ArcGIS® 9.3

ArcGIS Schematics Tutorial

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Exercise 1: Getting acquainted with ArcGIS Schematics tools

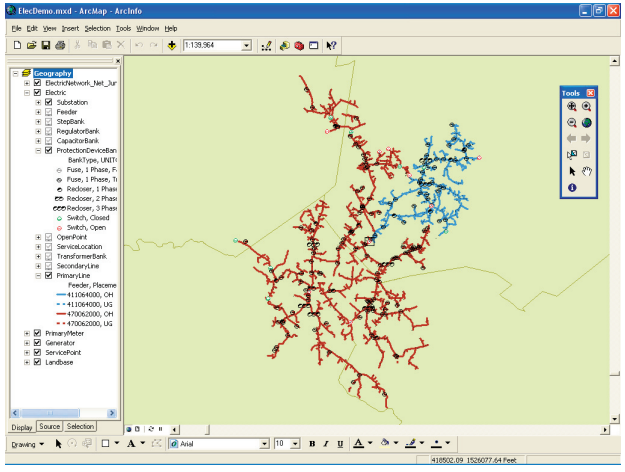
In this exercise, you will become familiar with the ArcGIS® Schematics graphical user interface by using a variety of its tools.

Activating the Schematics extension in ArcCatalog

1. Start ArcCatalog™ by either double-clicking a shortcut installed on your desktop or clicking the Programs list on your Start menu.
2. Click Tools on the main menu and click Extensions.
3. Check the Schematics check box and click Close.

Loading the tutorial .mxd file

1. In ArcCatalog, navigate to the C:\arcgis\ArcTutor\Schematics\ Schematics folder in the Catalog tree. (This is the default installation location for this data.)
2. Double-click the ElecDemo.mxd file; your ArcMap™ window appears as follows:



Activating the Schematics extension in ArcMap

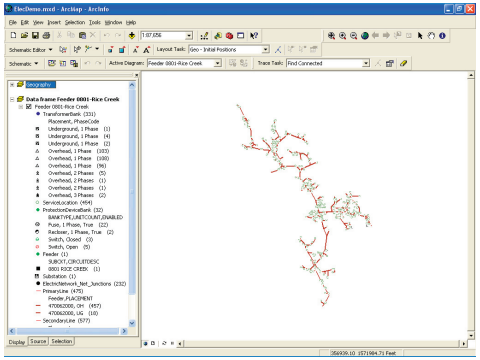
1. In ArcMap, click Tools on the main menu and click Extensions.
2. Check the Schematics check box and click Close.

Loading the Schematics extension toolbars

1. Click Tools on the main menu and click Customize.
2. Check the Schematic, Schematic Editor, and Schematic Network Analyst check boxes and click Close.
3. Arrange the toolbars under the toolbar main menu.

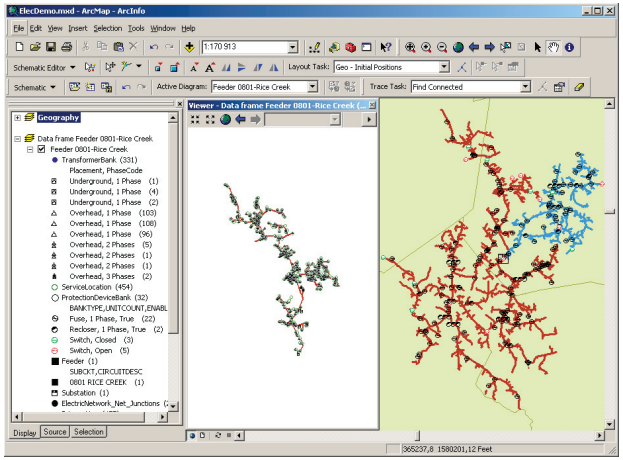
Opening a saved diagram

1. Click the Open Schematic Diagrams button . The Select schematic diagrams to open dialog box appears.
2. Navigate to the C:\arcgis\ArcTutor\Schematics\Schematics\ ElecDemo geodatabase and select the Feeders schematic subfolder.
3. Click Feeder 0801-Rice Creek in the diagram list and click Add.
4. The diagram opens in a new data frame under the Geography data frame. You can collapse the Geography data frame for a better view of the table of contents (TOC).



Displaying diagrams in a viewer window

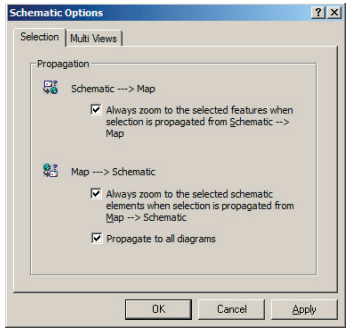
1. Click Window on the main menu and click Viewer.
   The open diagram is displayed in a viewer window.
2. Activate the Geography data frame to visualize the geographic features. Resize the viewer window and use the Pan tool to arrange all data and to be able to work with the schematic diagram and geographic features side by side on-screen.



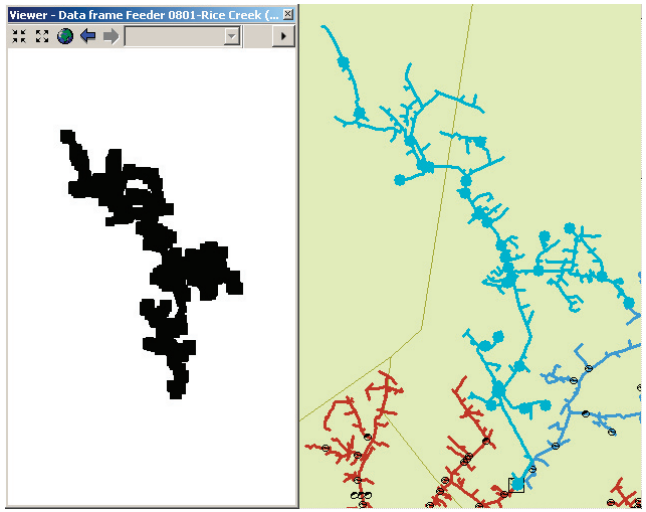
Note: Any schematic layout algorithm execution, schematic command triggering, or manipulation using any schematic tool (such as Schematics editing or refinement tools) can be done inside a viewer window.

Locating selected features

1. Click the Schematic drop-down menu on the Schematic toolbar and click Schematic Options.
2. Click the Selection tab.
3. Check the Schematic ---> Map and the Map ---> Schematic check boxes.

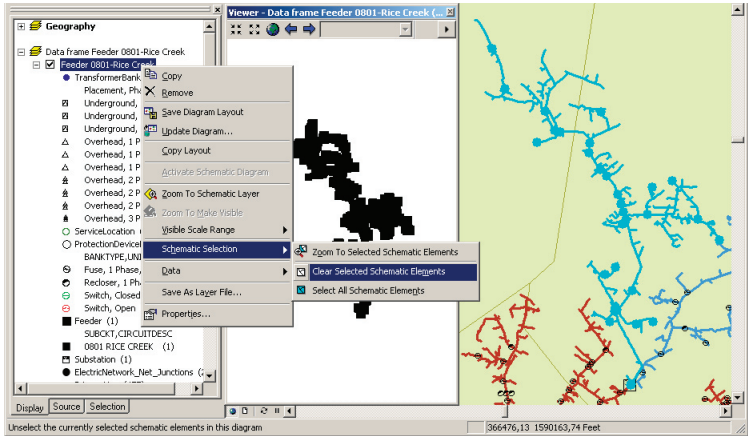


4. Click OK.
5. Click the Select Schematic Elements button on the Schematic Editor toolbar and select the full feeder in the diagram data frame by drawing a box with the tool.
6. Click the Propagate Schematic Selection To Map button to locate the selected features on the map. The selection set is automatically zoomed in on the map. Use the Pan tool to visualize all the selected features located at the right of the diagram viewer window.



Note: The propagate operation might take a few minutes as the selection contains a large amount of features.

7. Right-click the Feeder 0801-Rice Creek diagram entry in the TOC.
8. Point to Schematic Selection and click Clear Selected Schematic Elements.

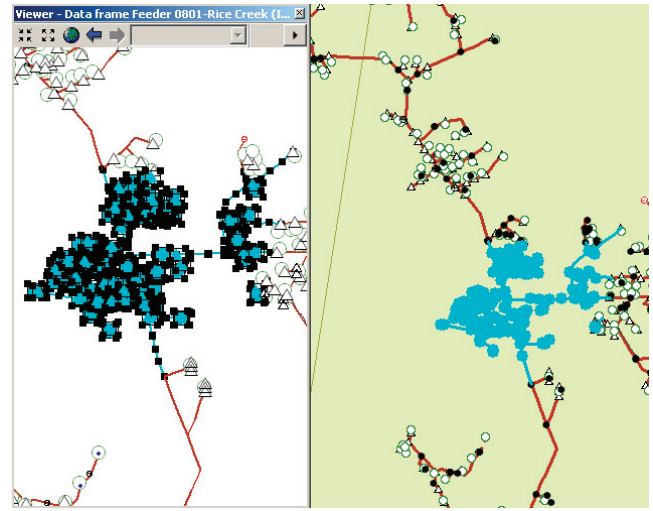


The schematic elements in the diagram are no longer selected.

Note: Activating the Select Schematic Elements or Edit/Move Schematic Elements tool and clicking the diagram background when schematic elements are selected in that diagram also cancels the schematic element selections.

9. Click Selection and click Clear Selected Features on the main menu to clear selected features on the map.
10. Using the Zoom In tool, zoom in on the map and use the Select Features tool to select a part of the network by drawing a box.

    Note: Ensure the features you select are part of the network used to generate the schematic diagram.
11. Click the Propagate Map Selection To Schematic button . The selection set is automatically zoomed in on the diagram.



12. Click the Select Schematic Elements button and click the background of the diagram to cancel the feature selections.
13. Click Selection and click Clear Selected Features to cancel the feature selections on the map.

Removing a diagram data frame

1. Right-click the diagram data frame in the TOC.
2. Click Remove.
3. Click No if the following message appears: The diagram 'Feeder 0801-Rice Creek' has been modified. Do you want to save its layout?.
4. Expand the Geography data frame in the TOC.
5. Click File and click Exit.
6. Click No when the following message appears: Save changes to ElecDemo.mxd ?.

Exercise 2: Generating your first diagrams

In this exercise, you will generate your first diagrams from the result of a manual selection, from a selection by attributes, and from a tracing result. You will also generate an inside plant diagram from an opened diagram.

Activating the Schematics extension in ArcCatalog

1. Start ArcCatalog by either double-clicking a shortcut installed on your desktop or clicking the Programs list on your Start menu.
2. Click Tools on the main menu and click Extensions.
3. Check the Schematics check box and click Close.

Loading the tutorial .mxd file

1. In ArcCatalog, navigate to the C:\arcgis\ArcTutor\Schematics\ Schematics folder in the Catalog tree. (This is the default installation location for this data.)
2. Double-click the ElecDemo.mxd file.

Activation the Schematics extension in ArcMap

1. In ArcMap, click Tools on the main menu and click Extensions.
2. Check the Schematics check box and click Close.

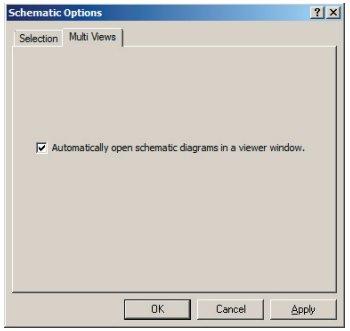
Loading the Schematics extension toolbars

1. Click Tools on the main menu and click Customize.
2. Check the Schematic, Schematic Editor, and Schematic Network Analyst check boxes.
3. Click Close.
4. Arrange the toolbars under the toolbar main menu.

Enabling the Multi Views running mode

In ArcGIS 9.3, a schematic diagram can be displayed in a viewer window. A viewer window can be opened on a diagram by clicking Window and clicking Viewer on the ArcMap menu. You can also work with the Multi Views running mode as the default mode so that each time a diagram is opened or generated, it is automatically displayed in a viewer window without changing the active data frame. Here are the detailed steps to activate the Multi Views running mode.

1. Click the Schematic menu and point to Schematic Options.
2. The Schematic Options dialog opens. Click the Multi Views tab.
3. Check the Automatically open schematic diagrams in a viewer window check box.

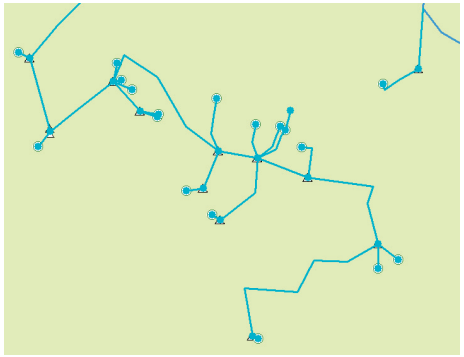


4. Click OK. Each time a schematic diagram is opened, it will be displayed in a viewer window, and the active data frame will be preserved.

Note: To deactivate this mode, uncheck the box on the Multi Views tab.

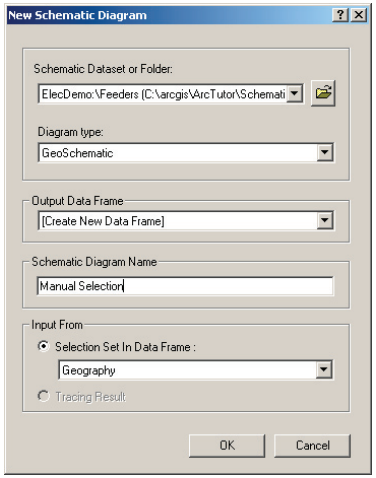
Generating a diagram from features manually selected

1. Click Bookmarks on the main menu and click Manual Selection.
2. Use the Select Features tool to manually select a part of the network by drawing a box with the tool.

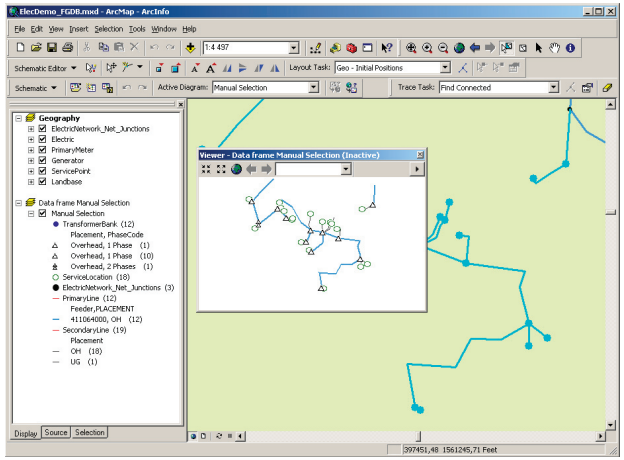


3. Click the Generate New Schematic Diagram button to open the New Schematic Diagram dialog box.
4. Click the browse button next to the Schematic Dataset or Folder text box and browse to the ElecDemo dataset (in the ElecDemo geodatabase available in the C:\arcgis\ArcTutor\Schematics\ Schematics\ folder), double-click ElecDemo, click Feeders, then click Add to store the diagram at this location.
5. Click the Diagram type drop-down arrow and choose GeoSchematic from the list.
6. Keep the default [Create New Data Frame] option selected in the Output Data Frame drop-down list.

   Note: If you choose Geography from the list, the diagram will be displayed in the Geography data frame on top of the map.
7. Type a name in the Schematic Diagram Name text box for the diagram to be generated (for example, “Manual Selection”).
8. In the Input From area, keep the Selection Set In Data Frame option selected and make sure that the Geography data frame containing the selection set you have just created is selected in the drop-down list.



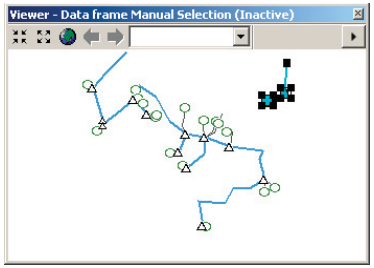
9. Click OK.
10. As the Multi Views mode is activated, the newly created diagram is displayed in a viewer window, and the active data frame containing the features is preserved. A new data frame related to this diagram has been created in the TOC but is not active.



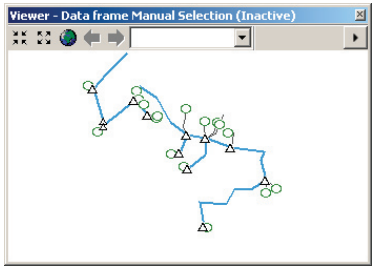
11. You can adjust the size of the symbols in the diagram using the Decrease Symbol Sizes and Increase Symbol Sizes buttons if needed.

Removing schematic elements

1. Click the Select Schematic Elements button and select a few elements on the diagram by drawing a box with the tool.



2. Click the Schematic Editor drop-down menu on the Schematic Editor toolbar and click the Remove Schematic Elements button. Click Yes when the following message appears: Do you want to remove the selected element(s)?. The selected elements are removed.



Note: The Undo tool is not available in this case. If you want to restore the removed elements, you must update the diagram with the Persist manually removed or reduced elements option unchecked on the Update Diagram dialog box.

Saving the diagram

1. Click the Save Diagram button.

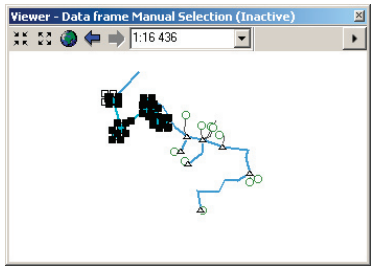
Note: You can also save the diagram under a different name using the Save Diagram As command available from the Schematic menu.

Saving a diagram after having removed schematic elements allows saving the removed state of those elements. The only way to restore the removed elements is to update the diagram with the Persist manually removed or reduced elements option unchecked on the Update Diagram dialog box.

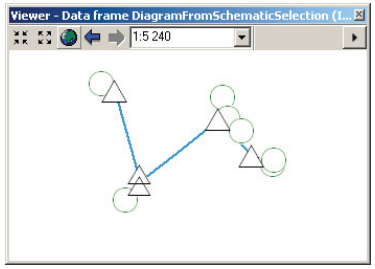
Generating a diagram based on a schematic selection

The Save Diagram As command can also be used to generate a new diagram based on the current selection set. When no schematic element is selected in the active diagram, it copies the entire diagram, but when schematic elements are selected, only that selection set will be saved in the new diagram.

1. Click the Select Schematic Elements button and select a few elements on the diagram by drawing a box with the tool.



2. Click the Schematic drop-down menu on the Schematic toolbar and click Save Diagram As.
3. Type a name for the diagram in the Schematic Diagram Name text box (“DiagramFromSchematicSelection”, for example).
4. Keep the default [Create New Data Frame] option and click Save. A new data frame is added to the TOC. As the Multi Views mode is activated, the new diagram is displayed in a viewer window



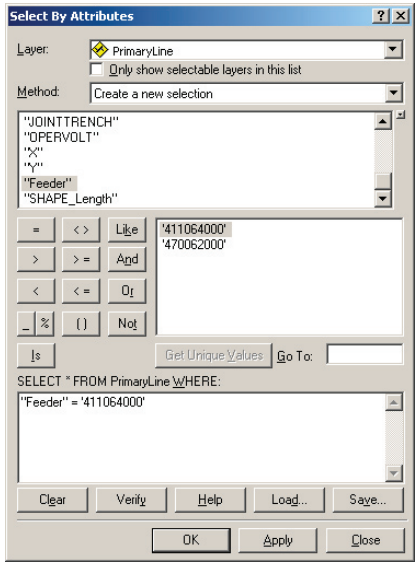
Note: Even if the resulting diagram seems to be based on the only selection set specified in the initial diagram, the whole initial diagram content is stored in the schematic database tables; the unselected elements are flagged as undisplayed elements for that resulting diagram exactly as if they have been manually removed using the Remove Schematic

Elements command. This will cause these undisplayed elements to be automatically restored if the diagram is updated with the Persist manually removed or reduced elements option uncheked.

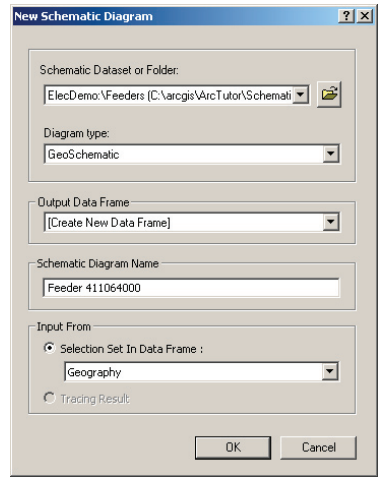
5. Right-click the new diagram data frame in the TOC and click Remove.
6. Remove the Manual Selection data frame.
7. Clear selected features.
8. On the ArcMap menu, click Bookmarks and click Overview.

Generating a diagram from a selection by attributes

1. Click Selection on the main menu and click Select By Attributes.
2. Click the Layer drop-down arrow, and click PrimaryLine.
3. Double-click [Feeder] from the fields list.
4. Click the equal sign button =.
5. Click Get Unique Values.
6. Double-click 411064000 from the unique values list.
   The Select By Attributes dialog box appears with the following query information:

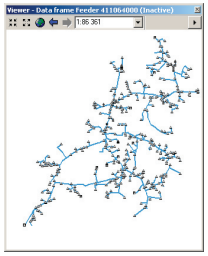


7. Click Apply, click Clear, then click Close.
8. Click Selection on the main menu and click Zoom To Selected Features.
9. Click the Generate New Schematic Diagram button to open the New Schematic Diagram dialog box.
10. Click ElecDemo:\Feeders in the Schematic Dataset or Folder text box so the generated diagram will be stored in the Feeders schematic folder.
11. Click the Diagram type drop-down arrow and choose GeoSchematic in the list.
12. Keep the default [Create New Data Frame] option selected in the Output Data Frame drop-down list.
13. Type a name in the Schematic Diagram Name text box for the diagram to be generated (for example, “Feeder 411064000”).
14. Make sure the Selection Set In Data Frame option is checked and the Geography data frame is currently selected in the drop-down list.



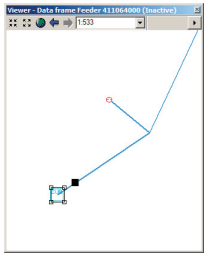
15. Click OK.
    The diagram is displayed in a new data frame. As the Multi Views mode is activated, it displays in a viewer window.
16. Resize the diagram viewer window. Use the zoom in tool for a better view of the diagram if needed.

17. Click the Increase Symbol Sizes or Decrease Symbol Sizes button to change the size of the symbols.

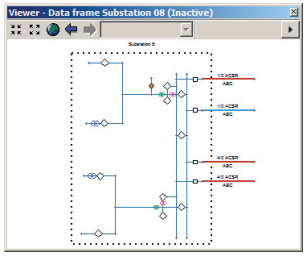


Generating an inside plant diagram

1. Zoom in to the substation (situated at the end of the network at the bottom left corner of the diagram window).
2. Click the Decrease Symbol Sizes button to change the size of the symbols for a better view of the network.
3. Click the Select Schematic Elements button and click the Substation to select it.



4. Right-click the substation.
5. The inside plant diagram opens in a viewer window.



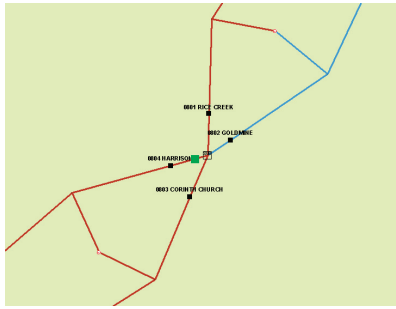
Note: You can identify elements in the inside plant diagram using the Identify tool.

Because the diagram elements are dynamically linked to the map, you can select an element in the diagram and locate it on the map.

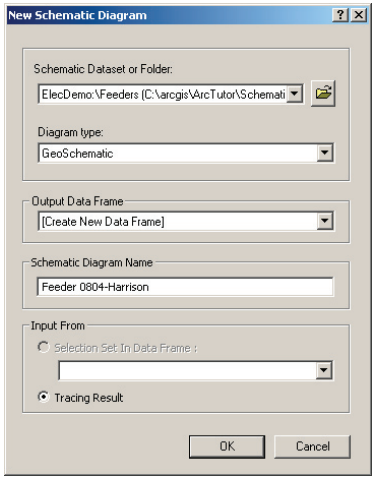
6. Click the Select Schematic Elements button and click one of the primary lines on the right of the substation.
7. Click the Propagate Schematic Selection To Map button.
8. Click Bookmarks on the main menu, and click Substation 08 to locate the selected line.
9. Drag the viewer windows used to display the Substation 08 and Feeder 411064000 diagrams for a better view of the line selected in the map.
10. Clear the selected features on the map.
11. Remove the Feeder 411064000 data frame. Click No if the following message appears: The diagram Feeder 411064000 has been modified. Do you want to save its layout?.
12. Remove the Substation 08 data frame without saving its layout.
13. Expand the Geography data frame in the TOC.

Generating a diagram from a trace

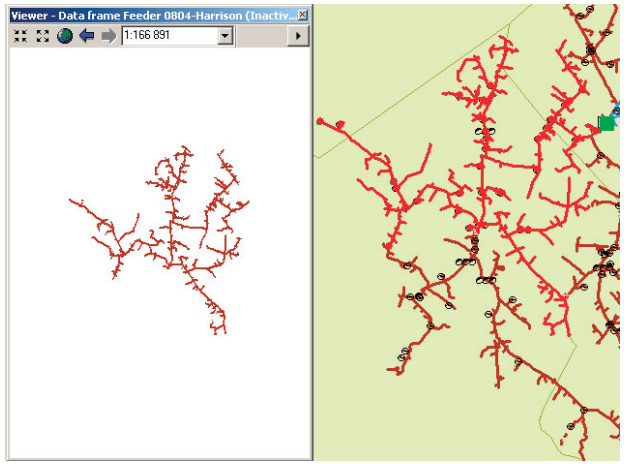
1. Load the Utility Network Analyst toolbar (if it is not already displayed).
2. Click the arrow button next to the Add Junction Flag tool and click Add Edge Flag tool.
3. Click the primary line between Feeder 0804 Harrison and the substation to add an edge flag.



4. Click the Trace Task drop-down arrow on the Utility Network Analyst toolbar. Click Trace Downstream, then click Solve.
5. Click the Generate New Schematic Diagram button to open the New Schematic Diagram dialog box.
6. Click ElecDemo:\Feeders in the Schematic Dataset or Folder text box.
7. Click the Diagram type drop-down arrow and choose GeoSchematic from the list.
8. Keep the default [Create New Data Frame] option selected in the Output Data Frame drop-down list.
9. Type a name in the Schematic Diagram Name text box for the diagram to be generated (for example, "Feeder 0804-Harrison").
10. Make sure the Tracing Result option is checked.



11. Click OK.
    The new diagram is displayed in a viewer window.
12. Click Bookmarks on the main menu and click Feeder 0804-Harrison to see the full feeder.
13. Use the Pan tool to drag the feature data display to the right.
14. Resize the viewer window related to the newly created Feeder 0804-Harrison schematic diagram and arrange that window so the geographic and schematic data display side-by-side.



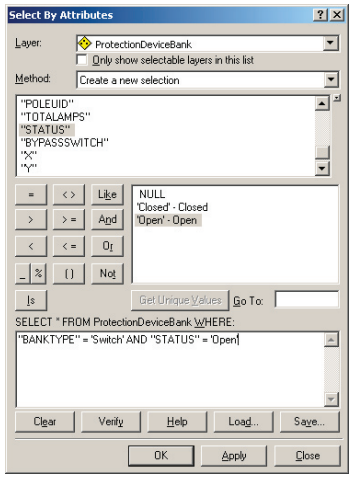
Updating a diagram generated from a trace

Notice that part of the network was not returned from the trace because a switch is open.

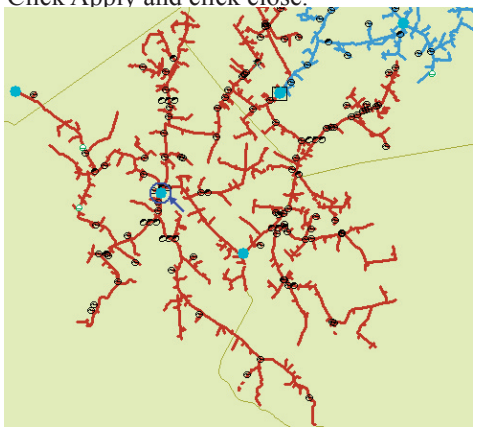
Because you want to find all the features connected to the substation, you will close this switch. First, you will select the open switches on the map.

1. Click the Analysis menu on the Utility Network Analyst toolbar and click Clear Results.
2. Click the Analysis menu again and click Clear Flags.
3. Click Selection on the main menu and click Select By Attributes.
4. Click the the Layer drop-down list and click ProtectionDeviceBank.
5. Double-click [BANKTYPE] in the Fields list.
6. Click the equal sign button =.
7. Click Get Unique Values.
8. Double-click 'Switch' - Switch in the unique values list.
9. Click the And button And.
10. Double-click [STATUS] from the fields list.
11. Click the equal sign button =.
12. Click Get Unique Values.

13. Double-click ‘Open’- Open from the unique values list.
The Select By Attributes dialog box appears with the following query information:

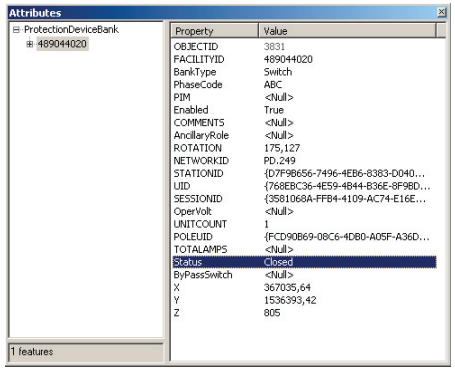


14. Click Apply and click close.

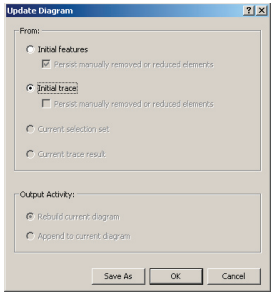


The switch that needs to be closed is the one in the middle of the network fed by Feeder 0804-Harrison and is highlighted in dark blue in the previous screen shot.

15. Click Tools on the main menu and click Customize.
16. Check the Editor check box and click Close.
17. Arrange the toolbar under the main menu.
18. Click the Editor drop-down menu and click Start Editing.
19. Use the Zoom In tool on the ArcMap Tools toolbar to zoom in to the switch.
20. Clear selected features.
21. Use the Edit tool to select the switch.
22. Click the Attributes button from the Editor toolbar to open the Attributes table.
23. Change the Enabled field from False to True and the Status field from Open to Closed.

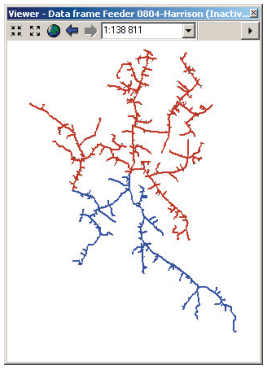


24. Close the Attributes window.
25. Click the Editor drop-down menu and click Save Edits.
26. Click the Editor drop-down menu again and click Stop Editing.
27. Click the Schematic menu on the Schematic toolbar and click Update Diagram.
28. The Update Diagram dialog box appears. Check the Initial trace option.



29. Click OK.

The entire content of the schematic diagram is updated according to the updated trace result based on the trace parameters that were persisted in the schematic database when the diagram was generated. Now that, as the switch has been closed, the trace goes beyond the switch. Without selecting this new trace result in the map, Schematics has reexecuted the trace in memory and updated the diagram accordingly. The following figure shows the diagram after its update. The blue part corresponds to the new trace result:



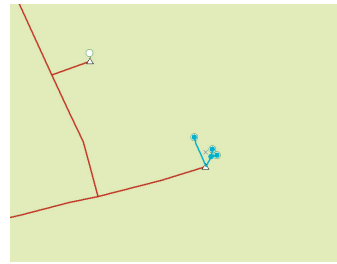
30. Remove the diagram data frame.

Note: If the trace downstream is reexecuted in the map starting from an edge flag placed at the same location it is when the diagram has is generated, updating diagram using the Current trace result will give the same result.

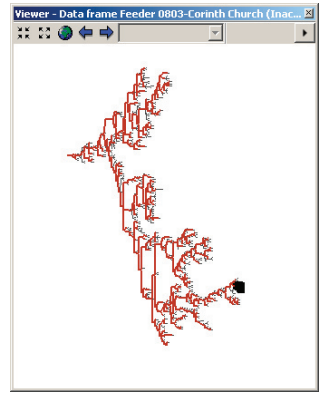
The Update Diagram dialog box also opens when right-clicking the schematic diagram entry in the TOC and clicking the Update Diagram shortcut menu.

Updating a diagram after deleting features

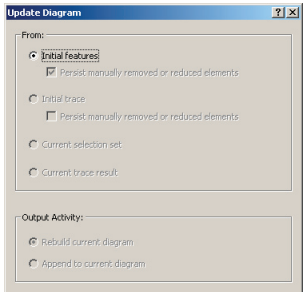
1. Click Bookmarks on the main menu and click Delete Features.
2. Start editing.
3. Manually select service locations and secondary lines as in the following example:



4. Click the Open Schematic Diagrams button . The Select schematic diagrams to open dialog box appears.
5. Navigate to the Feeders schematic subfolder of the ElecDemo schematic dataset in the C:\arcgis\ArcTutor\Schematics\Schematics\ElecDemo geodatabase.
6. Click Feeder 0803-Corinth Church in the diagram list and click Add. The diagram appears in a new data frame.
7. Click the Propagate Map Selection To Schematic button . The associated schematic elements in the active diagram are selected.



8. Click the Edit tool and press the Delete key.
9. Save your edits and stop editing.
10. Click the Schematic menu on the Schematic toolbar and click Update Diagram.
11. Click No if the following message appears: The diagram Feeder 0803-Corinth Church has been modified. Do you want to save its layout.?.
12. The Update Diagram dialog box appears and the Initial features option is checked.



13. Click OK.

Figure 1 shows the area where the schematic elements associated with the removed features are located before the diagram update.
Figure 2 shows the diagram after update.

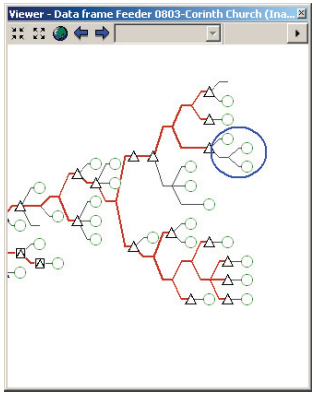


Figure 1: Before update

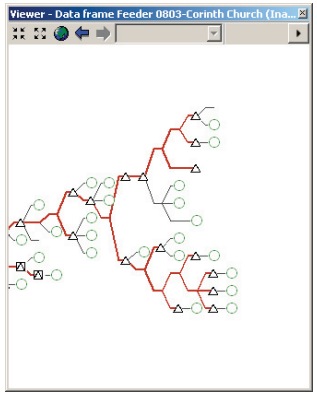


Figure 2: After update

14. Right-click the diagram data frame in the TOC.
15. Click Remove.
16. Expand the Geography data frame in the TOC.
17. Click File and click Exit.
18. Click No when the following message appears: Save changes to ElecDemo.mxd?

Exercise 3: Using the refinement tools

In this exercise, you will use the diagram refinement tools of ArcGIS Schematics.

Activating the Schematics extension in ArcCatalog

1. Start ArcCatalog by either double-clicking a shortcut installed on your desktop or clicking the Programs list on your Start menu.
2. Click Tools on the main menu and click Extensions.
3. Check the Schematics check box and click Close.

Loading the tutorial .mxd file

1. In ArcCatalog, navigate to the C:\arcgis\ArcTutor\Schematics\ Schematics folder in the Catalog tree. (This is the default installation location for this data.)
2. Double-click the ElecDemo.mxd file.

Activating the Schematics extension in ArcMap

1. In ArcMap, click Tools on the main menu and click Extensions.
2. Check the Schematics check box and click Close.

Loading the Schematics extension toolbars

1. Click Tools on the main menu and click Customize.
2. Check the Schematic, Schematic Editor, and Schematic Network Analyst check boxes.
3. Click Close.
4. Arrange the toolbars under the main menu.

Adding a new Schematics command on toolbars

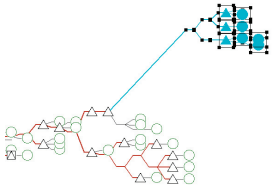
1. Click Tools and click Customize.
2. Click the Commands tab.
3. Click Schematics in the Categories list
4. Click Open Diagram by Diagram Type in the related Commands list and drag it onto the Schematic toolbar.
5. Click Close.

Moving schematic elements

1. Click the Open Diagram By Diagram Type button you just added to the Schematic toolbar. The Open schematic diagram dialog box appears.
2. Click the Diagram Type drop-down list and click GeoSchematic.
3. Click Feeder 0803-Corinth Church in the Diagram Name drop-down list and click OK. The diagram appears in a new data frame.

Note: The Open Diagram By Diagram Type command allows you to choose a schematic diagram based on its diagram type from any specified schematic dataset without searching in the schematic folder where it can be stored. This is a useful alternative to the Open Schematic Diagrams command.

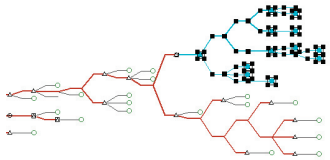
4. Zoom in on the diagram to a set of elements. Click the Edit/Move Schematic Elements button and select elements by drawing a box with the tool.
5. Move the selected set.



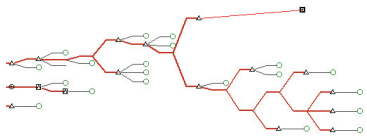
6. You can click the Undo tool to reverse the action.
7. Click the background of the diagram to cancel the feature selections.

Collapsing a selection set

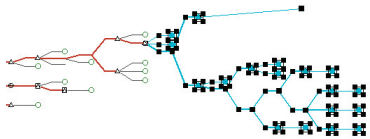
1. Click the Select Schematic Elements button and select a part of the network by drawing a box with the tool.



2. Click the Schematic Editor drop-down arrow, point to Collapse/Expand, then click Collapse Selected Set.

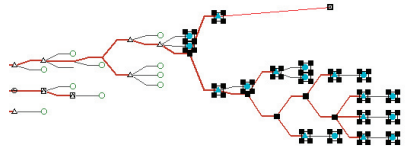


3. Select another set of elements by drawing a box with the Select Schematic Elements tool, including the first set.



4. Click the Schematic Editor drop-down arrow, point to Collapse/Expand, then click Collapse Selected Set.

5. You can expand all the collapsed sets one after the other by drawing a box around them, clicking the Schematic Editor drop-down arrow, pointing to Collapse/Expand, then clicking Expand By Level.

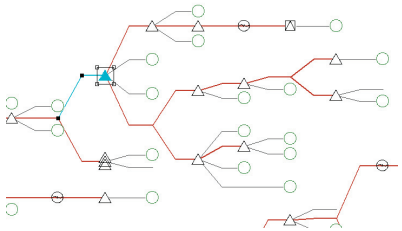


Note: You can expand all the sets at once by clicking the Schematic Editor drop-down arrow, pointing to Collapse/Expand, then clicking Expand All.

6. Click the background of the diagram to cancel the feature selections.

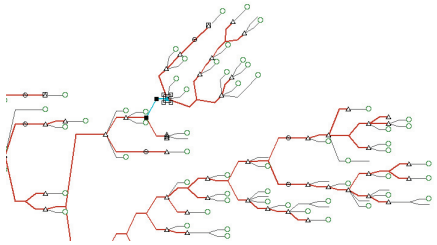
Rotating a tree

1. Click the Select Schematic Elements button and click a TransformerBank node at the root of a network branch. This node will be considered the root of the tree.
2. Hold down the Shift key and click the primary line to the left of the TransformerBank node to select it and isolate the branch, as in the following screen shot:



3. Click the Schematic Editor drop-down arrow and click Rotate Tree.

   Note: The default rotation angle is 45 degrees. You can set the rotation angle by clicking Editing Properties from the Schematic Editor drop-down arrow. Click the Rotate Tree tab and type a number in the Angle (degrees) text box.

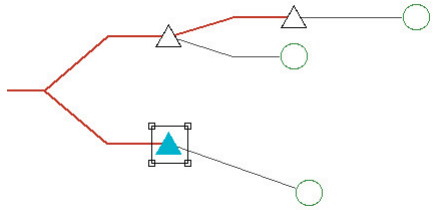


4. You can click the Undo tool to reverse the action.
5. Click the background of the diagram to cancel the feature selections.

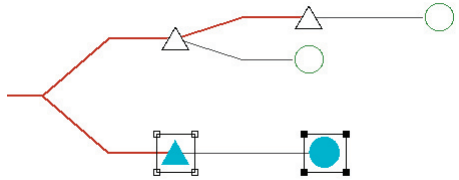
Using the alignment tools

Selected nodes can be automatically aligned horizontally, vertically, or by angle using the Align Nodes tool.

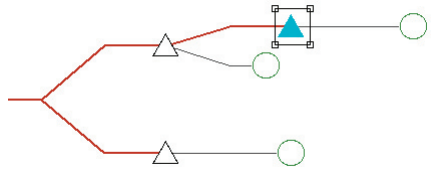
1. Click the Select Schematic Elements button and click a node to be used as the origin node.



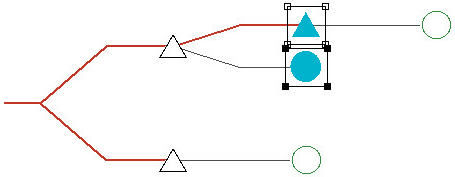
2. Hold down the Shift key and click a second node to be aligned horizontally with the first one.



3. Click the Schematic Editor drop-down arrow, point to Align Nodes, then click Align Horizontally.
4. You can click the Undo tool to reverse the action.
5. Click a node to be used as the origin node.



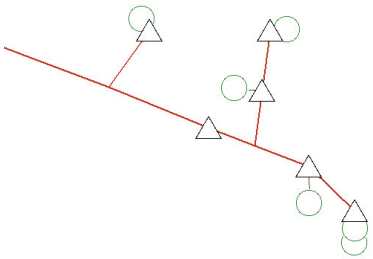
6. Hold down the Shift key and click a second node to be aligned vertically with the first one.



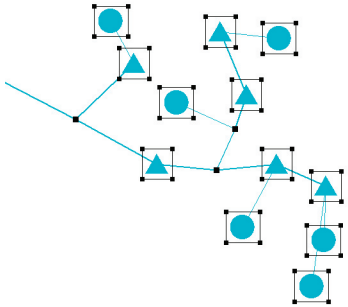
7. Click the Schematic Editor drop-down arrow, point to Align Nodes, then click Align Vertically.
8. You can use the Undo tool to reverse the action.
9. Remove the diagram data frame. Click No when the following message appears: The diagram'Feeder 0803-Corinth Church' has been modified. Do you want to save its layout?.

Separate overlapping nodes

1. Click the Open Diagram By Diagram Type button.
2. The Open schematic diagram dialog box appears. Click the Diagram Type drop down list and click GeoSchematic.
3. Click Feeder 0801-Rice Creek in the Diagram Name list and click OK. The diagram appears in a new data frame.
4. Zoom in to a part of the network where elements overlap.
5. Click the Select Schematic Elements button and select overlapping elements by drawing a box with the tool.



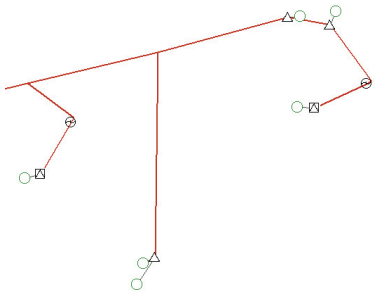
6. Click the Layout Task drop-down list on the Schematic Editor toolbar and click Geo-Spatial Dispatch.
7. Click the Layout Algorithm Properties button and type "5" in the Iterations number text box.
8. Click OK.



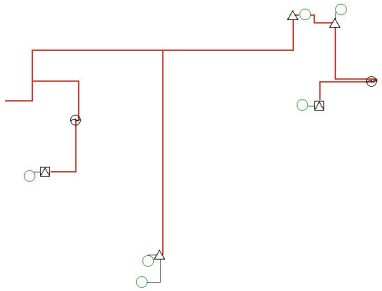
9. Click the background of the diagram to cancel the element selections.
10. You can click the Undo tool to reverse the action.

Squaring links

1. Select a part of the network by drawing a box with the tool.



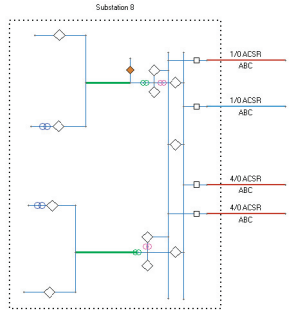
2. Click the Schematic Editor drop-down arrow and click Square Links.



3. Click the background of the diagram to cancel the element selections.
4. You can click the Undo tool to reverse the action.
5. Remove the diagram data frame. Click No when the following message appears: Do you want to save the layout of the diagram ‘Feeder 0801-Rice Creek’?.

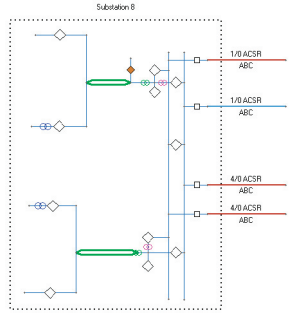
Finding overlapping links

1. Click the Open Diagram By Diagram Type button.
   The Open schematic diagram dialog box appears.
2. Click the Diagram Type drop-down list and click InsidePlants.
3. Click Substation 08 in the Diagram Name list and click OK. The diagram appears in a new data frame.
4. Click the Schematic Trace Task drop-down list on the Schematic Network Analyst toolbar and click Find Overlapping Links.
5. Click the Trace Task Properties button to open the Schematic Trace Task Properties dialog box.
6. Click the Find Overlapping Links tab and uncheck the Select links check box.
7. Click the Highlight tab, choose a line color, then type a line width to highlight the loop (for example, green and “3”).
8. Click OK.



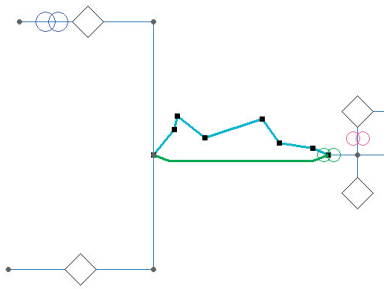
Separate overlapping links

1. If schematic elements are currently selected in the active diagram, click the diagram background to cancel their selections.
2. Click the Layout Task list and click Separate Overlapping Links.
3. Click the Layout Algorithm Properties button to open the Schematic Layout Algorithm Properties dialog box.
4. Type “1” for the Offset between links parameter.
5. Click OK.
   The overlapped links are separated.

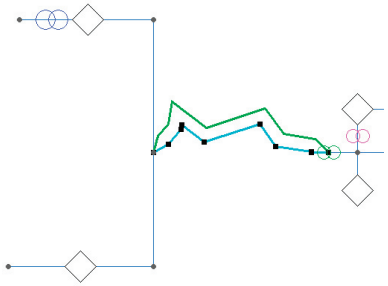


The next steps illustrate another way of working on the Separate Overlapping Links schematic algorithm layout.

6. Zoom in to the set of separated links that are displayed at the bottom of the diagram.
7. Click the Add Vertex tool.
8. Click and drag a point on one of the separated links to create a new vertex on that link.
9. Repeat the operation to create several vertices on that link.
10. Click the Select Schematic Elements tool and select that modified link.



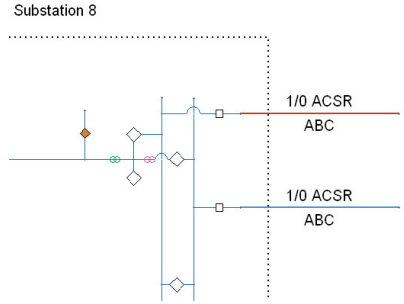
11. Click the Layout Task list and click Separate Ovelapping Links.
12. Click the Layout Algorithm Properties button to open the Schematic Layout Algorithm Properties dialog box.
13. Check the Use origin links option.
14. Click OK.
    The selected link is used as a reference link for the algorithm execution. The algorithm copies the vertices that are displayed along that link on the second link that connects the same origin and extremity nodes, and separates the two links.



15. Cancel the schematic link selection.
16. Click the Clear Trace Task Result tool to remove the highlight.
17. Click the Layout Task drop-down list and click Restore Saved Positions.
18. Click Apply Layout Task.

Marking crossing links

1. Click the Schematic Editor drop-down arrow and click Mark Crossing.
2. Zoom in on the right part of the diagram where the crossing marks have been added.



3. Click the Schematic Editor drop-down arrow and click Editing Properties. Click the Mark Crossings tab and increase the Crossing symbol size value. Click OK.
4. You can uncheck the Mark Crossings menu to remove the crossing marks.
5. Remove the diagram data frame. Click No when the following message appears: The Diagram ‘Substation 08’ has been modified. Do you want to save its layout?.
6. Expand the Geography data frame in the TOC.
7. Click File and click Exit.
8. Click No when the following message appears: Save changes to ElecDemo.mxd?.

Exercise 4: Using layout algorithms

In this exercise, you will use layout algorithms to automatically change the position of elements in the diagrams.

Enabling the Schematics extension in ArcCatalog

1. Start ArcCatalog by either double-clicking a shortcut installed on your desktop or clicking the Programs list on your Start menu.
2. Click Tools on the main menu and click Extensions.
3. Check the Schematics check box and click Close.

Loading the tutorial .mxd file

1. In ArcCatalog, navigate to the C:\arcgis\ArcTutor\Schematics\Schematics folder in the Catalog tree. (This is the default installation location for this data.)
2. Double-click the ElecDemo.mxd file.

Enabling the Schematics extension in ArcMap

1. In ArcMap, click Tools on the main menu and click Extensions.
2. Check the Schematics check box and click Close.

Loading the Schematics extension toolbars

1. Click Tools on the main menu and click Customize.
2. Check the Schematic, Schematic Editor, and Schematic Network Analyst check boxes.
3. Click Close.
4. Arrange the toolbars under the main menu.

Enabling the Multi Views running mode

In ArcGIS 9.3, a schematic diagram can be displayed in a Viewer window. A viewer window can be opened on a diagram by clicking Window and clicking Viewer on the ArcMap main menu. You can also work with the Multi Views running mode as the default mode so that each time a diagram is opened or generated, it automatically displays in a viewer window without changing the active data frame. Here are the detailed steps to activate the Multi Views running mode.

1. Click the Schematic menu and point to Schematic Options.
2. Click the Multi Views tab on the Schematic Options dialog box that opens.
3. Check the Automatically open schematic diagrams in a viewer window check box.
4. Click OK. Each time a schematic diagram is opened, it will be displayed in a viewer window and the active data frame be preserved.

Note: To deactivate this mode, uncheck the box on the Multi Views tab.

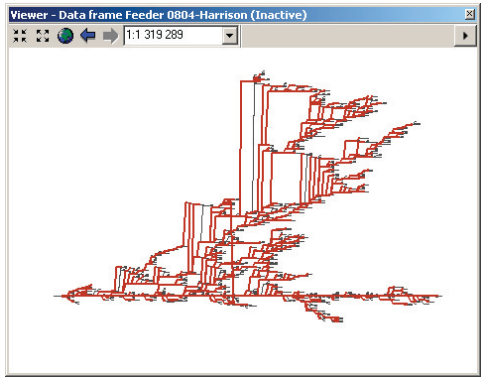
Adding a new Schematics command on toolbars

1. Click Tools and click Customize.
2. Click the Commands tab.
3. Click Schematics in the Categories list
4. Click Restore Initial Layout in the related Commands list and drag it onto the Schematic toolbar.
5. Click Close.

Using the Hierarchical - Main Line Tree algorithm

The Main Line Tree layout hierarchically arranges all the nodes and links in the active schematic diagram along the detected main line.

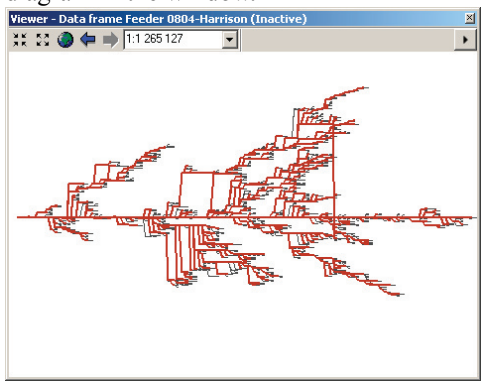
1. Click the Open Schematic Diagrams button . The Select schematic diagrams to open dialog box appears.
2. Navigate to the Feeders schematic folder of the ElecDemo schematic dataset in the C:\arcgis\ArcTutor\Schematics\Schematics\ElecDemo geodatabase and select Feeder 0804-Harrison. Click Add. The diagram opens in a viewer window.
3. Click the Layout Task drop-down arrow and click Hierarchical - Main Line Tree.
4. You can change direction, spacing and branch placement options on the Schematic Layout Algorithm Properties dialog box by clicking the Layout Algorithm Properties button . Type “6” for the spacing between nodes perpendicular to the direction, and type “20” for the spacing between nodes along the direction.
5. Click OK.
6. Resize the viewer window and click the Full Extent tool to center the diagram in the window.



7. Click the Undo button to revert to the former layout.
8. Click Full Extent.

Setting the root and end nodes of the tree

1. Expand the Electric layer group under the Geography data frame in the TOC.
2. Right-click Substation and click Selection, then click Select All.
3. Click Propagate Map Selection To Schematic.
4. Right-click the Feeder 0804-Harrison schematic layer, click Schematic Selection, then click Zoom To Selected Schematic Elements.
5. Click the Edit/Move Schematic Elements tool and move the Substation element from its original location so it doesn’t overlap its neighbors.
6. Cancel the Substation selection.
7. Click the Layout Task drop-down arrow and click Hierarchical - Main Line Tree.
8. Click the Set Schematic Root button , and click the substation node to be set as the root of the tree.
9. You can set the end node by clicking the Set Schematic End button and clicking a node on the diagram (for example, a service location).
10. Click the Apply Layout Task button .
11. Resize the viewer window and click the Full Extent tool to center the diagram in the window.



12. Notice that the Restore Initial Layout button you added to the Schematic toolbar at the beginning of this exercise is currently

dimmed.

13. Click Save Diagram Layout to save the current diagram layout. Note that since the layout for the active schematic diagram is now stored in the schematic database, the Restore Initial Layout button is activated.

Using the Geo-Initial Positions algorithm

1. You can get back to the geoschematic layout of the features by clicking the Layout Task drop-down arrow, clicking Geo-Initial Positions, then clicking the Apply Layout Task button .
2. Click the Full Extent tool to center the diagram in the view.

Restoring schematic elements saved positions

1. Click the Layout Task drop-down arrow, click Spatial Dispatch, then click Apply Layout Task.
2. You can return to the saved layout of the schematic elements by clicking Restore Saved Positions in the Layout Task drop-down list and clicking Apply Layout Task.

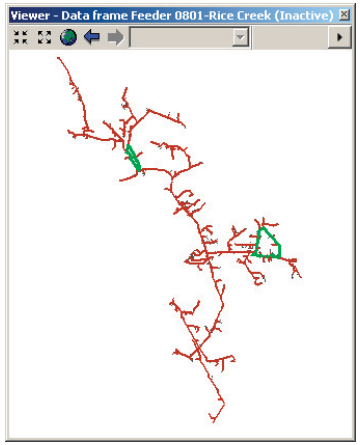
Removing a schematic diagram's saved layout from the schematic database

1. Click Restore Initial Layout.
2. Confirm the restoration of the initial layout.
   All the schematic elements contained in the active diagram are restored to their initial positions. The diagram layout has been removed from the schematic database. As no layout exists anymore for the diagram, the Restore Initial Layout button is unavailable.
3. Click Full Extent.
4. Remove the Feeder 0804-Harrison data frame.

Using the Find Loops tool

You can identify loops on your network using the Find Loops tool.

1. Click the Open Schematic Diagrams button . The Select schematic diagrams to open dialog box appears. Navigate to the Feeders schematic folder of the ElecDemo schematic dataset in the C:\arcgis\ArcTutor\Schematics\Schematics\ElecDemo geodatabase and select Feeder 0801-Rice Creek.
2. Click the Schematic Trace Task drop-down arrow on the Schematic Network Analyst toolbar and click Find Loops.
3. Click the Trace Task Properties button to open the Schematic Trace Task Properties dialog box.
4. Click the Find Loops tab and uncheck the Select nodes and Select links check boxes.
5. Click the Highlight tab, choose a line color, then type a line width to highlight the loop (for example, green and "3").
6. Click OK.



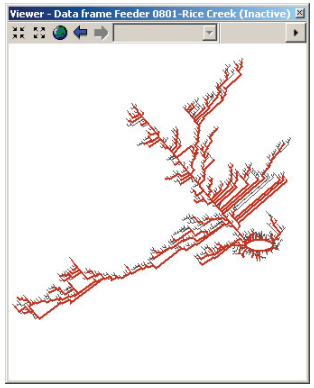
7. Click the Clear Trace Task Result tool to cancel the selection.

Using the Main Ring algorithm

Once a loop is detected, you can lay out the network around the loop.

1. Click the Layout Task drop-down arrow and click Main Ring.

2. Click the Apply Layout Task button .
3. Click Full Extent to center the diagram in the window.



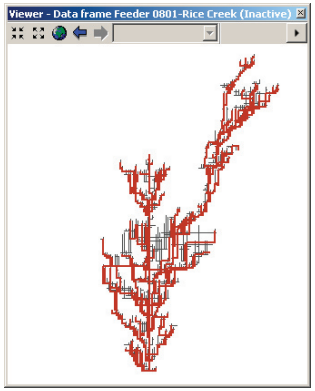
Note: You can change the ring type from Ellipse to Rectangle on the Schematic Layout Algorithm Properties dialog box by clicking the Layout Algorithm Properties button .

4. Click the Undo button to revert to the former layout.

Using the Orthogonal algorithm

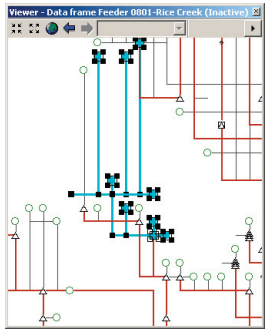
The Orthogonal layout arranges the nodes and links in the active schematic diagram orthogonally in a hirarchical order.

1. Click the Layout Task drop-down arrow and click Orthogonal.
2. Click the Apply Layout Task button .
3. Click the Full Extent tool to center the diagram in the window.

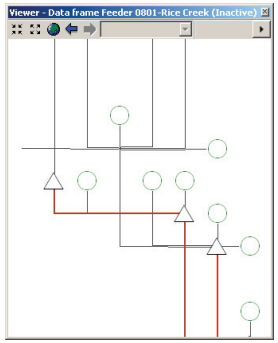


Using the Geo - Partial Overlapping Links algorithm

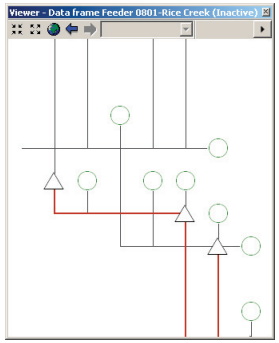
1. Zoom in on an area that contains secondary lines and primary lines that are partially overlapped.
2. Click the Select Schematic Elements tool and select a subset from these overlapped links.



3. Click the Layout Task drop down arrow, click Geo - Partial Overlapping Links, click then the Layout Algorithm Properties button to modify its default properties.
4. Type “50” for the Buffer width paramater and “25” for the Offset.
5. Click OK.
6. Zoom in on the link segments that have been separated.
7. Click the Select Schematic Elements tool and cancel the schematic element selections by clicking the schematic diagram background.
8. Click Undo and Redo to clearly visualize the impact of the algorithm.



After algorithm execution

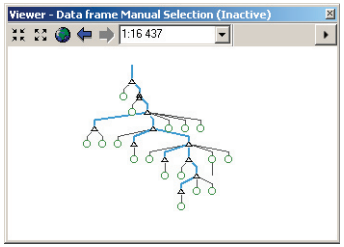


Before algorithm execution

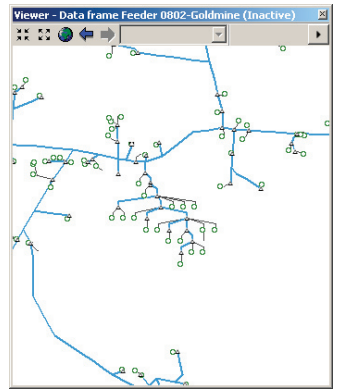
9. Remove the diagram data frame.Click No when the following message appears: The Diagram 'Feeder 0801 - Rice Creek' has been modified. Do you want to save its layout?

Copying a diagram layout on another diagram

1. Click the Open Schematic Diagrams button . The Select schematic diagrams to open dialog box appears.
2. Navigate to the Feeders schematic folder of the ElecDemo schematic dataset in the C:\arcgis\ArcTutor\Schematics\Schematics\ElecDemo geodatabase, and select Manual Selection. Click Add. The diagram opens in a viewer window.
3. Click the Layout Task drop down arrow and click Smart Tree.
4. Zoom in on the little black Electric_Network_NetJunctions schematic node at the top of the diagram.
5. Click the Set Schematic Root button and click the Electric_Network_NetJunctions schematic node so it is set as the root of the tree.
6. Click Layout Algorithm Properties.
7. Check the From top to bottom option in the Direction area and click OK.



8. Right-click the Manual Selection schematic layer in the TOC, click Schematic Selection, then click Select All Schematic Elements.
9. Click the Propagate Schematic Selection To Map to visualize the associated features in the Geography data frame.
10. Click the Open Schematic Diagrams button, navigate to the Feeder 0802-Goldmine schematic diagram stored in the Feeders schematic folder of the ElecDemo schematic dataset, then click Add.
11. Click the Propagate Map Selection To Schematic button to visualize the schematic elements contained in Feeder 0802-Goldmine that are associated with the same features.
12. Zoom in on these selected schematic elements.
13. Click the Select Schematic Elements tool and click the Manual Selection diagram's background to cancel all its schematic element selections.
14. Click the Feeder 0802 - Goldmine diagram's background to cancel all its schematic element selections.
15. Right-click the Manual Selection schematic layer in the TOC and click Copy Layout. The Copy Layout To dialog box opens.
16. Click Feeder 0802 - Goldmine and click OK.
    The position of all the schematic elements contained in the Manual Selection diagram are reported on the schematic elements contained in Feeder 0802-Goldmine that are associated with the same features.



17 Close ArcMap.
18. The Schematics - Save Layouts dialog box opens. Click the Apply to all option and click No so that no diagram is saved.
19. Click No again so that the mxd file is not saved.