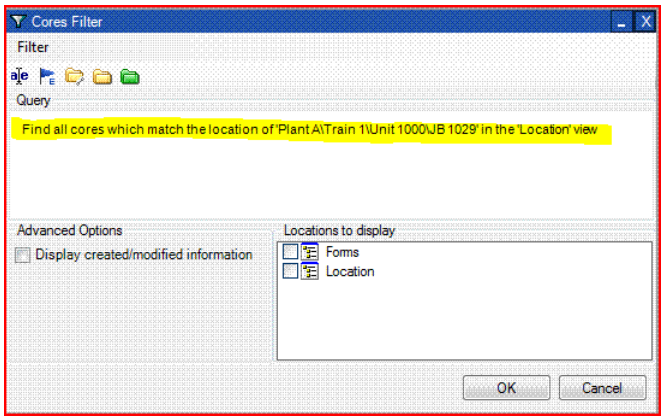
These are the Train 1 cables so now you simply copy the names and paste them into an XLS file (or use the Export Files).

Appendix D.2. Wire Markers

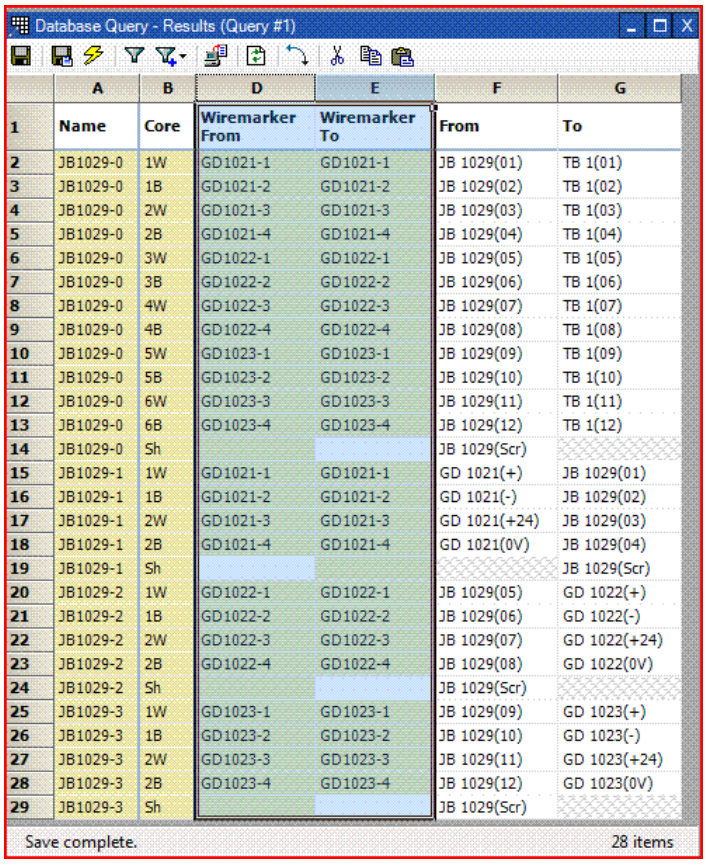
You can also use a similar process to export wire markers

Cable cores can be given wire markers as explained elsewhere. So if you want to export them you get them into a cores spreadsheet and copy them out to Excel.

This filter returns the cores in the cables connected to JB 1029.



Here is the resulting spreadsheet.

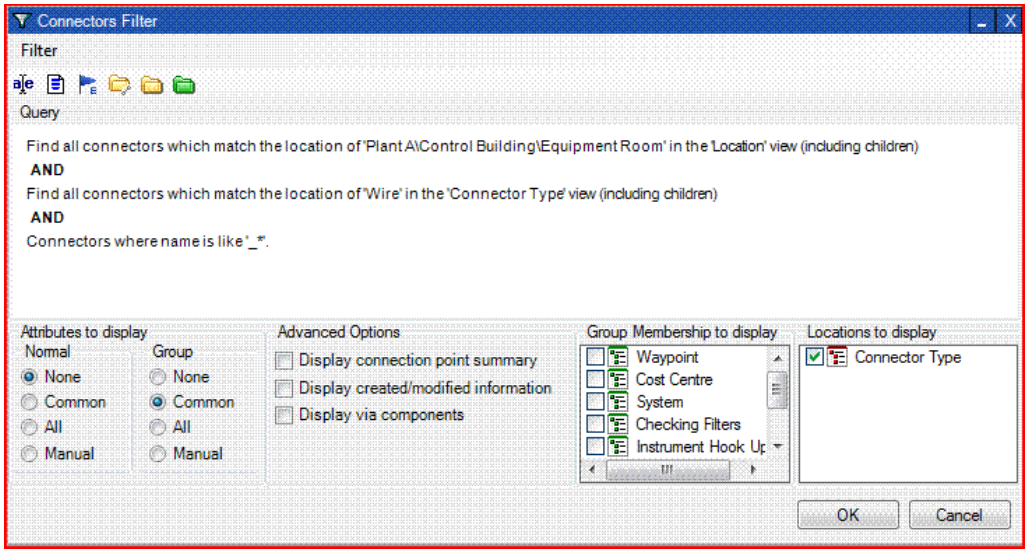


	A	B	D	E	F	G
1	Name	Core	Wiremarker From	Wiremarker To	From	To
2	JB1029-0	1W	GD1021-1	GD1021-1	JB 1029(01)	TB 1(01)
3	JB1029-0	1B	GD1021-2	GD1021-2	JB 1029(02)	TB 1(02)
4	JB1029-0	2W	GD1021-3	GD1021-3	JB 1029(03)	TB 1(03)
5	JB1029-0	2B	GD1021-4	GD1021-4	JB 1029(04)	TB 1(04)
6	JB1029-0	3W	GD1022-1	GD1022-1	JB 1029(05)	TB 1(05)
7	JB1029-0	3B	GD1022-2	GD1022-2	JB 1029(06)	TB 1(06)
8	JB1029-0	4W	GD1022-3	GD1022-3	JB 1029(07)	TB 1(07)
9	JB1029-0	4B	GD1022-4	GD1022-4	JB 1029(08)	TB 1(08)
10	JB1029-0	5W	GD1023-1	GD1023-1	JB 1029(09)	TB 1(09)
11	JB1029-0	5B	GD1023-2	GD1023-2	JB 1029(10)	TB 1(10)
12	JB1029-0	6W	GD1023-3	GD1023-3	JB 1029(11)	TB 1(11)
13	JB1029-0	6B	GD1023-4	GD1023-4	JB 1029(12)	TB 1(12)
14	JB1029-0	Sh			JB 1029(Scr)	
15	JB1029-1	1W	GD1021-1	GD1021-1	GD 1021(+)	JB 1029(01)
16	JB1029-1	1B	GD1021-2	GD1021-2	GD 1021(-)	JB 1029(02)
17	JB1029-1	2W	GD1021-3	GD1021-3	GD 1021(+24)	JB 1029(03)
18	JB1029-1	2B	GD1021-4	GD1021-4	GD 1021(0V)	JB 1029(04)
19	JB1029-1	Sh				JB 1029(Scr)
20	JB1029-2	1W	GD1022-1	GD1022-1	JB 1029(05)	GD 1022(+)
21	JB1029-2	1B	GD1022-2	GD1022-2	JB 1029(06)	GD 1022(-)
22	JB1029-2	2W	GD1022-3	GD1022-3	JB 1029(07)	GD 1022(+24)
23	JB1029-2	2B	GD1022-4	GD1022-4	JB 1029(08)	GD 1022(0V)
24	JB1029-2	Sh			JB 1029(Scr)	
25	JB1029-3	1W	GD1023-1	GD1023-1	JB 1029(09)	GD 1023(+)
26	JB1029-3	1B	GD1023-2	GD1023-2	JB 1029(10)	GD 1023(-)
27	JB1029-3	2W	GD1023-3	GD1023-3	JB 1029(11)	GD 1023(+24)
28	JB1029-3	2B	GD1023-4	GD1023-4	JB 1029(12)	GD 1023(0V)
29	JB1029-3	Sh			JB 1029(Scr)	

Now simply copy and paste into Excel.

Although single wires can have both a name and wire markers we think you are better to treat the name as the wire marker. So this is how you export these.

Filter for the wires in the Equipment Room



These are the all wires in the Equipment Room

Now you simply copy and paste to Excel.

Appendix E. User Configuration

Introduction

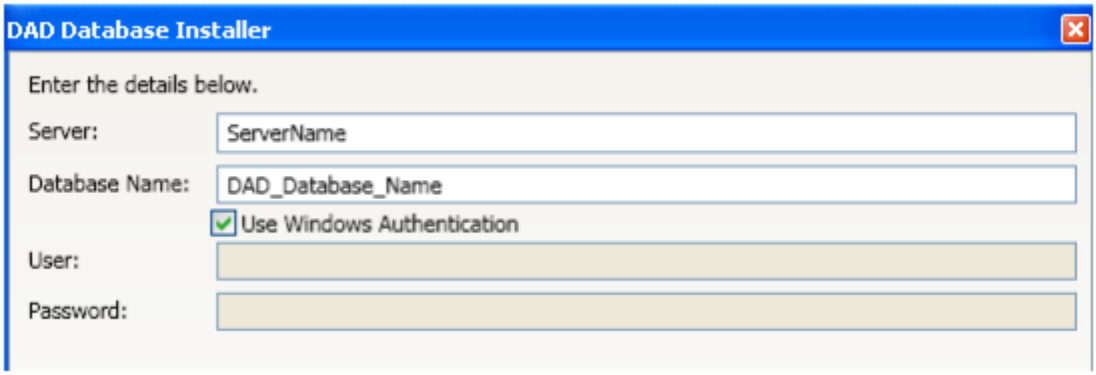
There are two types of authentication methods that DAD supports:

- SQL Authentication - accounts are created and managed by SQL server.
- Windows Authentication - accounts are created and managed as part of the Windows domain

Windows authentication is the recommended choice. It can involve more setup initially, but saves the users having to remember another login and password, and is easier to maintain.

SQL Security also requires the SQL Server to have mixed mode authentication set, which is not the default setting.

The DAD Database is set to use one of the methods depending on the login option selected in the DAD Database installer.



If the default “Use Windows Authentication” is ticked then it is setup for Windows authentication. If a user and password is provided, then the database is setup for SQL Security.

This can be changed at any time by running the following command on the DAD database.

To setup the database for SQL Security (Creates. the SQL DAD user) run

Exec spSetupDatabase

To setup the database for Windows Authentication (Adds the BUILTIN\USER account) run

Exec spSetupDatabaseTrusted 1

Windows Authentication

When a database is setup for Windows Authentication, the SQL Server account BUILTIN\Users is added to the DAD database with full rights. This is a special server account which will allow all users to log into the database with those rights. No further action is needed, however to customise the rights so only certain users can login, or different users have different rights then the following 4 steps will be needed.

1. Create the Windows Group

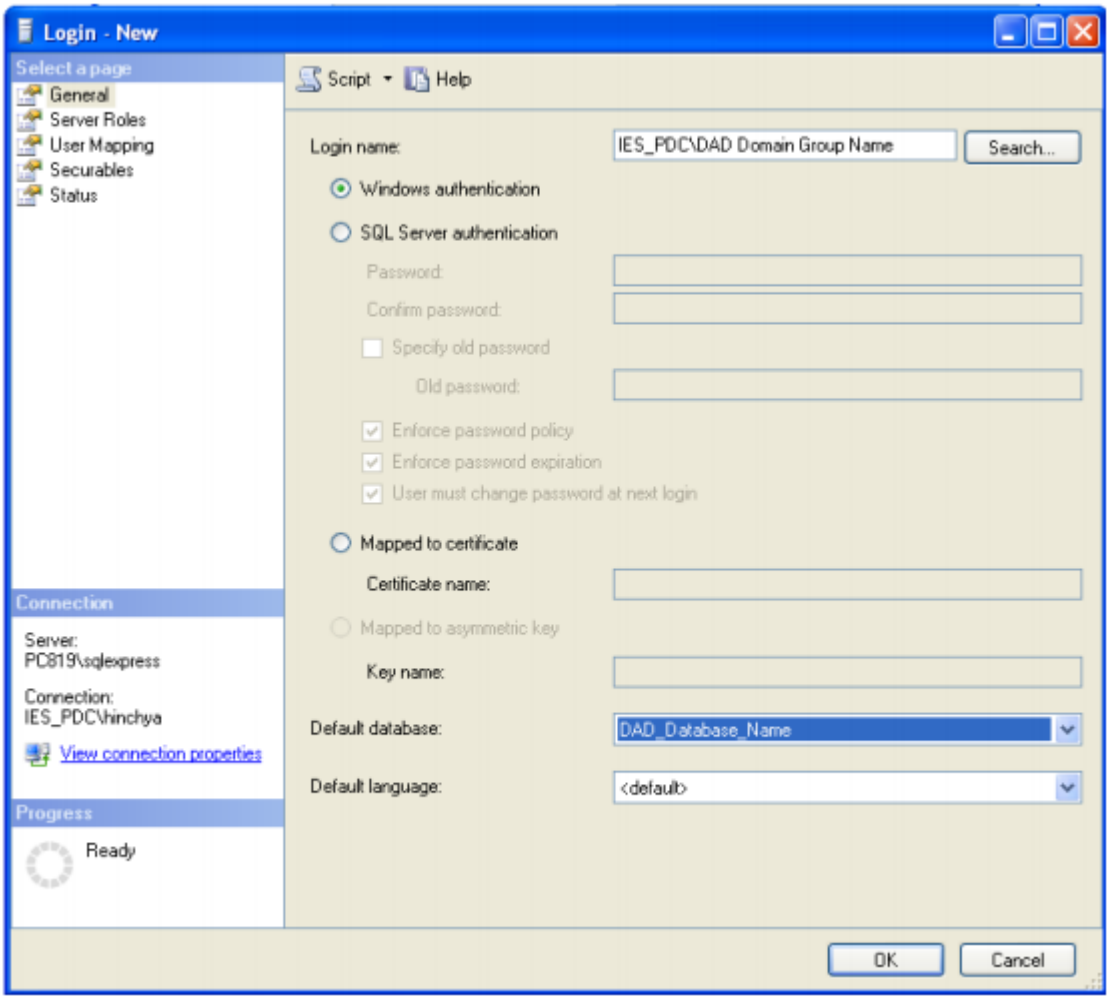
The IT department will need to create a Windows group with all the relevant windows login added. Not all of these logins have to be added as DAD users.

2. Add the Windows Group as a Login in SQL Server and grant database access

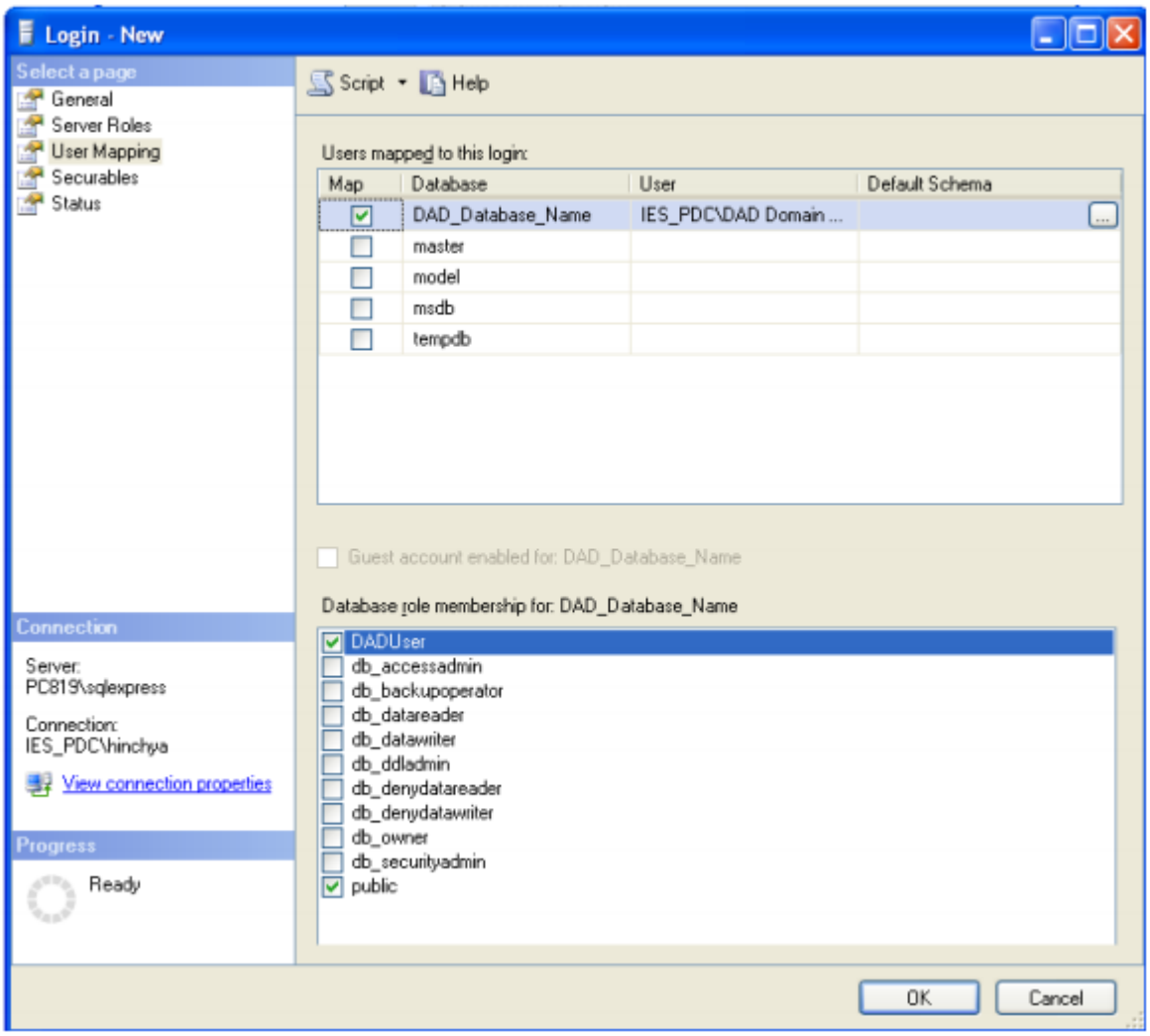
The SQL Administrator will then need to add the windows group as a login to the SQL Server, and give it access to the DAD database with the 'DADUser' role. To do this, open SQL Management Studio and connect to the DAD server.

On the tree on the left, expand through <Server Name>, Security, right click on Logins, and select 'New Login'.

On the form that opens enter the full Windows name as the Login Name (including domain) and leave as Windows authentication. The default database can also be changed to the DAD database.



Select User Mapping on the left. Check the box to the left of the database name, and in the box below, select the DADUser database role.

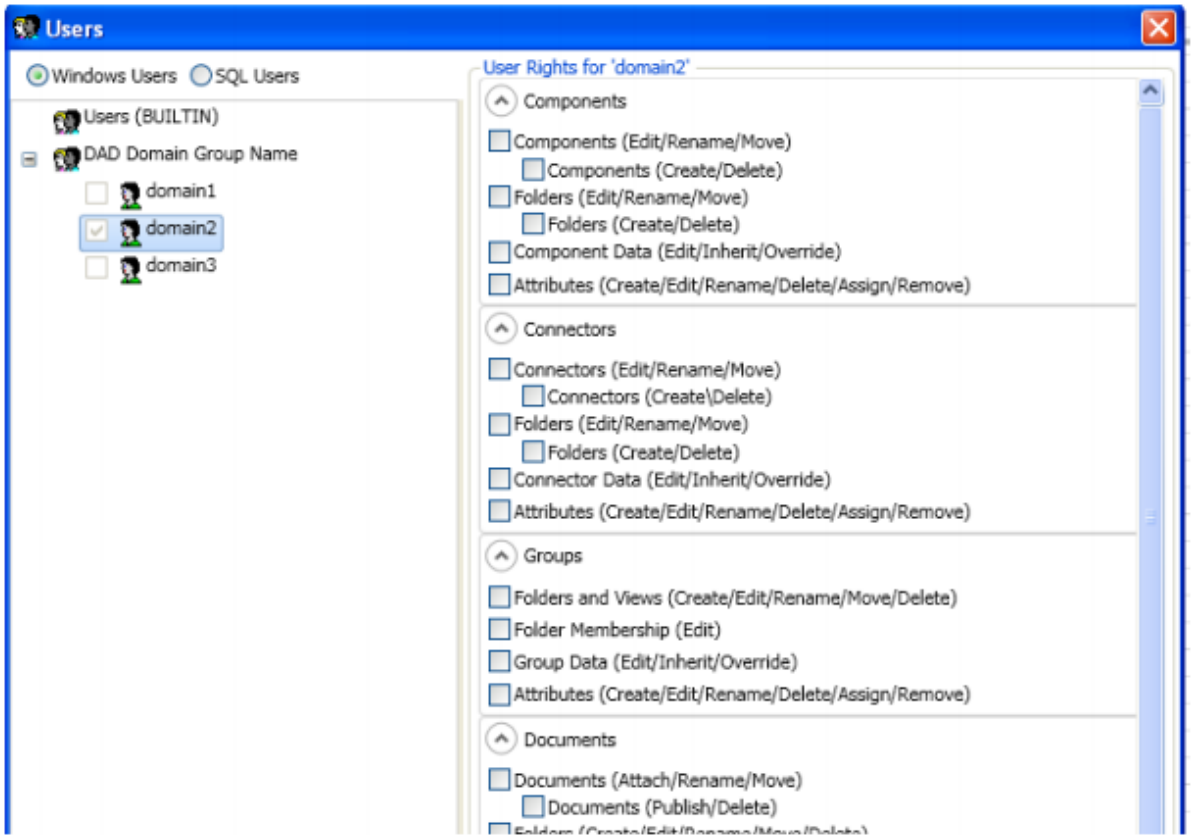


Click OK to save the login

3. Add Users via DAD

If you now login into DAD, and select the System menu, Users form, this windows group will be visible. If the group is expanded all windows users in it will be displayed. The empty box to the left means that the user has not been added to the database.

To add a user, right click and “Add user to database”. This will allow the user access. To change the user rights, left click on the user name, and the right hand tree will populate. This will show the available rights broken down into sections. After ticking the relevant rights, click “Assign” to save the changes. You can right click a header (Components, Connectors, Groups etc.) to toggle all of that subsections rights.



Repeat this step 3 for all users. There are options to copy users assigned rights, and paste to another user via the right click which can speed up adding many users. Ensure at least 1 user has the “Administrator” right which allows access to this form.

4. Remove the BUILTIN\Users user

After adding all the users, remove the BUILTIN\Users SQL user. This will restrict the logins to the ones you specified in Step 3.

To do this, open Management studio. Expand the tree on the left through :

<Server Name> - Databases - <Database Name> - Security – Users

Right click on BUILTIN\Users and delete. This will remove this user from the database. To re-add this user use Management studio or run the command :

Exec spSetupDatabaseTrusted 1

Index

No index entries found.

This index is still under development.

References:

[i] Derived from NIBS - Definition of BIM

[ii] Wikipedia – Definition of a System.

(Still under Development)