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# **Discern Explorer®**

## **Layout Builder Tutorial Part 1 of 2**

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# Discern Explorer Layout Builder Tutorial

## Code Level

This tutorial is geared for clients on the *Cerner Millennium® Cumulative Support Package 2007.18* release of Discern Visual Developer (DiscernVisualDeveloper.exe), also referred to as DVDev. Much of the functionality discussed in this document is also available for earlier releases, but there are significant differences between 2007.18 and some of the earlier versions. All references to help files and functionality pertain to 2007.18 production release.

A basic understanding DVDev and the *Discern Explorer®* (CCL) programming language to create programs and reports is assumed.

## General Information

Layout Builder is a component that allows visual development of layout sections used to create *Discern Explorer* reports using the Report API. You can link the layout sections to a *Discern Explorer* select command, a program that prompts users for input, a driver program, or a record structure that contains information that needs to be displayed or printed. For each layout section, two *Discern Explorer* subroutines are created by Layout Builder. More information on the subroutines is provided in Appendix A.

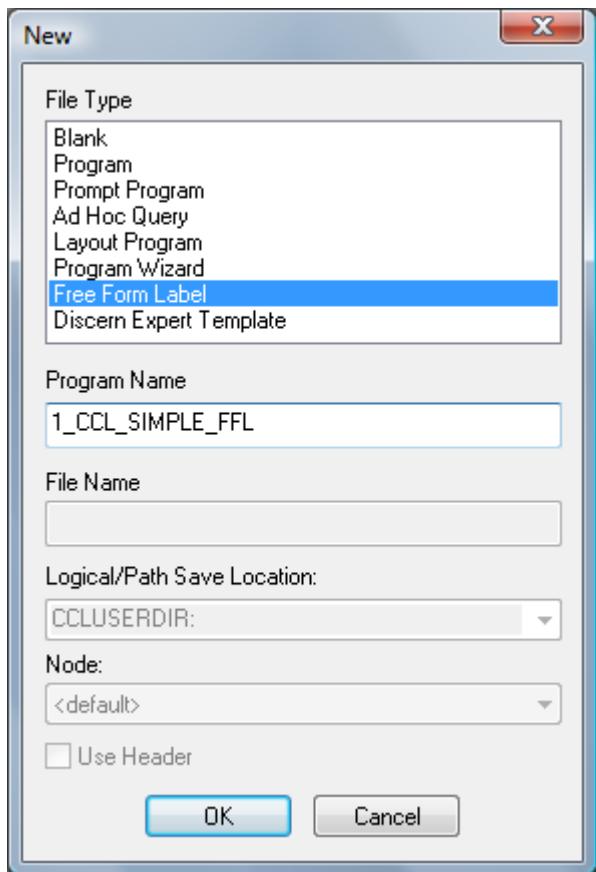
This tutorial contains instructions that will guide you through the common functionality of Layout Builder. Follow the step by step instructions in a non-production environment to help you gain an understanding of the Layout Builder.

## Creating a Free Form Label

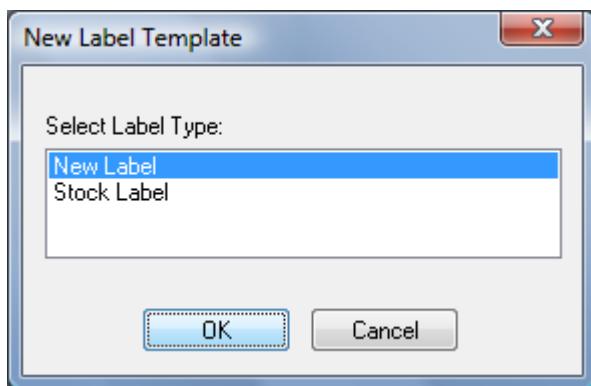
The simplest and most basic layout is a Free Form Label. A Free Form Label can be thought of as a single page output program. The page size can be customized to fit any size of paper or label stock. You can specify the number of labels on a sheet or use standard label stock. Layout Builder can generate PostScript, .PDF, Intermec, or Zebra outputs. The information displayed can be static text, selected fields or expressions, variables, items from a record structure, or values entered at prompts.

The following exercise creates a simple Free Form Label to look at some of the basic functionality of Layout Builder.

1. Open Discern Visual Developer (DiscernVisualDeveloper.exe) and from the File menu, select New. The New dialog box is displayed similar to the following:



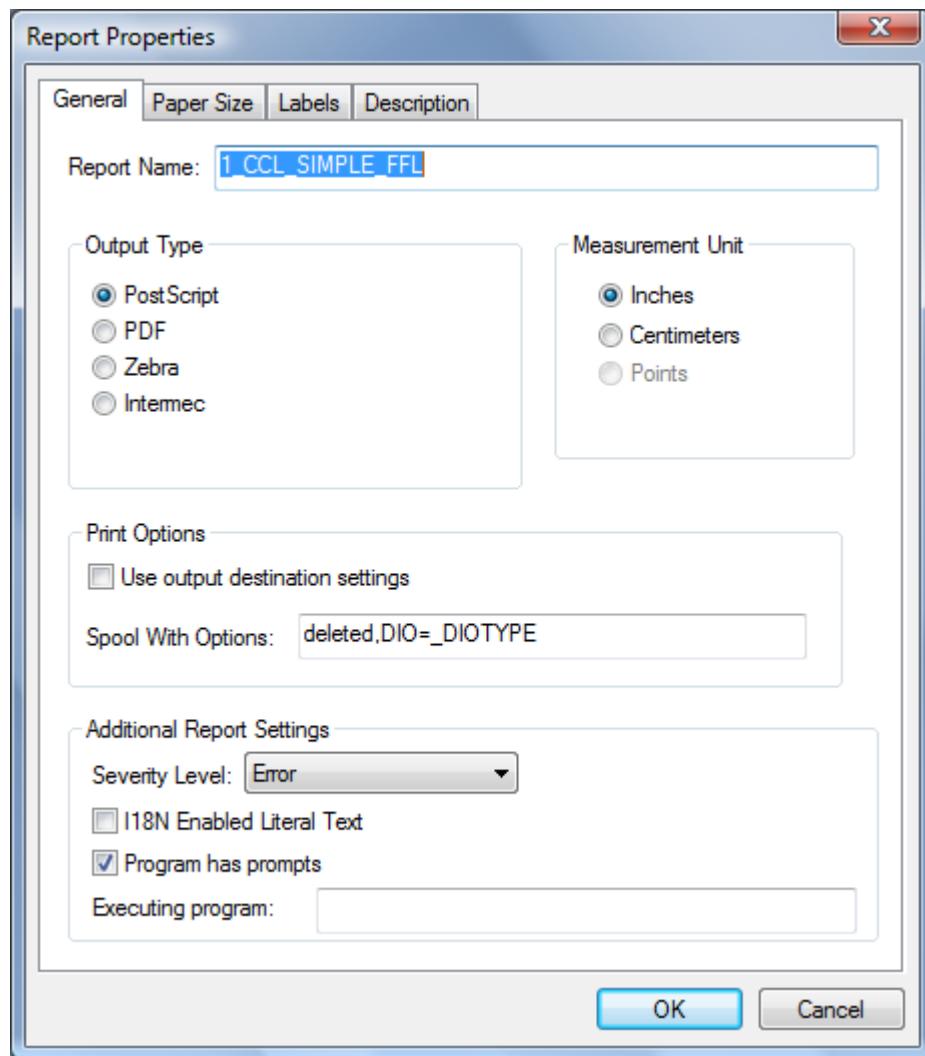
2. From the File Type list, select Free Form Label.
3. Enter a unique program name. For example, **1\_your\_initials\_SIMPLE\_FFL**.
4. Click OK. The New Label Template dialog box shown below is displayed.



The New Label Template dialog box enables you to define a new label or pick from a list of standard stock labels. Stock labels are pre-manufactured labels that can have several sub-labels on a single page. For example, a CL-0100 or CL-0101 stock label has one 3.5 by 2.5, two 2.5 by 1.25, and four 1.25 by 1.25 inch sub-labels on a single page. For our example we will create a new label and define its properties.

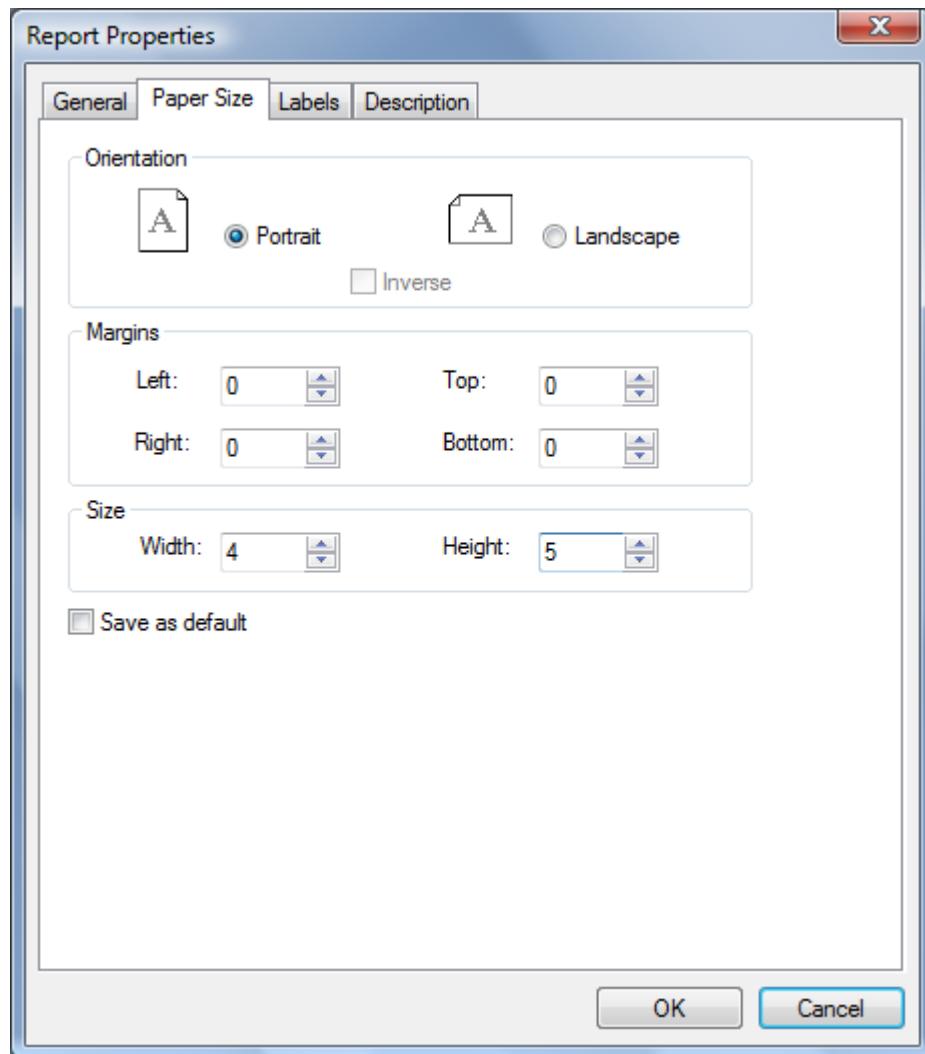
5. Verify New Label is selected in the New Label Template dialog box and click OK.

The Report Properties dialog box is displayed. This dialog box enables you to set the properties of the report layout that you are creating. For information regarding the Report Properties dialog box, see **Discern Explorer Help (DiscernExplorerHelp.exe) > Discern Visual Developer Help> Discern Layout Builder > Windows and Dialog boxes.**

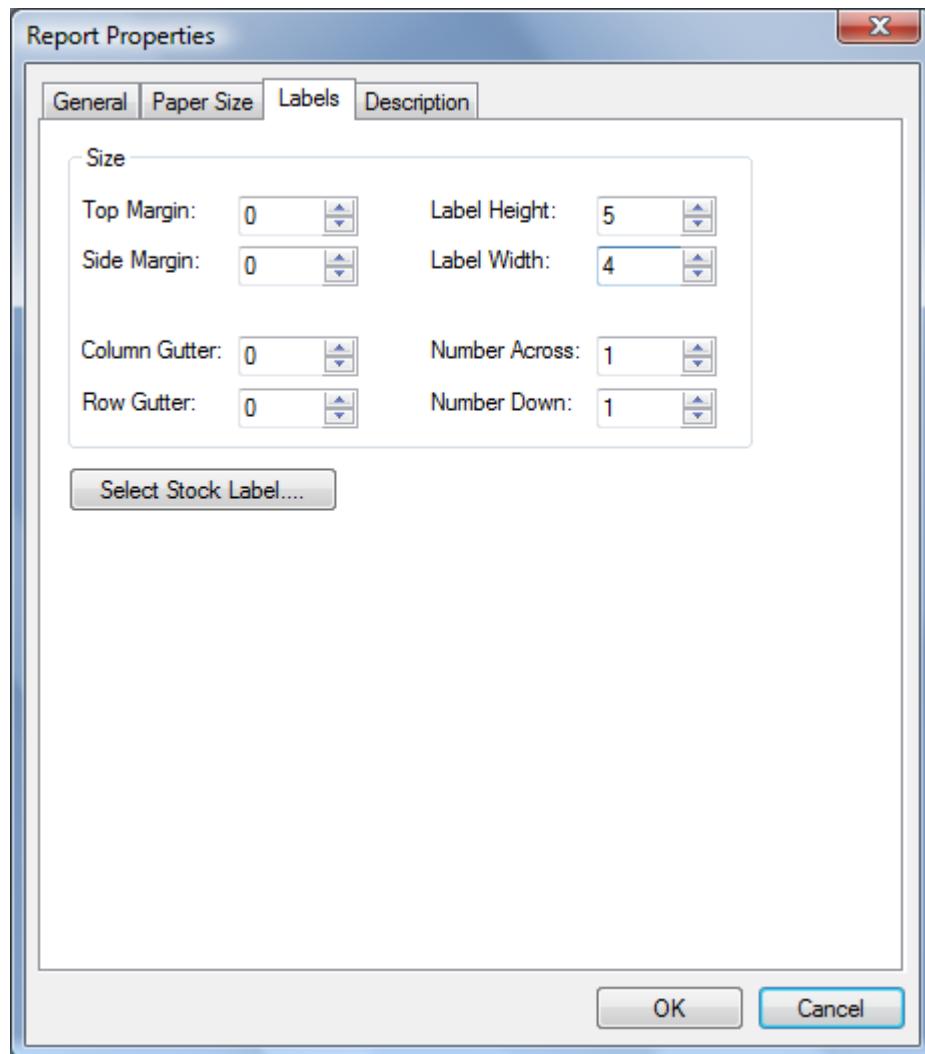


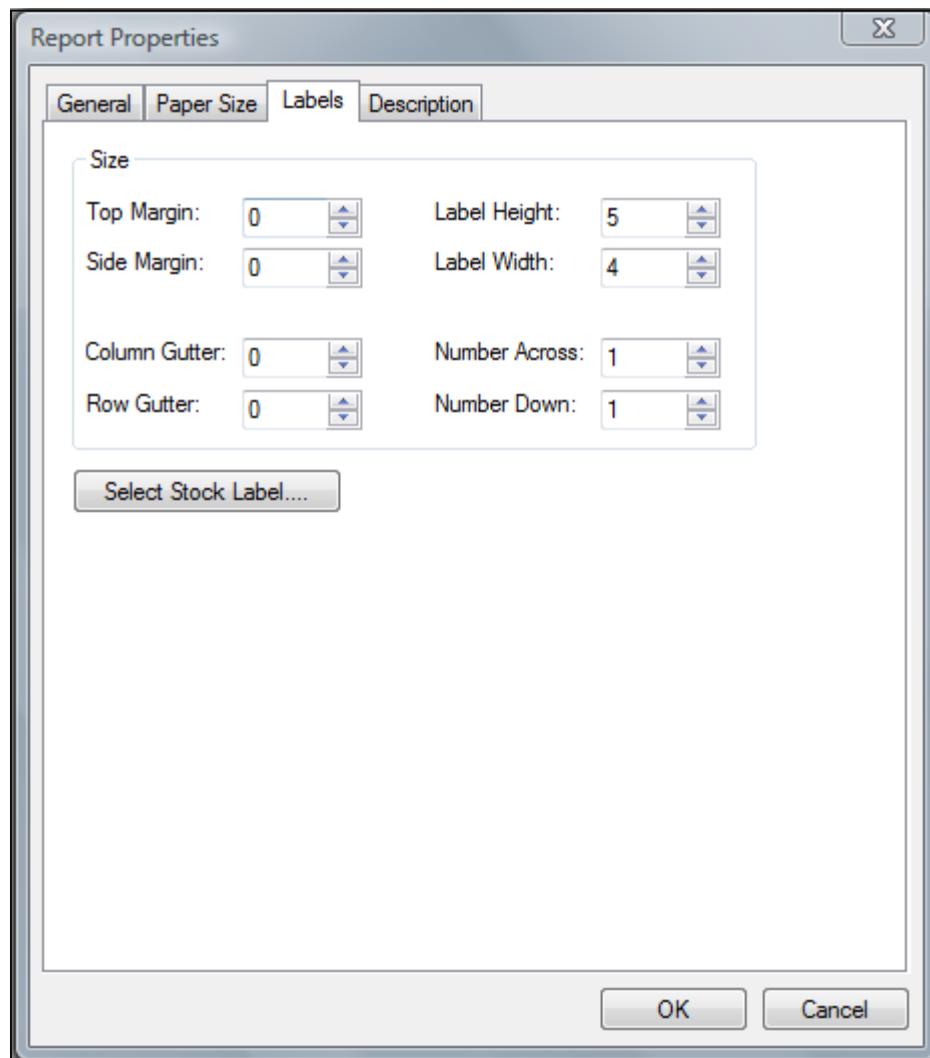
For our example we will create a single 4-inch by 5-inch label on a 4-inch by 5-inch page. To display the output on the screen, we need to create the output using PostScript format.

6. Verify the PostScript option is selected for the Output Type and select the Paper Size tab.
7. Set the width and height of the paper to 4 and 5 respectively. If this is the most common paper size you use for labels, you can select the Save As Default option; however, for this example we will leave the option deselected. You can expect your Report Properties dialog box to display similar to the following screen:

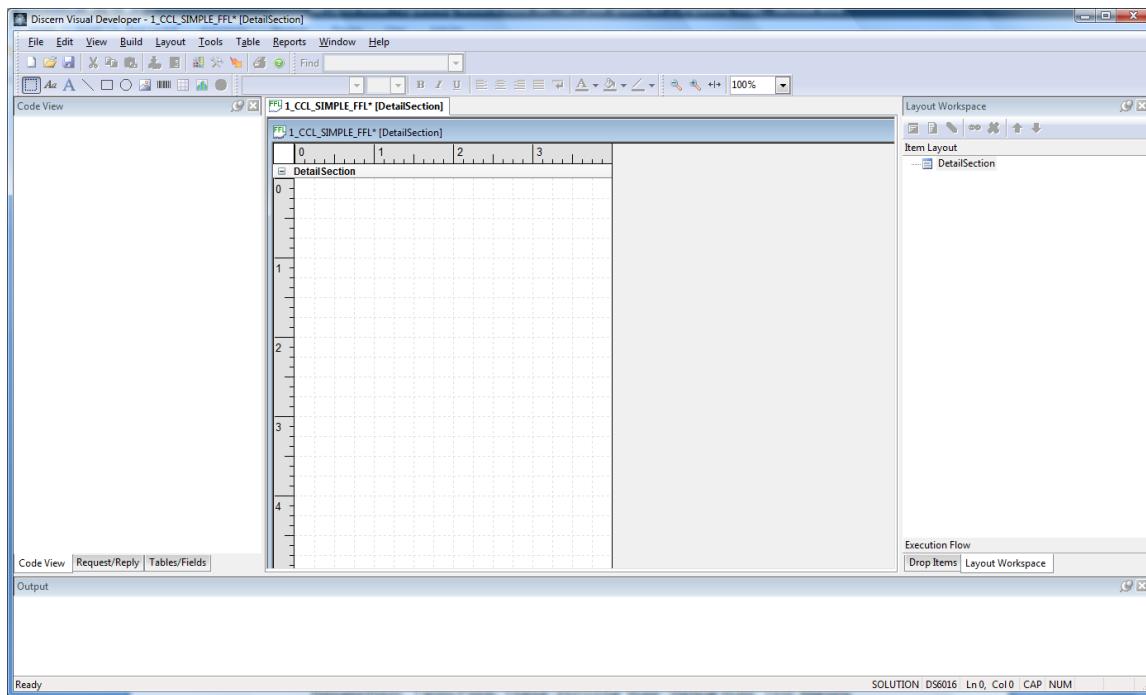


8. Select the Labels tab and set the Label Height to 5 and the Label Width to 4.
9. Verify that Number Across and Number Down both are set to 1. You can expect your Report Properties dialog box to display similar to the following screen:



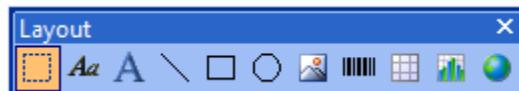


10. Click OK to close the Report Properties dialog box. A layout section named DetailSection is created and displayed similar to the following screen:



If your layout is displayed differently you may want to modify the display using the View menu. For the example above, the following items are selected on the View menu:  
Standard Toolbar, Layout Toolbar, Formatting Toolbar, Zoom Toolbar, Code View, Request/Reply, Tables/Fields, Output, Horizontal Ruler, Vertical Ruler, Grid, Margins, and Section Title Bars.

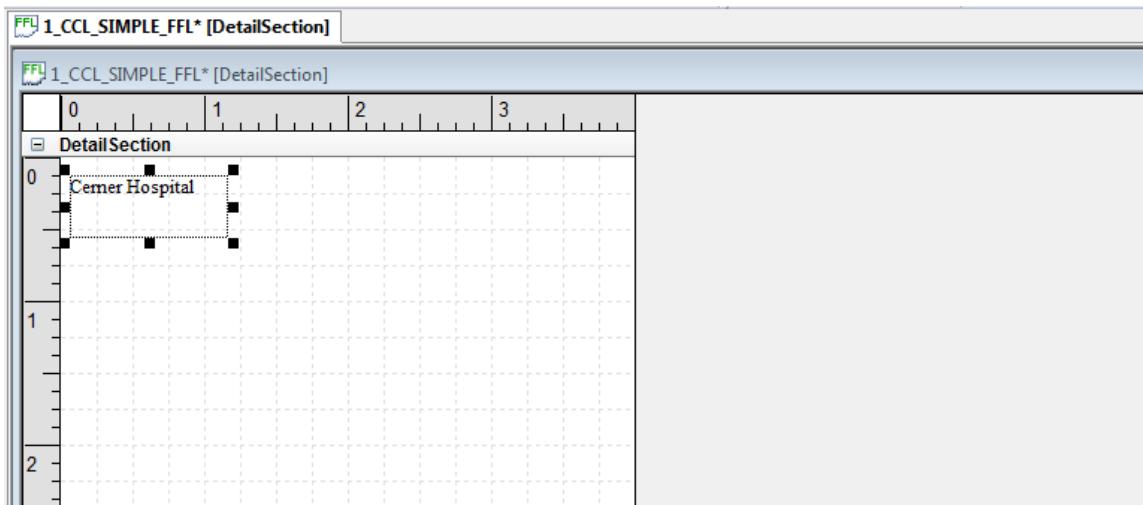
Now that we have the layout section created, we can create our label using the layout tools. The layout tools are on the layout toolbar shown below.



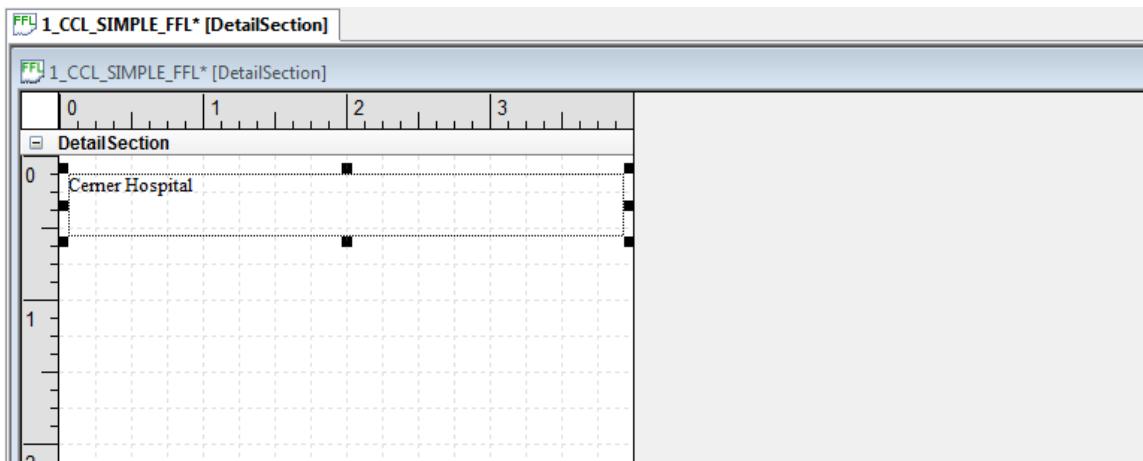
## Label Tool

The Label tool can be used to display static text in a rectangular area within a layout. Within the rectangular area the text can be centered top and bottom, justified, or rotated. The rectangular area can be given a background color or border. The font style, color, size and many other properties can be set. For information regarding text properties, see **Discern Explorer Help (DiscernExplorerHelp.exe) > Discern Visual Developer Help> Discern Layout Builder > Windows and Dialog boxes > Layout Text Properties Dialog box**. The text displayed using the properties that you set in Layout Builder displays in WYSIWYG (what you see is what you get) fashion. However, some differences can exist between what is displayed in the layout and what is printed. These differences are generally the result of the printer not supporting properties that are available in Layout Builder.

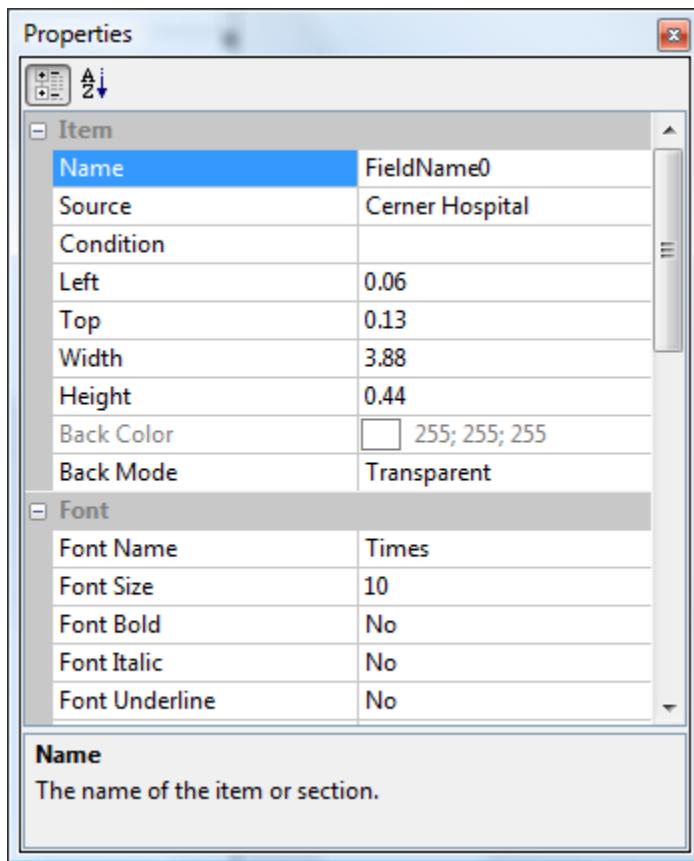
1. Select the Label tool, and then click in the upper left-hand corner of the DetailSection to add an item to the layout. Enter the name of your organization in the Label item.



2. Click and drag the handles on the selected label item to expand the size of the box to cover the top half-inch of the DetailSection.

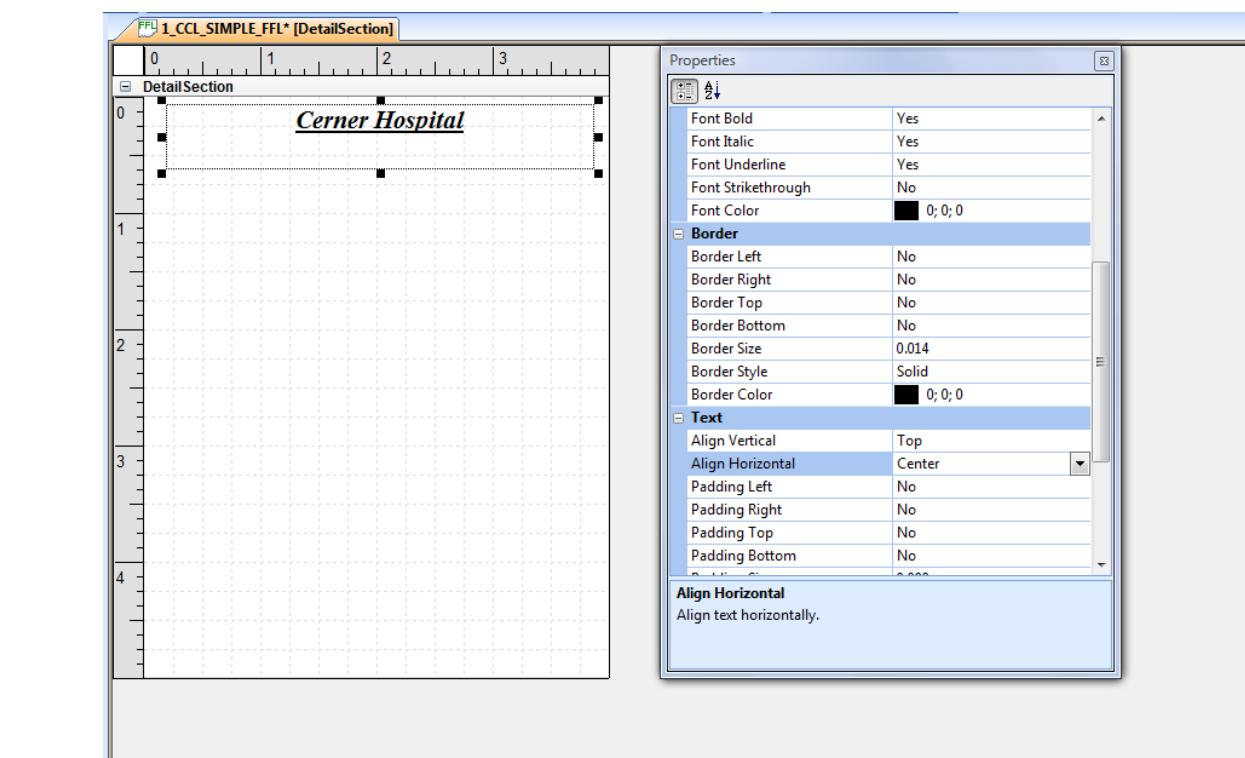


3. Open the Properties dialog box, if it is not already open on the right hand side. If the Properties dialog box is not open, press F4, select View > Properties, or click somewhere on the layout to deselect the label item and then double-click the label item to open the Properties dialog box. The Properties dialog box displayed below is used to set the properties of the label item.



At the bottom of the Properties dialog box, there is a brief description of each item within the box. Selecting the different items listed will change the description on the bottom of the dialogue.

4. Use the Properties dialog box to make the following modifications:
  - Change the font size to 16.
  - Turn on the Bold, Italic and Underline options.
  - Modify the horizontal alignment (Align Horizontal) to center the text within the box.  
Your layout should be similar to the following screen:



Note: Text is rendered within the rectangular box on the layout. If the height of the font exceeds the height of the box, the text is not rendered. To see an example of this, increase the size of the font to a larger number, such as 72. This most likely will cause the name of your organization to no longer be displayed. Text that does not fit within the width of the rectangular box is also clipped. To see an example of clipping, add some additional text to the end of your organization's name. When your text string gets long enough, part of it is no longer displayed.

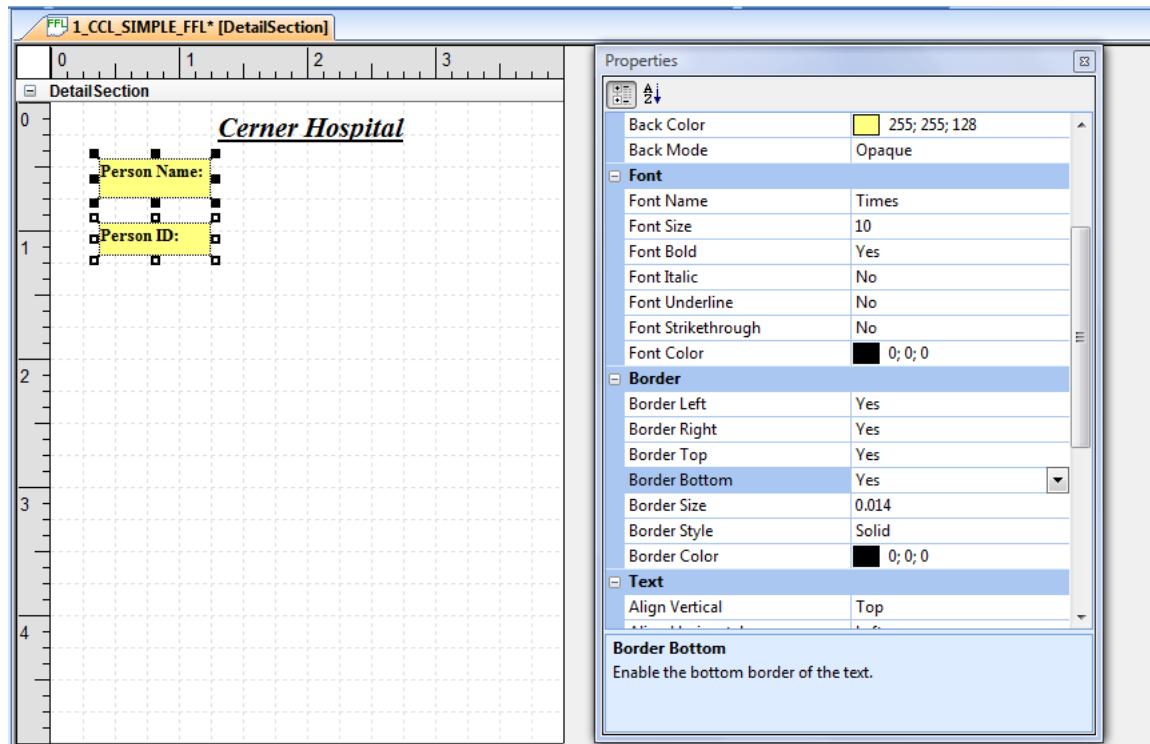
You can modify the properties on multiple items by pressing the CTRL or SHIFT key to select multiple items and select View > Properties or press the F4 key to open the Properties dialog box. Modifications made in the Properties dialog box are applied to all of the selected items.

If you want the text displayed in a shaded or colored background, Layout Builder facilitates this functionality using the Back Mode and Back Color properties.

5. Use the Label tool to add the static text **Person Name:** to your layout. Place this item under your organization name on the left side of the layout.
6. Modify the size of the text area as necessary to ensure all of the text is displayed.
7. Use the Label tool to add the text **Person ID:** to your layout. Place this item under the Person Name item on the left side of the layout.
8. Modify the size of the text area as necessary to ensure all of the text is displayed.
9. Press the CTRL, and select the Person Name and Person ID items.
10. With both items selected, select the Layout from the main menu and then choose the Align>Left menu options to align the left side of the items.

11. With both of the items selected, set the Font Bold option to Yes.
12. Change the Back Mode to Opaque and set the Back Color to a light color.
13. Set Border Left, Border Right, Border Top and Border Bottom options to Yes.

If adding the border causes your text to no longer display, you need to increase the size of your boxes by selecting the item and then using the handles to increase the height of the box. You can expect your layout to be similar to the following screen:



## Text from Prompts, Queries, and System Variables

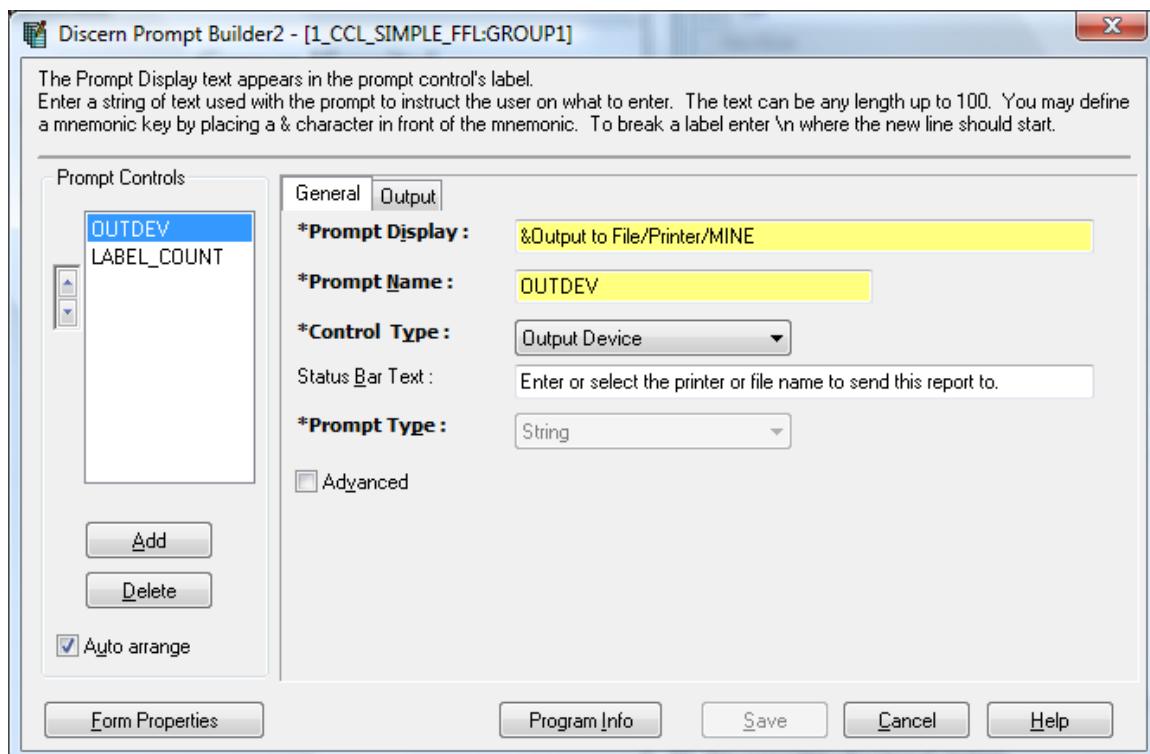
The Text tool  can be used to display information that is entered at a prompt during run time, selected from the *Cerner Millennium* database, or supplied by a *Discern Explorer* variable. Older versions of Layout Builder also use the Text tool to display static text.

### Text from Prompts

Suppose we needed to place a person's name and ID on our layout. This could be accomplished by adding prompts to our program to have the user enter the name and ID, and then display the information they enter on the layout.

You can add prompts to a Free Form Label using the Prompt Builder tool. There is a tutorial that covers the basic functionality of the Prompt Builder tool in the *Discern Explorer Cerner Millennium Support Guide* available on [www.Cerner.com](http://www.Cerner.com). If you are not familiar with using the Prompt Builder, you may want to complete that tutorial. For our purposes we will create a couple of very simple prompts using some minimal functionality of the Prompt Builder.

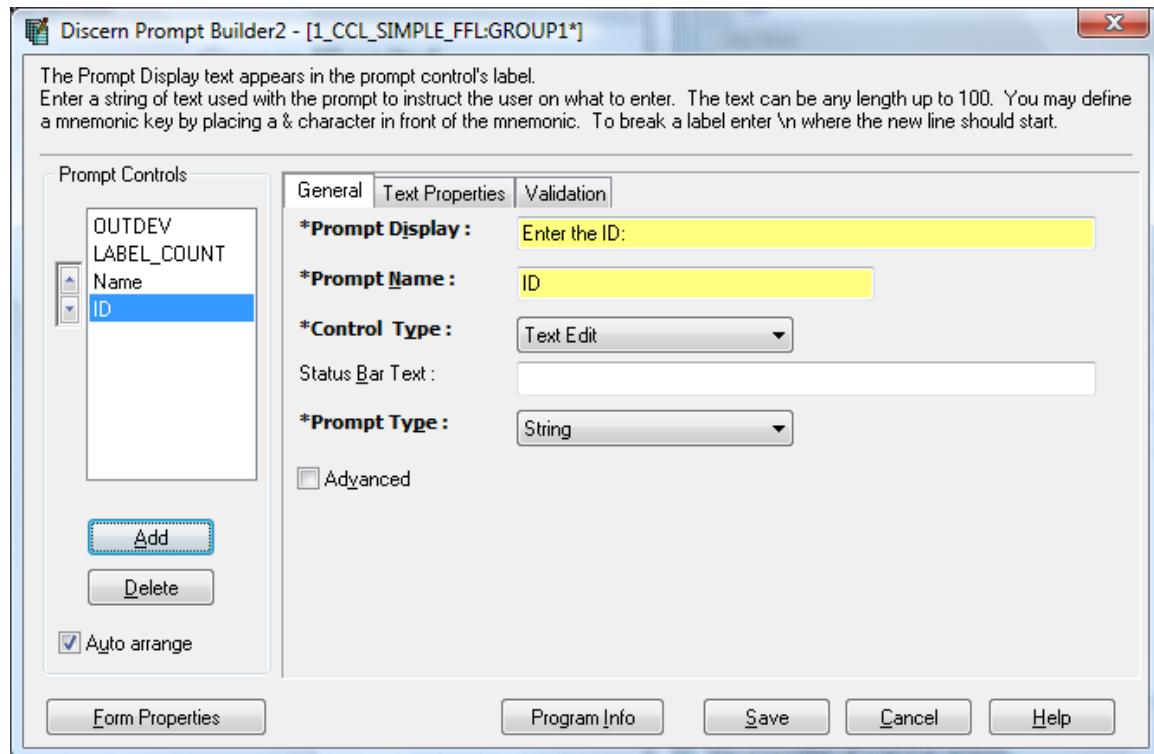
1. Save your Free Form Label program using the Save option on the File menu or by clicking Save from the toolbar.
2. To open the Prompt Builder, either select the Prompt Builder from the Tools menu or click Prompt Builder from the toolbar. The Prompt Builder dialog box is displayed similar to the following example:



Layout Builder creates a prompt for an output device and a prompt for the number of labels to create. We want to add a prompt for the person's name and a prompt for the person's ID.

3. Click Add on the Prompt Builder. A new Prompt Control entitled prompt1 is displayed.
4. Modify prompt1 in the Prompt Display to **Enter the Name**.
5. Modify prompt1 in the Prompt Name: to **Name**.
6. Click Add. The previous prompt1 is changed to Name and a new prompt1 is displayed.
7. Modify the new prompt1 in the Prompt Display to **Enter the ID**.

8. Modify the new prompt1 in the Prompt Name to **ID**. Your Prompt Builder dialog box should be displayed similar to the following example:



9. Click Save to save the Prompt Builder form.

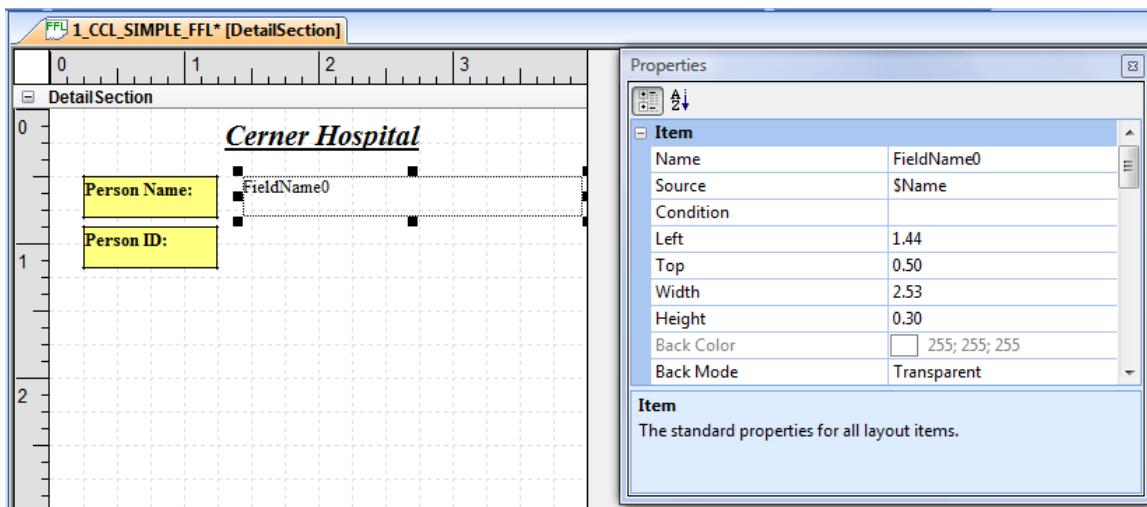
Using the Prompt Builder tool creates a prompt form that is opened when the Free Form Label program is executed. The prompt form assigns the value entered at the name prompt to the symbol \$Name and assigns the value entered at the ID prompt to the symbol \$ID. We can use the text tool to display these values on the layout.

10. Use the text tool  to place a text field to the right of the Person Name:..

11. Use the handles to expand the text field so that it takes up most of the space to the right of the Person Name.

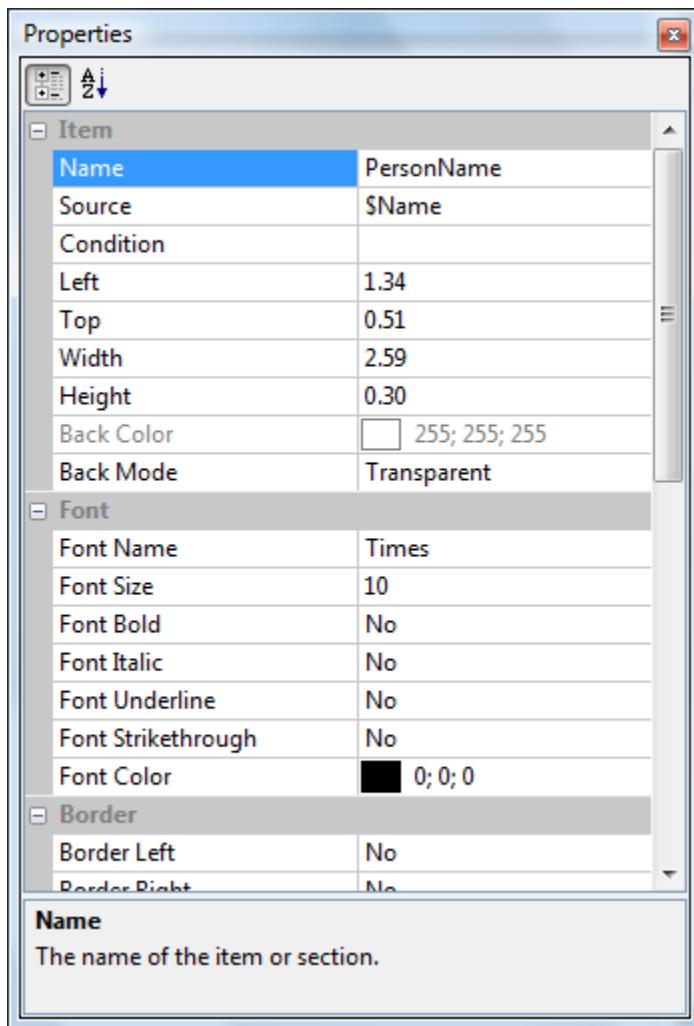
One of the properties listed in the Properties dialog box is Source. This property is used to indicate the value that is to be displayed on the layout. Entering text in quotes will display the literal text on the layout. Any value entered in the Source property that is not embedded in quotes is assumed to be a field name, a prompt value, or a variable.

12. In the Properties dialog box, enter **\$Name** in the Source property. You can expect your layout to be similar to the following screen:

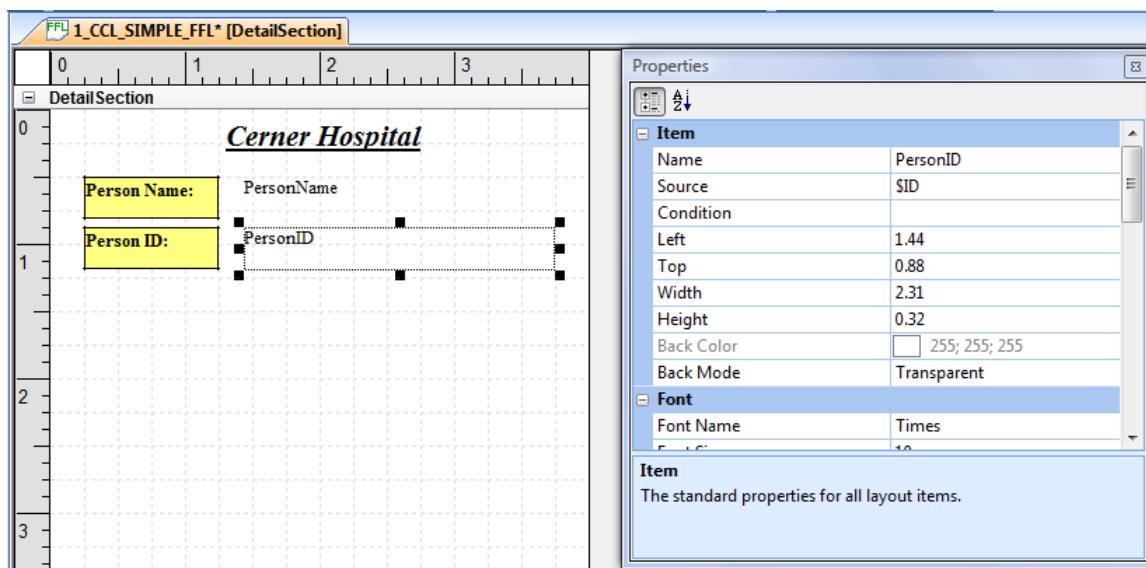


Layout Builder creates generic names for the text fields that you place on the layout. In the example above, Layout Builder named the text field **FieldName0**. Layout Builder could have created a different name for the field you created. If you want a more meaningful name displayed on the layout, you can modify the value of the Name property. This can make working with the layout easier. If the value entered as the Source is enclosed in quotation marks, then Layout Builder uses that value when it names the field.

13. Modify the value of the Name property for the text field you created above to PersonName. Your Text Properties now look similar to the following example:



14. Use the text tool to place a text field to the right of the Person ID:.
15. Use the handles to expand the text field so that it takes up most of the space to the right of the Person ID:.
16. In the Properties dialog box, enter \$ID in the Source property on the Properties dialog box.
17. Modify the value of the Name property for the text field you created above to PersonID. You can expect your layout to be similar to the following example:

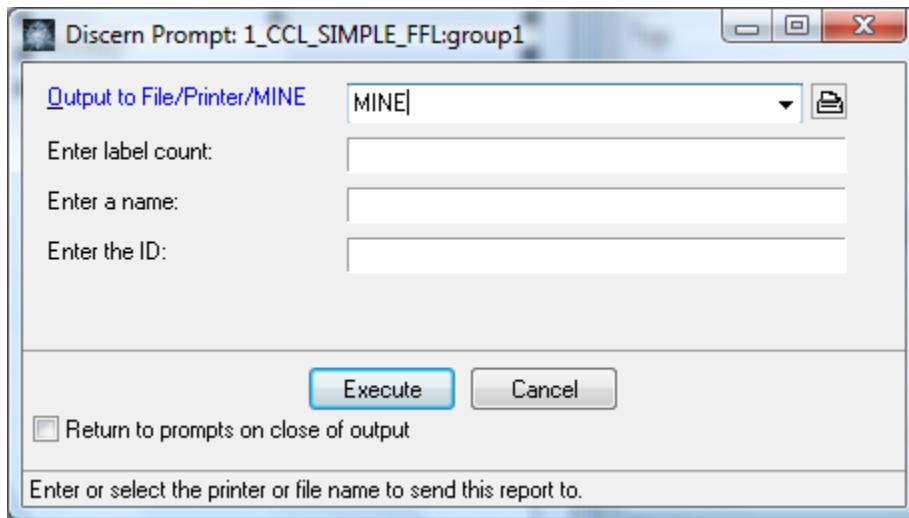


At this point it is a good idea to test the Free Form Label program to see what the output will look like.

18. From the Build menu, select Run "Your\_Free\_Form\_Label" menu or press CTRL+F5 to execute your Free Form Label.

In older versions of Layout Builder select View... from the Task menu to execute the Free Form Label.

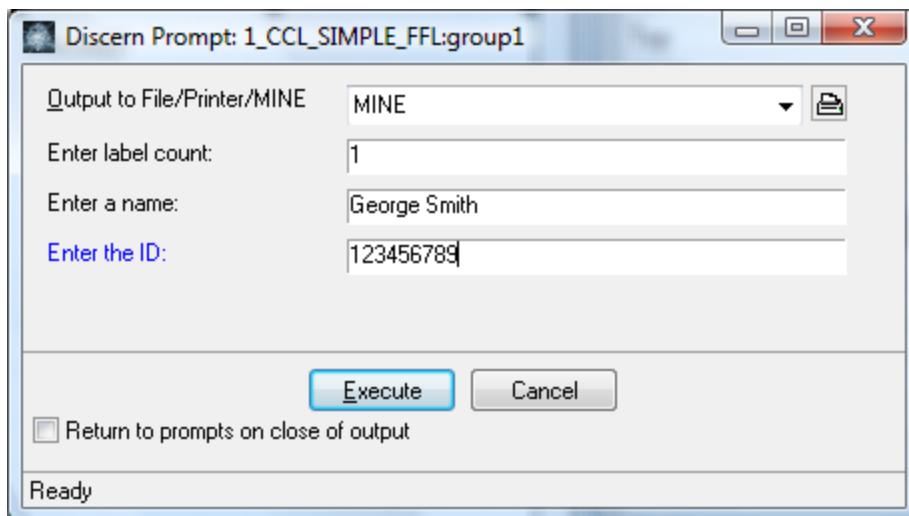
19. Click Yes when prompted to save the layout. A prompt form similar to the following example is displayed:



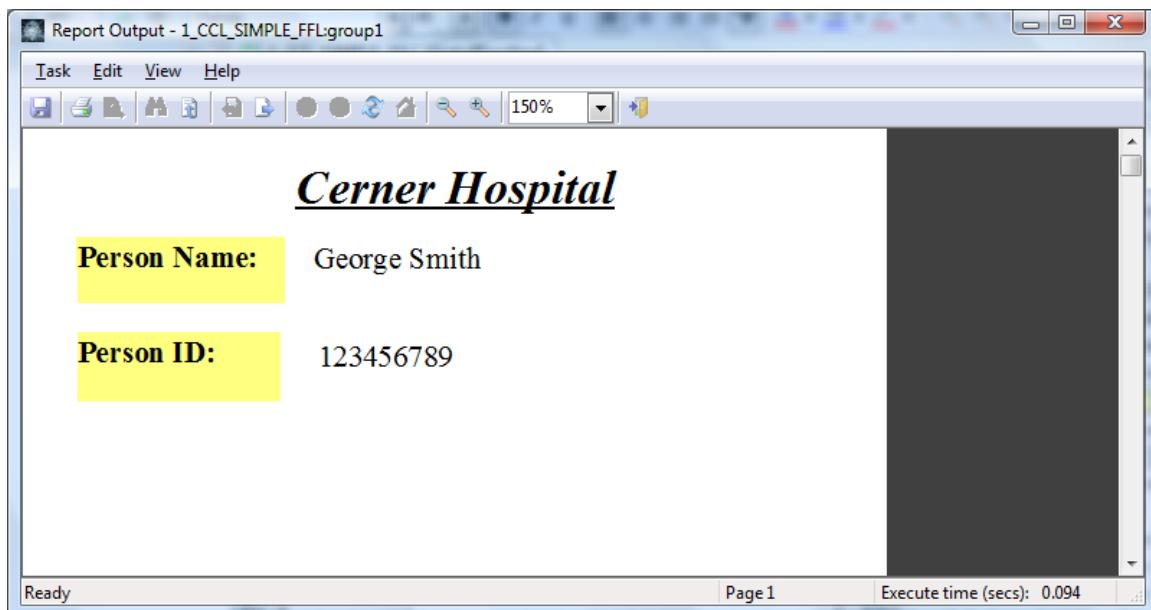
The prompts for output device and label count were created by Layout Builder. You added the prompts for Name and ID above. The label count is used to determine how many copies of the label you want to produce.

20. Accept the default of MINE for the output device.

21. Enter 1 for the Label Count.
22. Enter a person's name in the name prompt.
23. Enter a person ID in the ID prompt (you can use any name and ID that you want).  
Your Prompt form should be similar to the following example:



24. Click Execute to test the Free Form Label program. The program is executed and something similar to the following output should be displayed:



Remember that text is rendered within the rectangular box on the layout. If the height of the box is less than the height of the font, the text will not be rendered. If items are not displayed in your output, you can increase the height of the box by selecting it and then dragging the handles to enlarge it. Text that does not fit within the width of the

rectangular box is clipped. You can click the text field and in the Properties dialog box, set the Ellipsis property to Yes. This will display a set of ellipsis (...) at the end of the clipped text to indicate the text was clipped. The Wrap property can be set to Yes to allow longer text to wrap within the rectangular box. The height of the box must be large enough for at least two lines of text to fit in order for the wrapping to occur. When the Wrap property is set to Yes, the text is wrapped within the size of the box. Text that does not fit within the box is clipped. The Grow property can be set to Yes to expand the box vertically down the page instead of clipping the text.

25. Close the output window to return to Layout Builder.
26. Before moving on to the next section, open the Prompt Builder and delete the prompts for Name and ID you added above. Also, delete the prompt for Label\_Count.

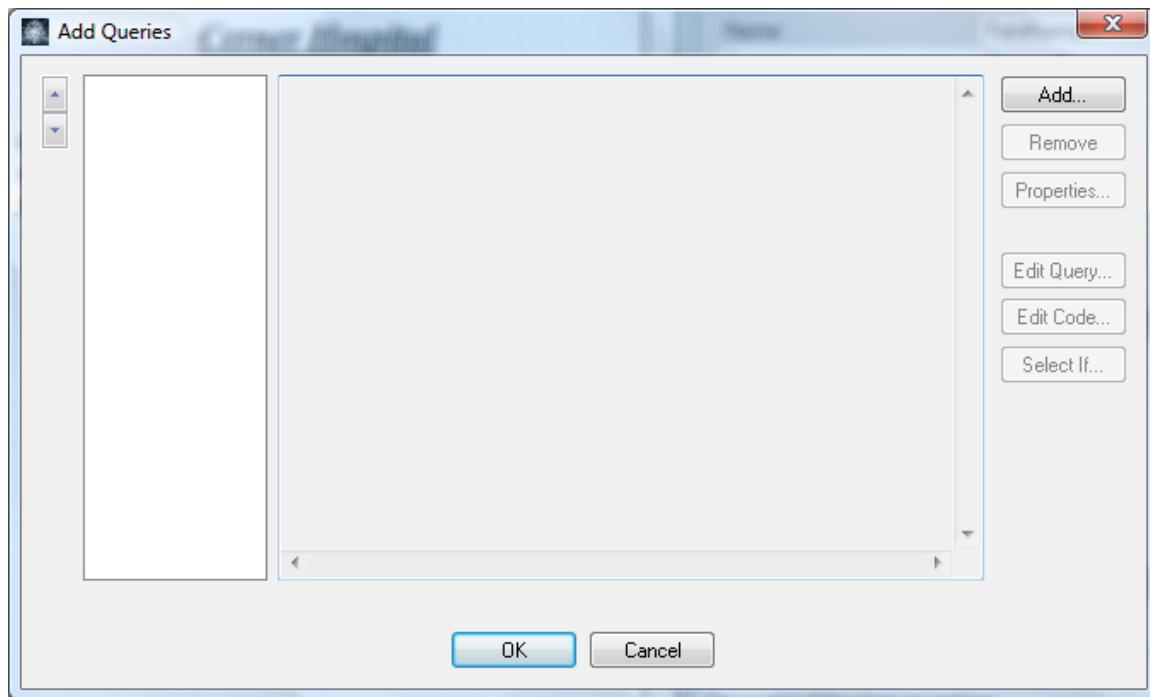
Layout Builder creates a prompt for an output device and a prompt for the label count when you create a new Free Form Label. The prompt for the output device is required. The prompt for label count can be used to print multiple copies of a label. In the next section we will create and associate a query with the Free Form Label. When a query is associated with a Free Form Label the prompt for label count is ignored and one label is created for each row that is returned by the query.

27. Click Save to save the modifications to the prompts and close the Prompt Builder.

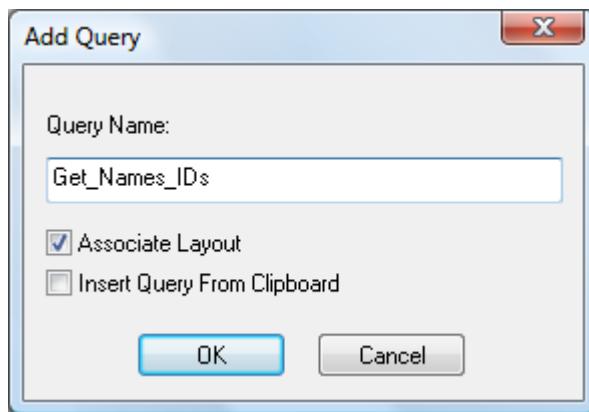
## Text from Queries

The text tool  can be used to display text that is selected by a query on the Cerner Millennium database. Query Builder can be used to associate a query with a layout. Instead of entering a name and ID at the prompt, we want to modify our layout to display names and IDs selected from the Person table.

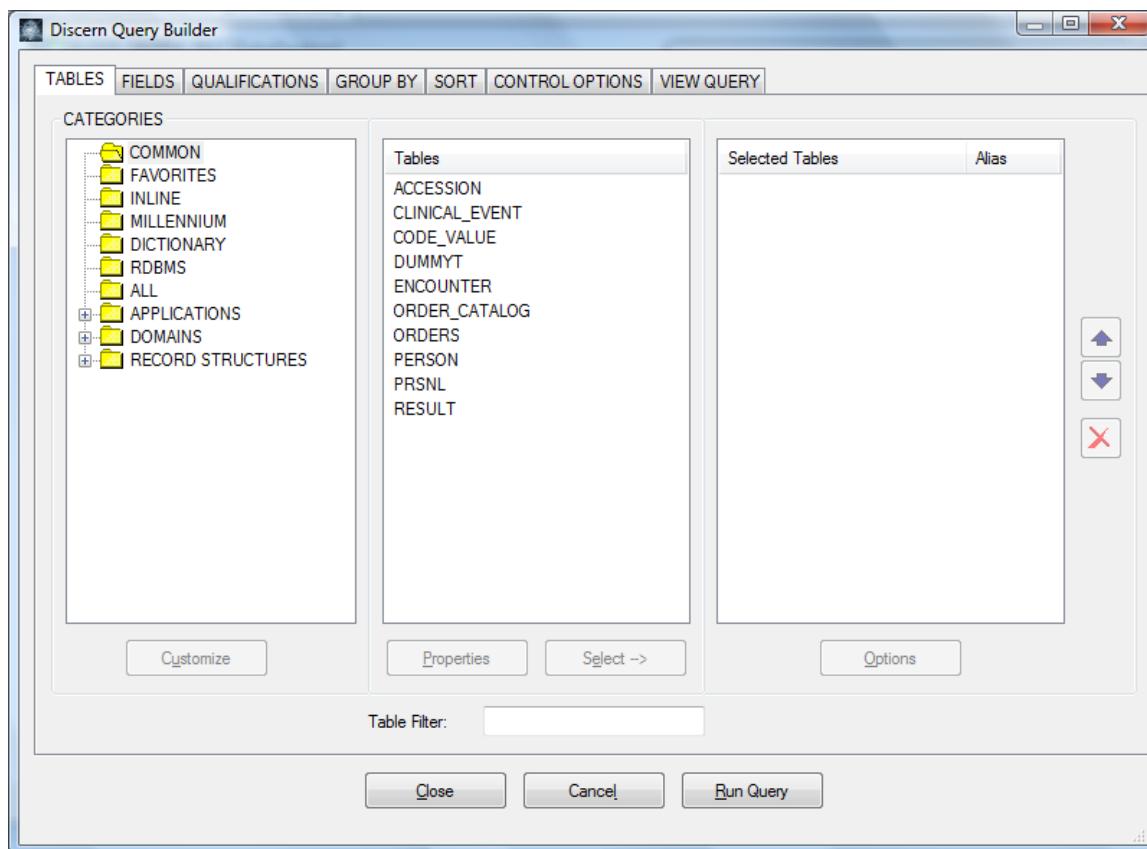
1. From the Tools menu, select Query Builder. The Add Query dialog box is displayed.



2. Click Add to add a new query.
3. Name your query **Get\_Names\_IDs**.
4. Note that the Associate Layout option is selected by default, which associates the new query with the layout. The Add Query dialog box is displayed similar to the following example:



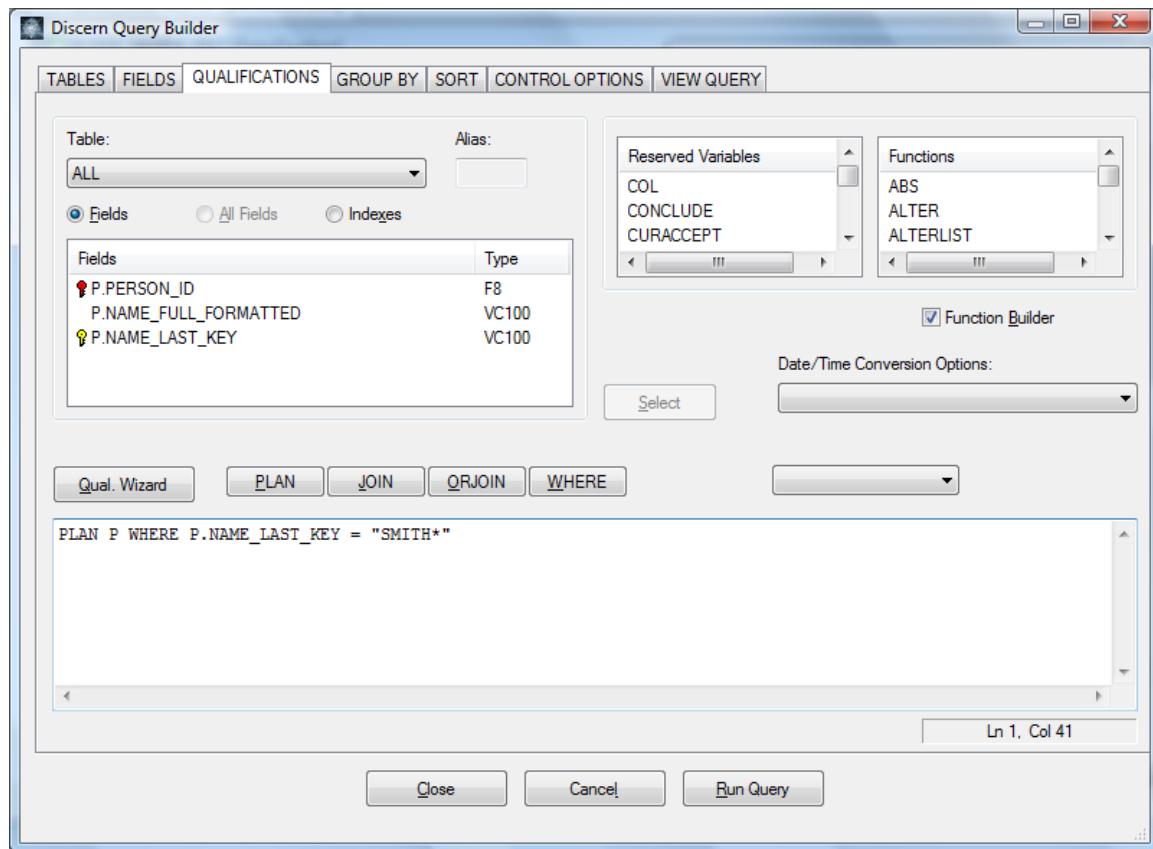
5. Click OK to add the new query to the Free Form Label program. The Discern Query Builder dialog box is displayed.



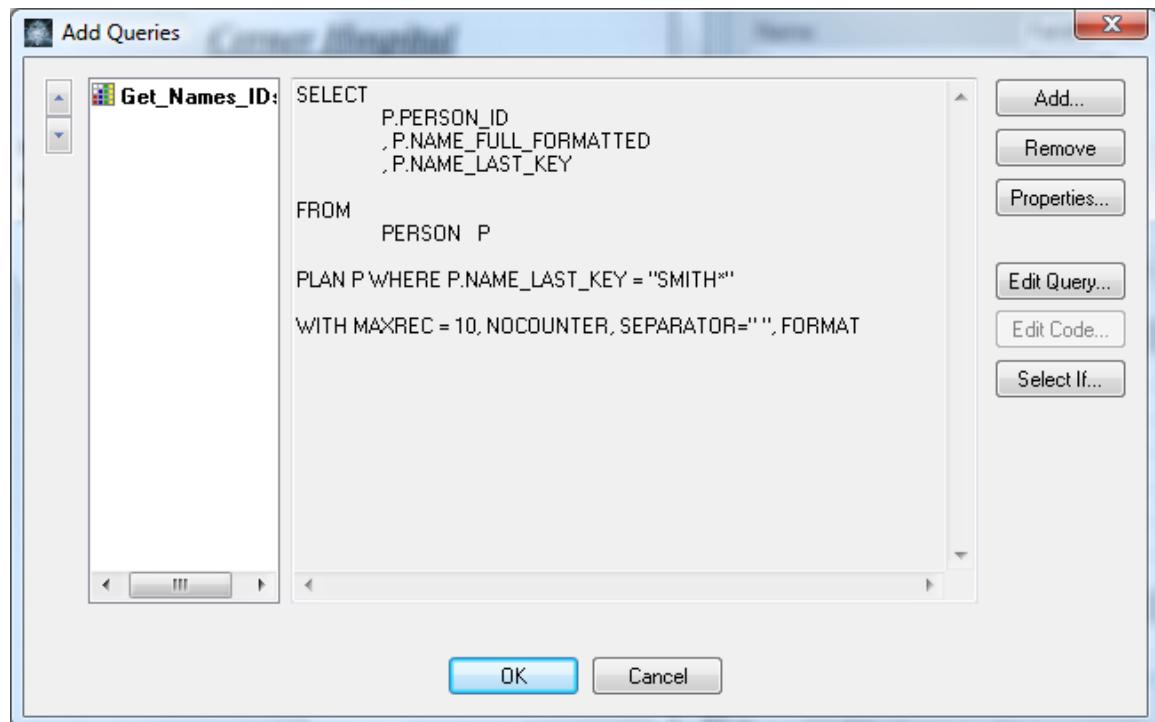
Query Builder is a component that is used in many places within the *Discern Explorer* applications to create select statements. We want to use Query Builder to create a simple select statement that retrieves person names and IDs from the PERSON table.

6. From the Tables tab, select the Common category on the left, and then double-click the PERSON table in the middle to move the PERSON table to the Selected Tables list on the right.
7. From the Fields tab, double-click Person\_ID, Name\_Full\_Formatted and NAME\_LAST\_KEY to move them to the Select Fields tree on the right.
8. On the Control Options tab, enter **10** in Max Records:
9. Enter **PLAN P WHERE P.NAME\_LAST\_KEY = "SMITH\*"** in the Qualifications tab.

The Discern Query Builder dialog box is displayed similar to the following example:



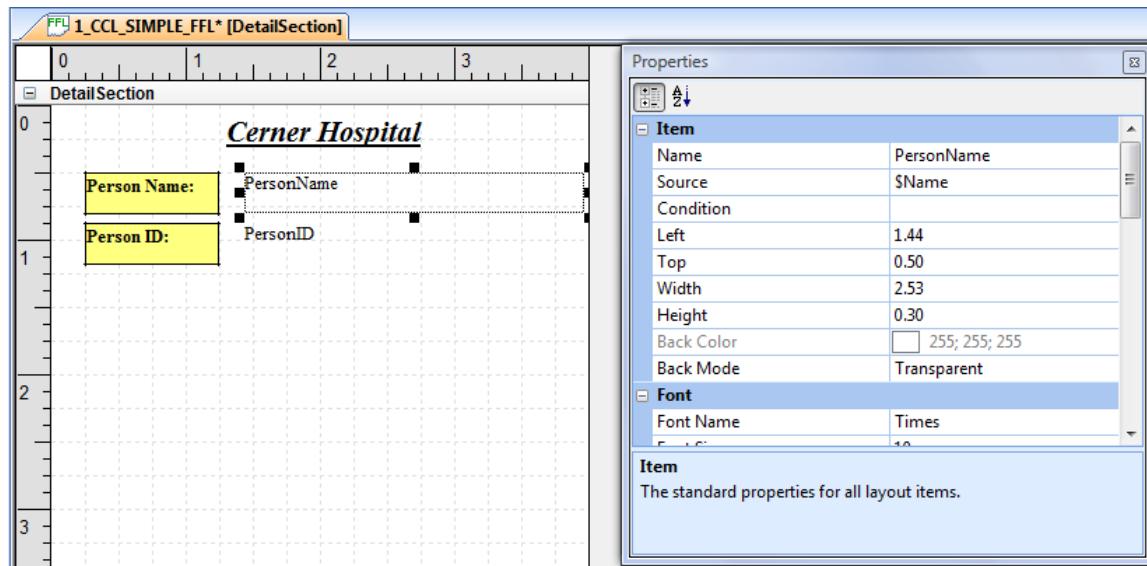
10. Click Close to exit Query Builder. This returns you to the Add Query dialog box:



11. Click OK to close the Add Queries dialog box.

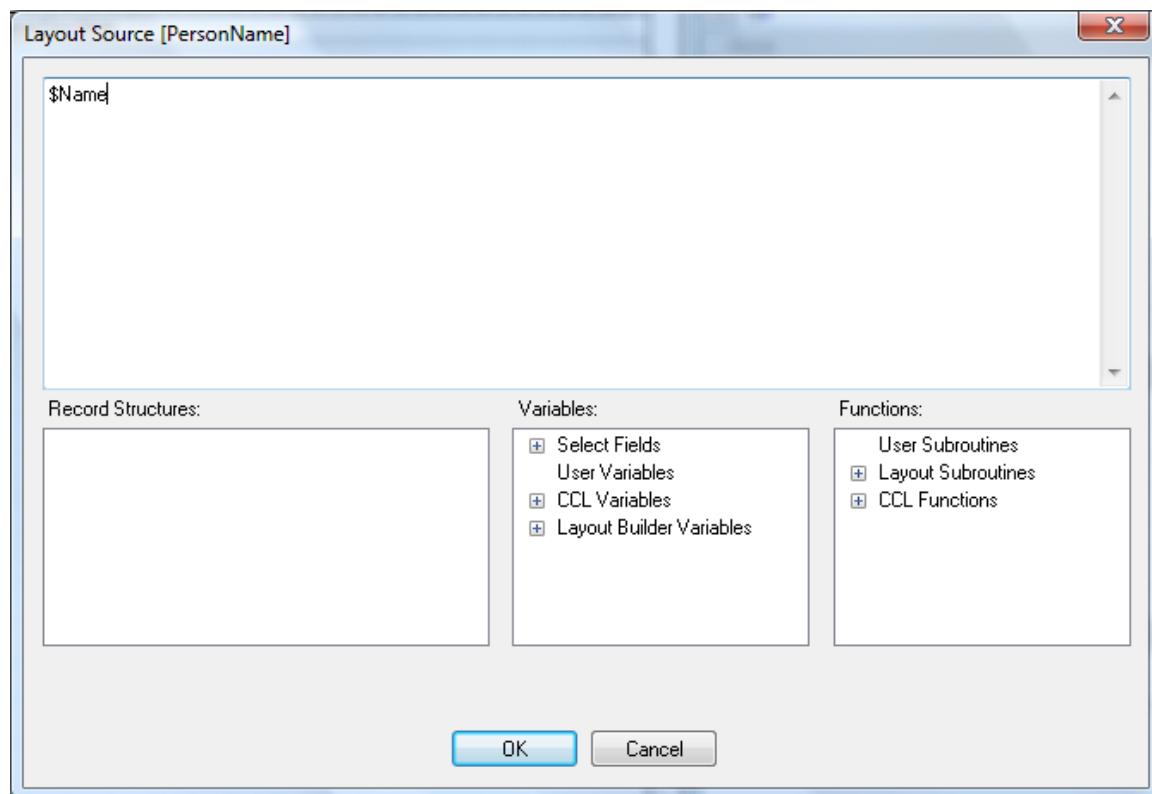
The query that we created using Query Builder will select the name and ID for ten people on the Person table. Since we associated this query with the layout, items from the query can be displayed in the layout using the Text tool. Currently our layout is written to display a name and ID that was entered at the prompts. We now want to modify those text fields on our layout to display the names and IDs that are selected using the query.

12. Click the PersonName field on the layout to display the PersonName information in the Properties dialog box. Your layout should be displayed similar the following example:

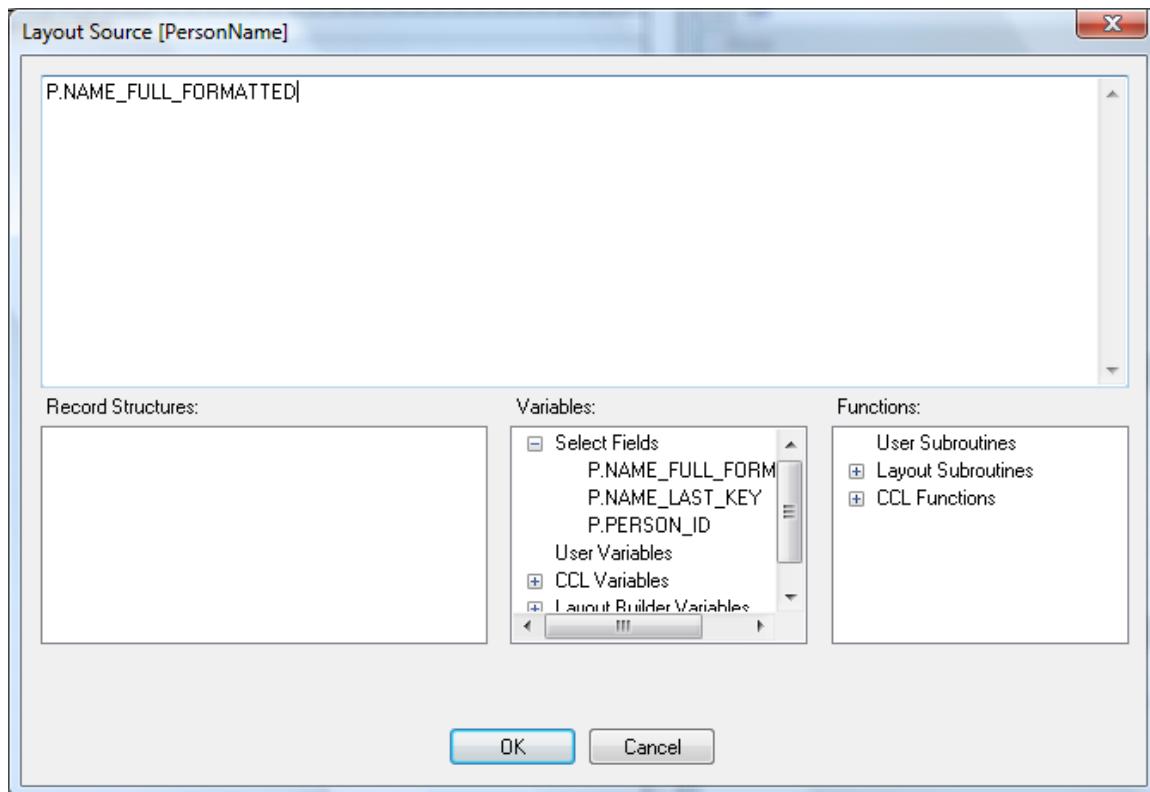


When the Source property on the Properties dialog box is selected, the ellipsis button is activated and you can click the ellipsis button to open the Layout Source dialog box. The Layout Source dialog box is used to reference record structures, variables, fields from selects, functions and subroutines that are available to the layout.

13. Click in the Source property for the PersonName item, and click the ellipsis button to open the Layout Source dialog box. Your Layout Source dialog box should be displayed similar to the following example:



14. Delete the \$Name value.
15. Expand the Select Fields list in the Variables area by clicking in the + sign.
16. Drag the P.Name\_Full\_Formatted field up into the source code area. Your Layout Source dialog box should be displayed similar to the following example:



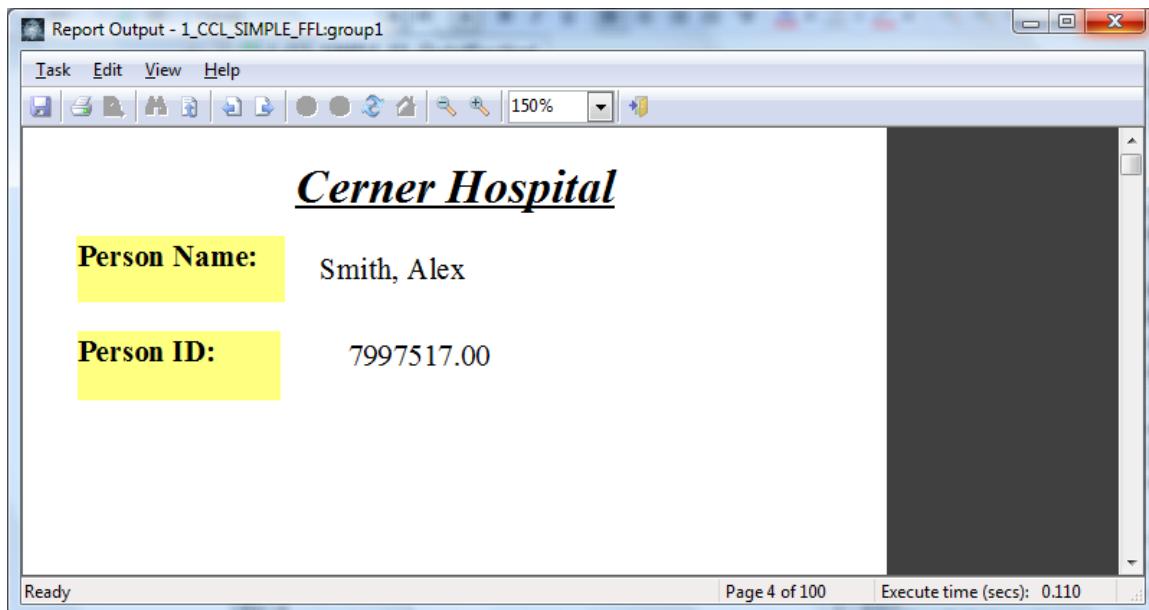
17. Click OK to close the Layout Source dialog box. P.NAME\_FULL\_FORMATTED now is displayed as the Source for the PersonName text item.
18. Select the PersonID item on the layout and modify the Source property to the Person\_ID from the query that is associated with the layout by either entering the table alias and field name (P.Person\_ID) or selecting it from the Select Fields tree on the Layout Source dialog box.

At this point it is a good idea to test the Free Form Label program to see what the output will look like.

19. From the Build menu, select Run "Your\_Free\_Form\_Label" or press CTRL+F5 to execute your Free Form Label.
20. Select Yes when prompted to save the layout. The prompt form is displayed.
21. Accept the default of MINE for the output device.
22. Click Execute to run your Free Form Label.

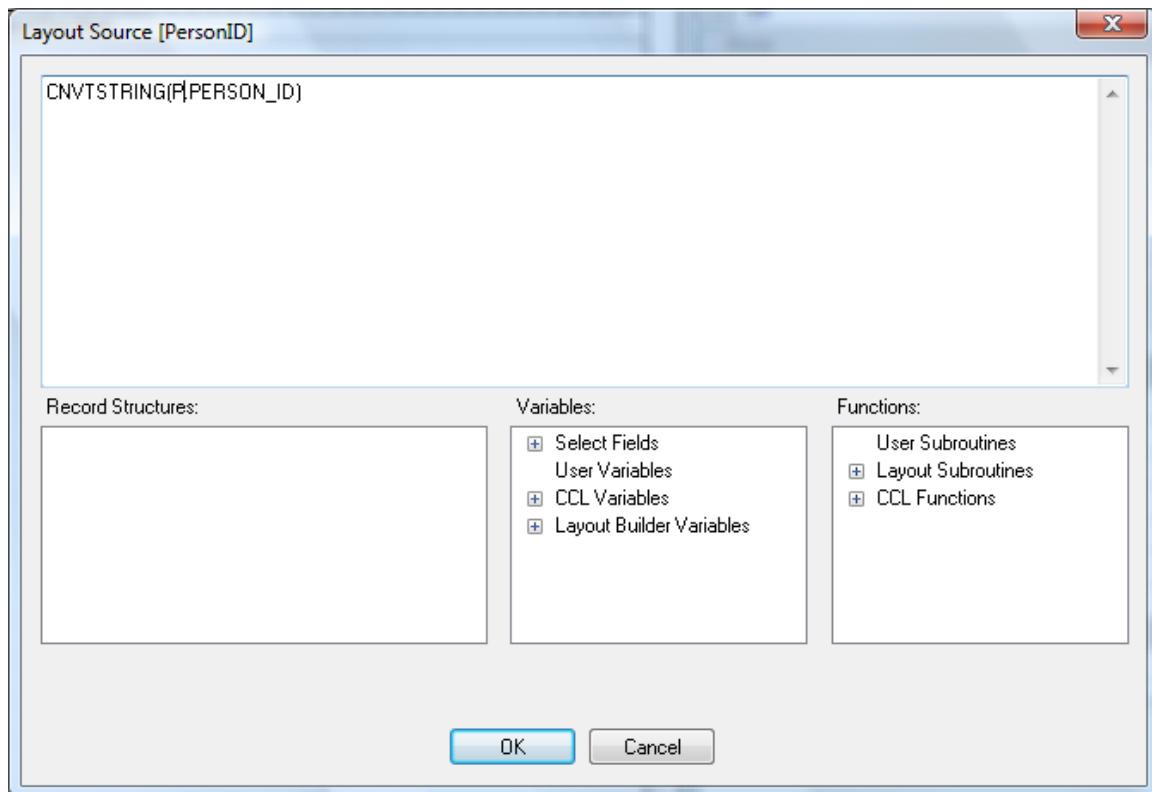
Since a query is now associated with the Free Form Label, one label is created for each row that is returned in the result set of the query. Since your query is using 10 as the Max Records (MaxRec = 10), ten labels are created.

23. Use the Page Down key on your keyboard or click the Next Page button on the Report Output toolbar to scroll through the different labels. The output of your Free Form Label should be displayed similar to the following example:

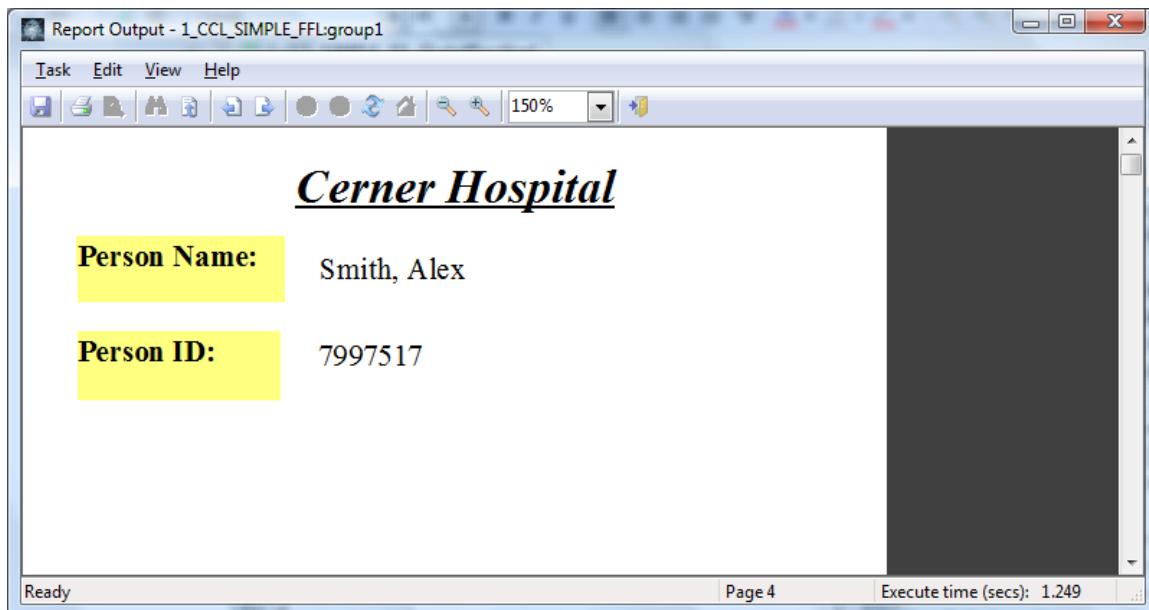


Layout Builder converts non-character data to character data before displaying it in a box. By default character data is left justified. In the example above, the Person\_ID field on the PERSON table is an F8 data type. When Layout Builder converts the Person\_ID to a character data type it retains the default display format for an F8 data type. This results in leading spaces being placed in front of the Person\_ID and the Person\_ID being displayed with two digits to the right of the decimal place. In some cases you will want to remove the leading spaces and decimals to the right of the decimal place. A simple method for doing that is to use the CnvtString() function around the field when setting the Source property.

24. Close the output window to return to Layout Builder.
25. Click the PersonID field on the layout to display the PersonID information in the Properties dialog box.
26. Click in the Source property for the PersonID item, and click the ellipsis button to open the Layout Source dialog box.
27. Place the cursor in front of the P.Person\_ID.
28. Expand the CCL Functions list in the Functions: area by clicking in the + sign.
29. Scroll down and double-click the CNVTSTRING function.
30. Place a closing parenthesis at the end of the P.Person\_ID. You can expect your layout to be similar to the following screen:

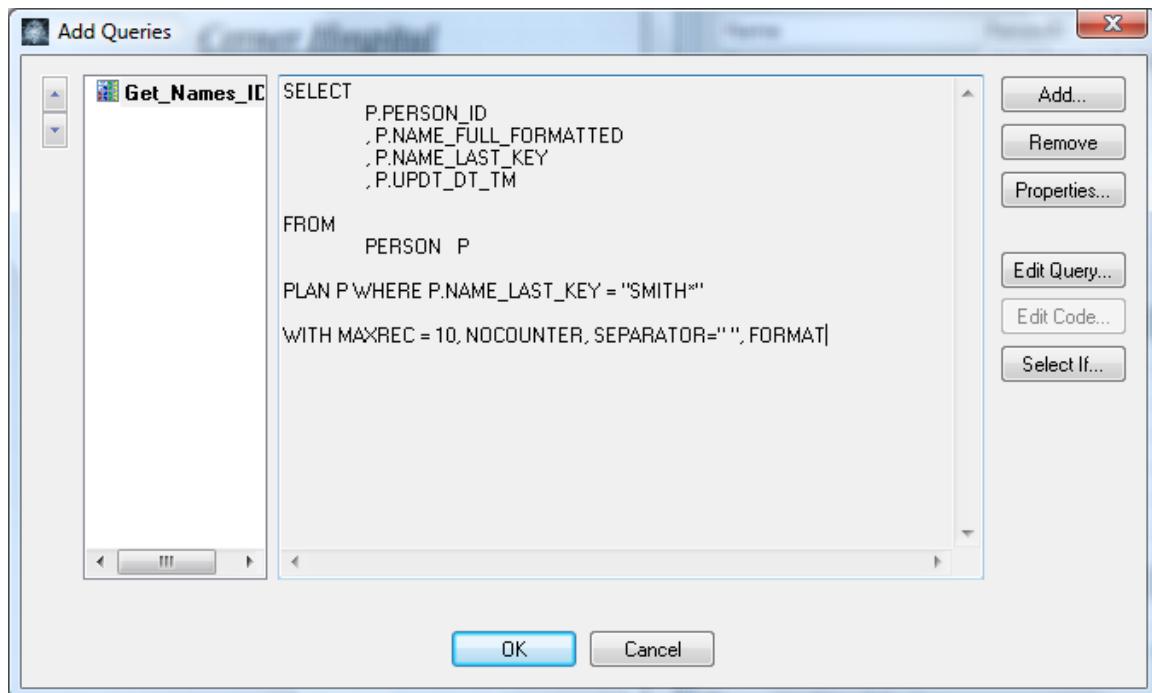


31. Click OK to close the Layout Source dialog box. CNVTSTRING(P.PERSON\_ID) is displayed as the Source for the PersonID item.
32. From the Build menu, select Run "Your\_Free\_Form\_Label" or press CTRL+F5 to execute your Free Form Label.
33. Select Yes when prompted to save the layout. The prompt form is displayed.
34. Accept the default of MINE for the output device.
35. Click Execute to run your Free Form Label. The output of your Free Form Label should be displayed similar to the following example:

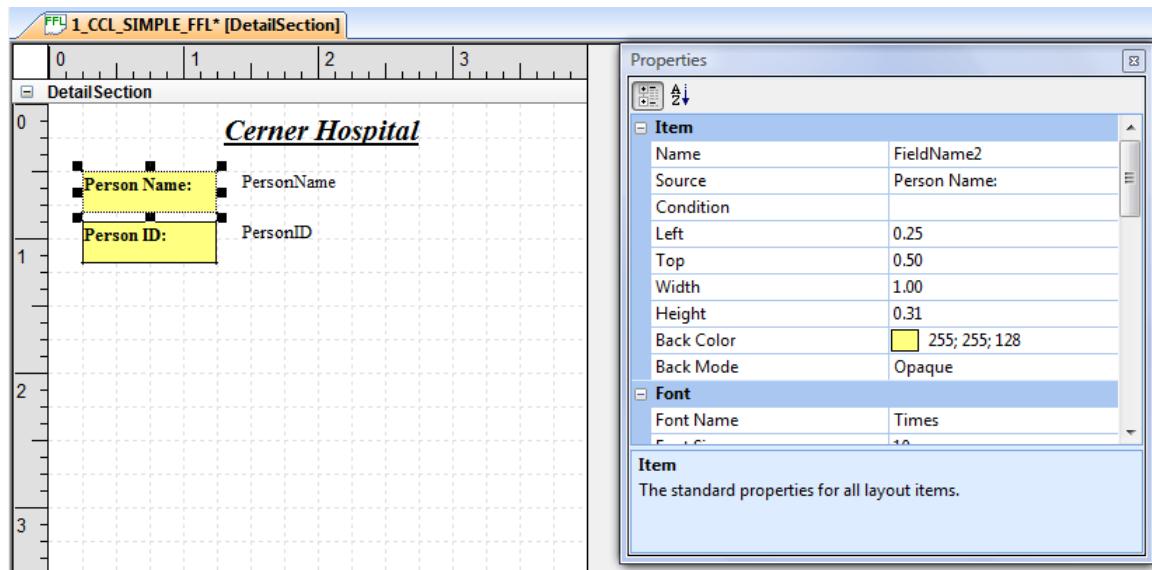


In the examples you completed above, you have modified the source value for a text item to have it display data from a select field instead of data that was entered at a prompt. Data from the query can be used as the initial source value for a text item on a layout as well. For example, if we wanted to add the date and time when the person information was updated, we could add the Uptd\_DT\_TM field from the PERSON table to the query and then have it displayed on the layout.

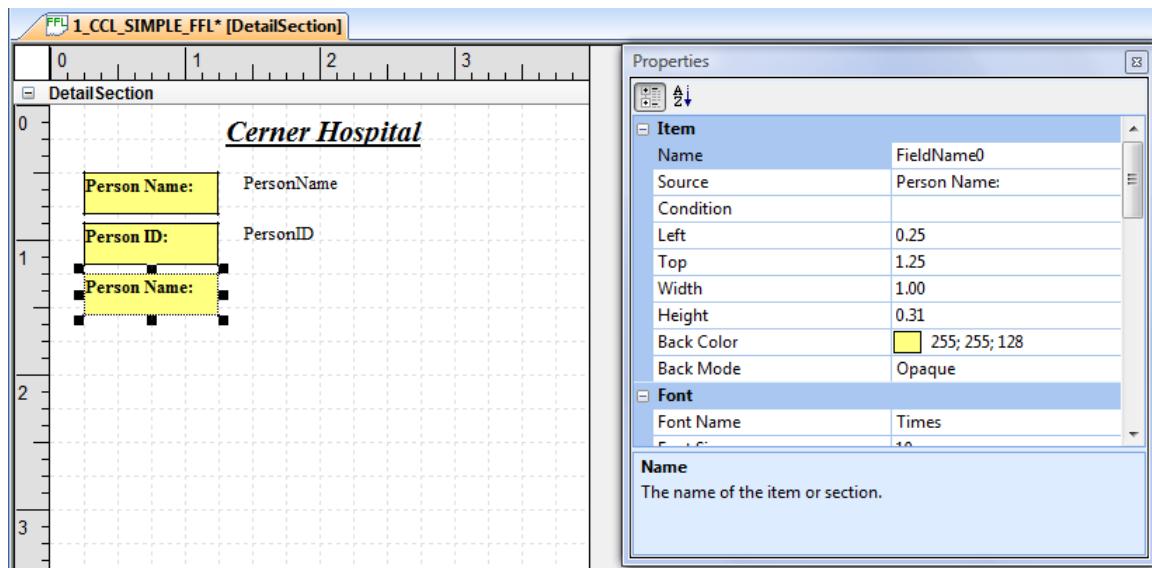
36. Close the output window to return to Layout Builder.
37. From the Tools menu, select Query Builder to open the Add Queries dialog box.
38. Ensure the Get\_Names\_IDs query is selected and click Edit Query to open the Query Builder dialog box.
39. On the Fields tab, double-click the UPDT\_DT\_TM field to add it to the Select Fields tree.
40. Click Close to exit the Query Builder dialog box. You are returned to the Add Queries dialog box. Your query should be displayed similar to the following example:



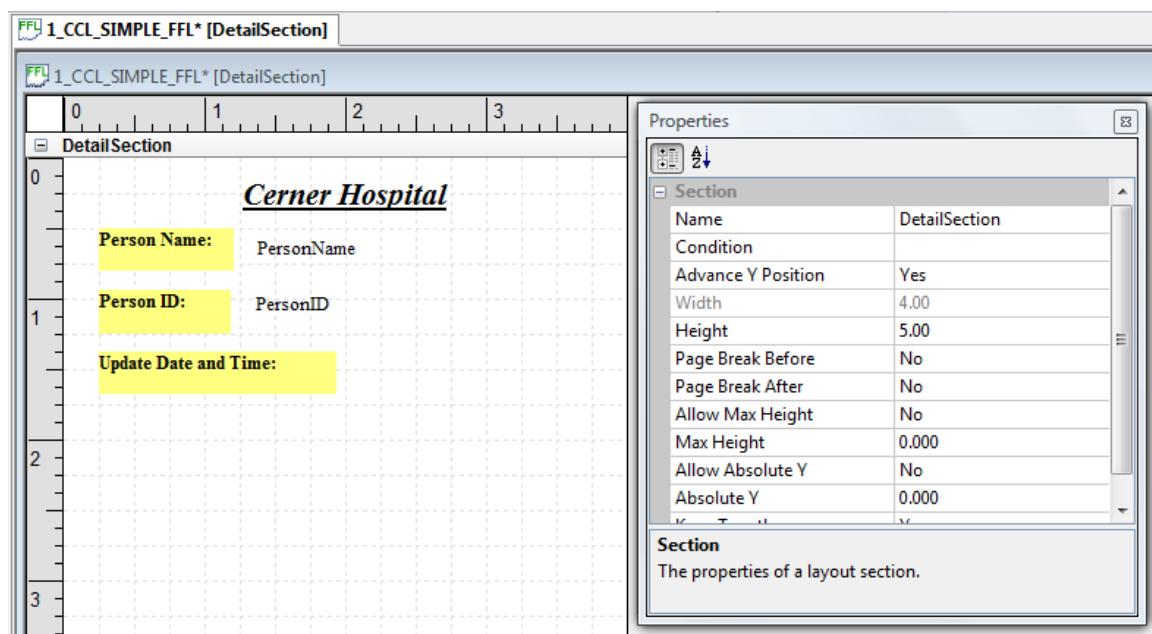
41. Click OK to close the Add Queries dialog box.
42. Click the Person Name: text on the layout to select it. You can expect your layout to be similar to the following screen:



43. Use the Copy and Paste buttons on the toolbar, CTRL+C and CTRL+V, or the Copy and Paste options on the Edit menu to create a copy of the Person Name: text.
44. Drag the copy of the Person Name: text to a location below the Person ID: text. You can expect your layout to be similar to the following screen:

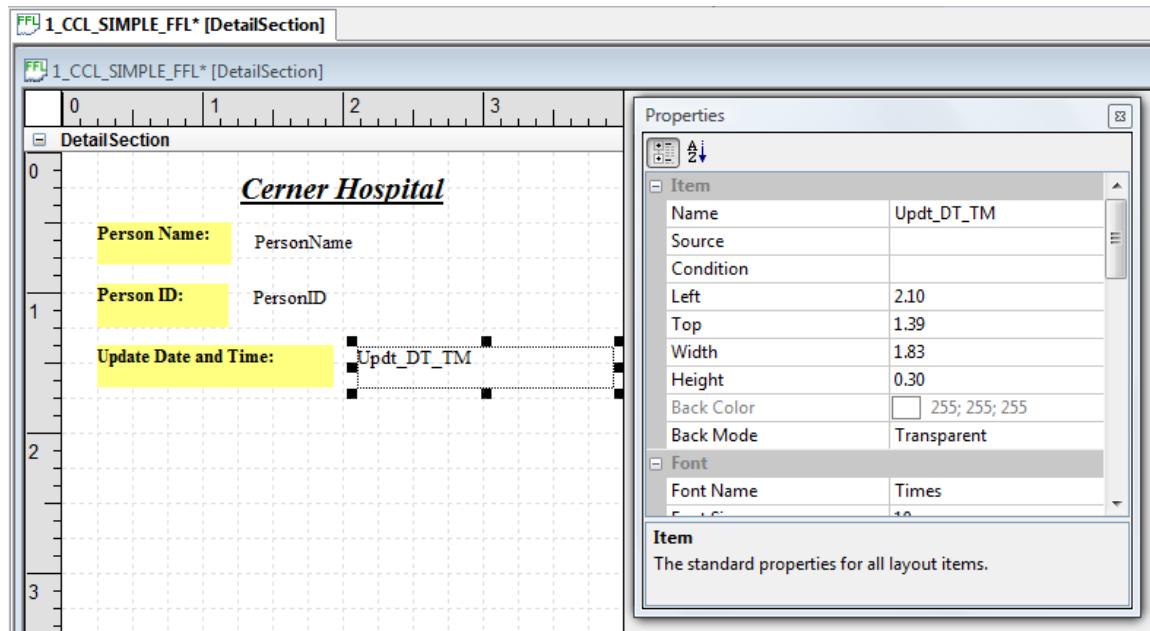


45. In the Properties dialog box, modify the Source from Person Name: to **Update Date and Time:**.
46. Use the handles to make the text item large enough to display all of the text. You can expect your layout to be similar to the following screen:



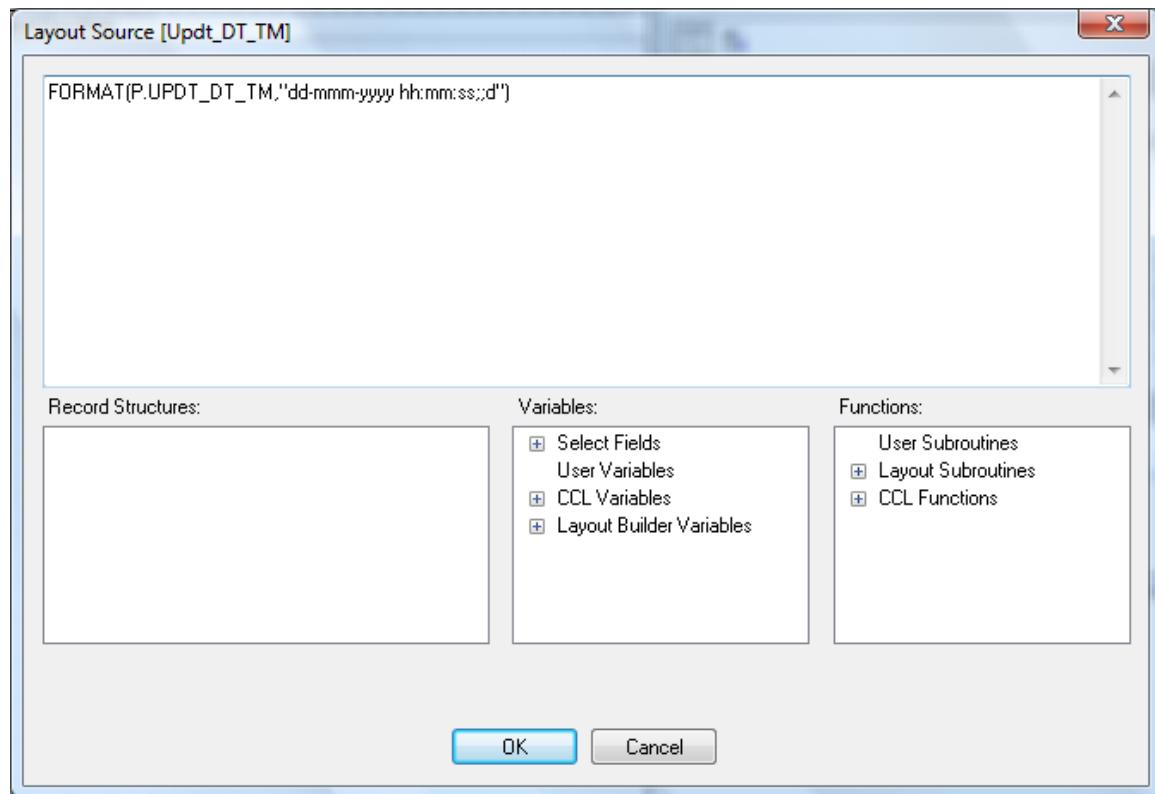
47. Use the Text tool  to place a text field to the right of the Update Date and Time: text that is currently on the layout.

48. Use the handles to expand the text field so that it takes up most of the space to the right of the Update Date and time text that is currently on the layout.
49. In the Properties dialog box, modify the value of the Name property for the text field you created above to Updt\_DT\_TM. You can expect your layout to be similar to the following screen:

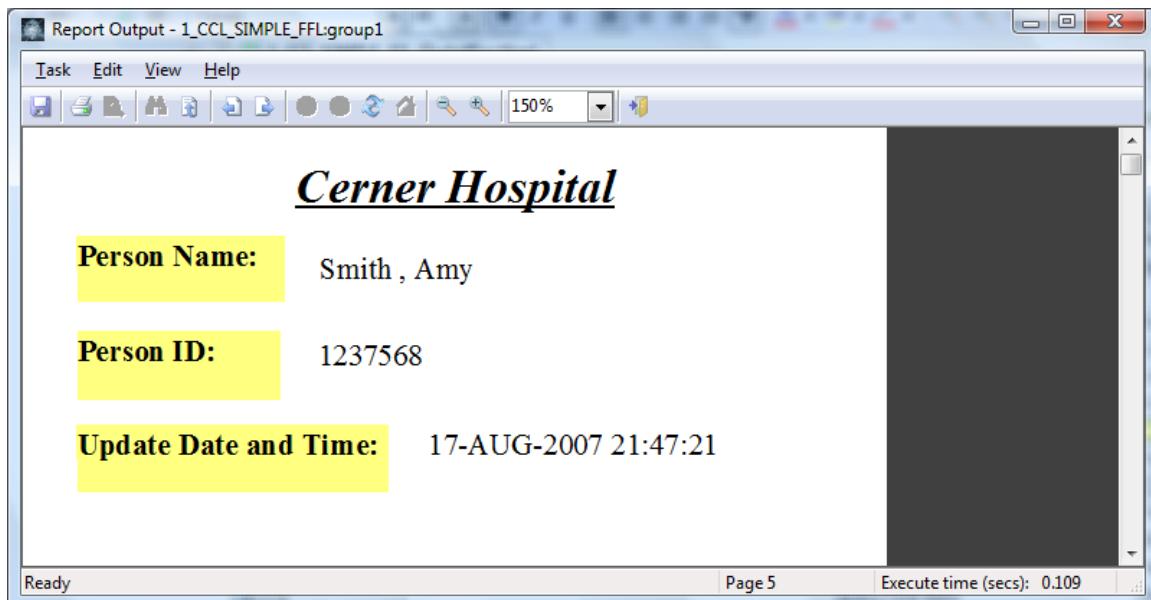


The default format for displaying a date time field is MM/DD/YY. To display both the date and time when the person information was updated, we need to override the default format for a date time field. We can accomplish this by using the format function.

50. Click the Source property and click the ellipsis [...] button to open the Layout Source dialog box for the Updt\_DT\_TM item.
51. Double-click the FORMAT function on the CCL Functions list.
52. Double-click the P.UPDT\_DT\_TM field from the Select Fields tree.
53. Place the cursor at the end of the P.UPDT\_DT\_TM field.
54. Enter a comma and place a display option in quotation marks that you would like to use when the P.Updt\_DT\_TM field is displayed. For example, "**dd-mmm-yyyy hh:mm:ss**" or "@**SHORTDATETIME**". Then enter a closing parenthesis to finish the Format function. Your Layout Source dialog box should be displayed similar to the following example:



55. Click OK to close the Layout Source dialog box.
56. From the Build menu, select Run “Your\_Free\_Form\_Label” or press CTRL+F5 to execute your Free Form Label.
57. Select Yes when prompted to save the layout. The prompt form is displayed.
58. Accept the default of MINE for the output device.
59. Click Execute to run your Free Form Label. The output of your Free Form Label is displayed similar to the following example:



When displaying fields or expressions from the query that is associated with the layout, it is important to know that Layout Builder is using the default display format based on the data type of the item. Display options (field formats) added in the selection list of a query are ignored by Layout Builder. For example, if you had `select p.updt_dt_tm "dd-mmm-yyyy; ;d"` and executed the query, the date would be displayed in dd-mmm-yyyy format. However, if you added `p.updt_dt_tm` to the layout, the display format of dd-mmm-yyyy would be ignored and the default display format for date-time fields of mm/dd/yy would be used. To override the default display format, you can either create an expression in the selection list using the `Format()` function or use the `Format()` function in the Layout Source.

For example, you could use `Updt = format(p.updt_dt_tm, "dd-mmm-yyyy; ;d")` in the selection list of the query and then use `Updt` as the Layout Source or use `p.updt_dt_tm` in the selection list and use `format(p.updt_dt_tm, "dd-mmm-yyyy; ;d")` as the Layout Source.

60. Close the output window to return to Layout Builder.

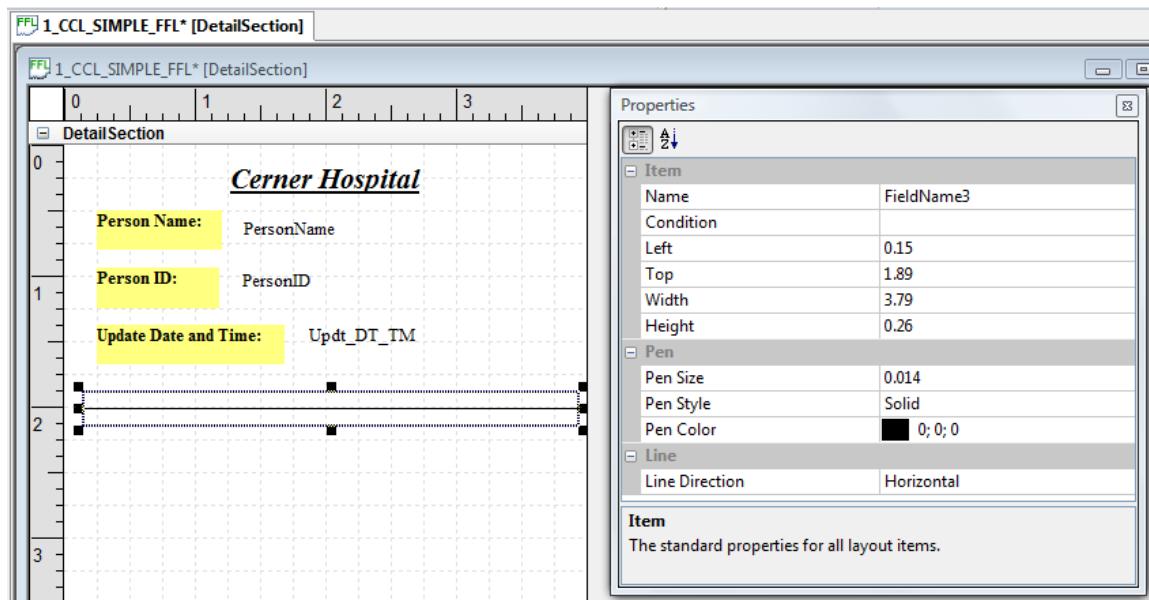
## Drawing Objects



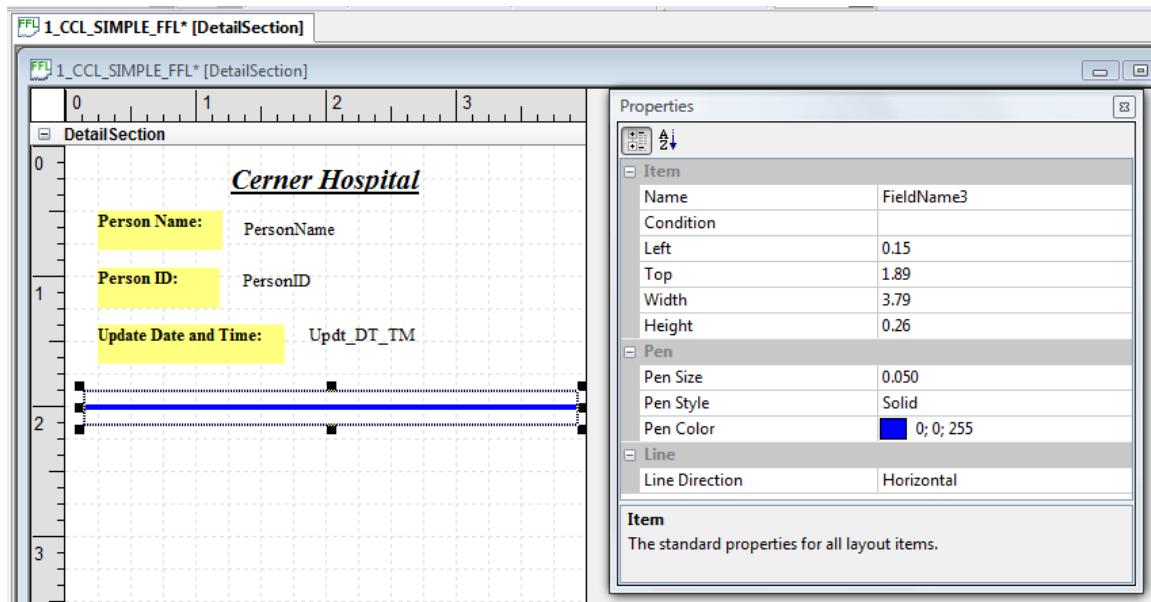
Layout Builder provides tools for drawing Lines, Rectangles, and Ovals. Lines, rectangles, and ovals are displayed within a rectangular area in a layout. The properties of lines, rectangles, and ovals are similar, so these items use similar dialog boxes for setting the properties. For information regarding the properties of lines, rectangles, and ovals, see **Discern Explorer Help (DiscernExplorerHelp.exe) > Discern Visual Developer Help> Discern Layout Builder > Windows and Dialog boxes > Layout Line/Rectangle/Oval Properties Dialog box**.

The drawing objects can be used to enhance the appearance of the output. Suppose we wanted to use a line to divide the layout into two distinct areas. We can accomplish this using the Line tool.

1. Select the Line  tool and click the left side of the layout.
2. Click and drag the handles on the line box to expand the line across the layout. You can expect your layout to be similar to the following screen:

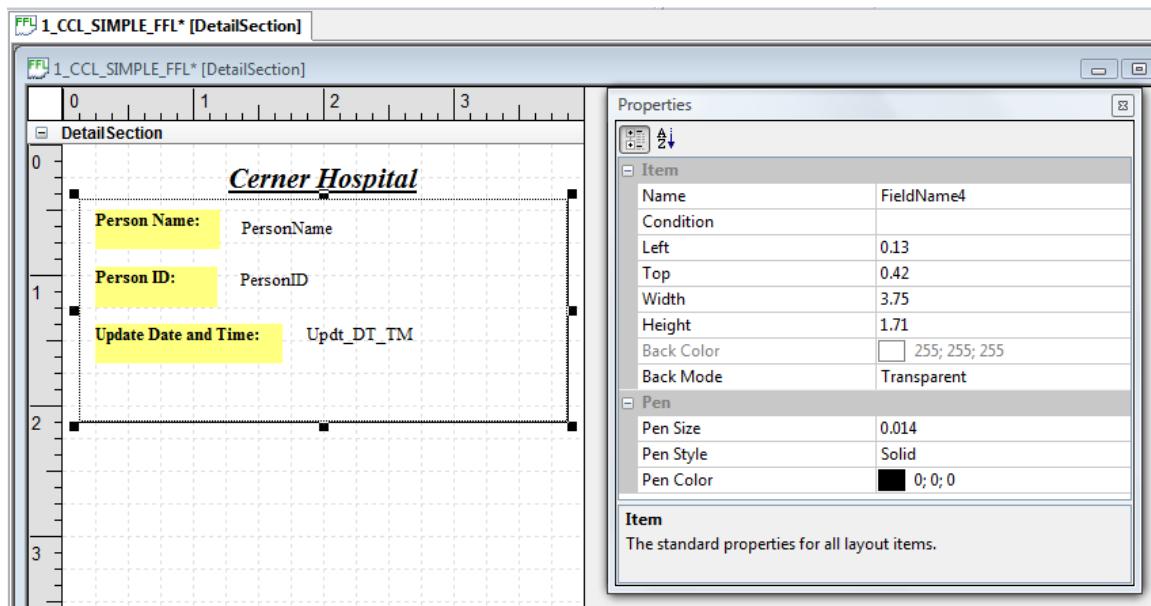


3. In the Properties dialog box, the Pen properties can be used to modify the appearance of the line. The Pen Color is used to modify the color of the line. Pen Size modifies the thickness of the line. Pen Style can be used to modify the line from a solid line to a dashed line. Line Direction can be used to draw a horizontal, vertical, or diagonal line.
4. Modify the Pen Size of the line to **0.05**.
5. Modify the color of the line. You can expect your layout to be similar to the following screen:



Rectangles can be used to draw boxes in a layout. For example, we could draw a box around the Person Name:, Person ID:, and Update Date and Time: items placed on the layout in earlier steps.

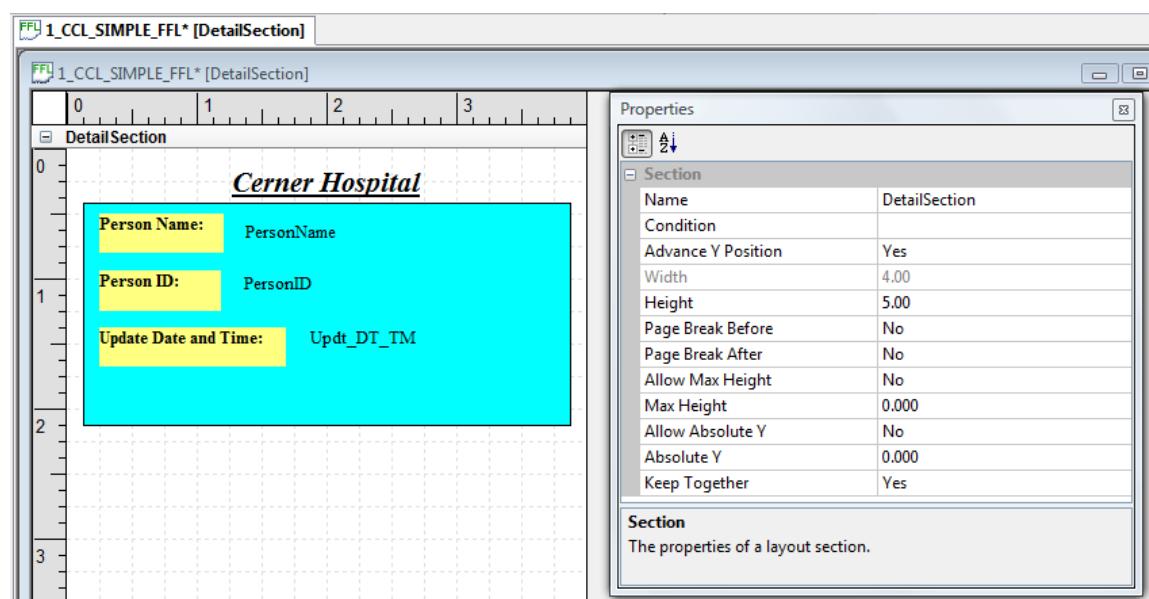
6. Click the line you created in the steps above and use the Delete key to remove it from the layout.
7. Select the Rectangle tool and then click the left side of the layout.
8. Click and drag the handles on the rectangle box to make the rectangle large enough to surround the Person Name:, Person ID:, and Update Date and Time: items on the layout. You can expect your layout to be similar to the following screen:



In the Properties dialog box, the Pen properties can be used to modify the appearance of the rectangles outline. The Pen Color is used to modify the color of the line. Pen Size modifies the thickness of the line. Pen Style can be used to modify the line from a solid line to a dashed line. Back Mode and Back Color can be used to fill the rectangle with a specific color.

9. Modify the Back Mode to Opaque and select a light color for the Back Color. Your rectangle now is filled with the default color. The other items on your layout are hidden behind the rectangle.

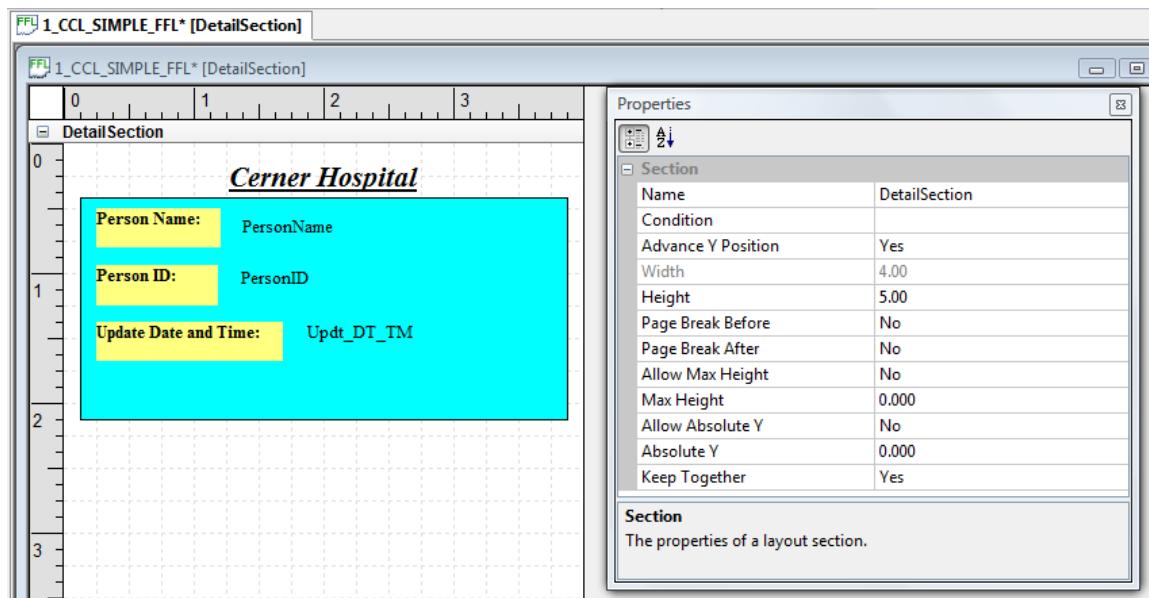
10. Verify your rectangle is selected, and from the Layout menu, select Send To Back. Your layout should now be displayed similar to the following example:



The Oval  tool can be used to draw circles and ovals in a layout. The Oval tool functions just like the Rectangle tool except that it creates circles and ovals instead of rectangles.

11. Experiment with creating and setting the properties of ovals and rectangles.

12. When you are ready to move on, delete the items you created while experimenting to restore your layout to display similar to the following example:

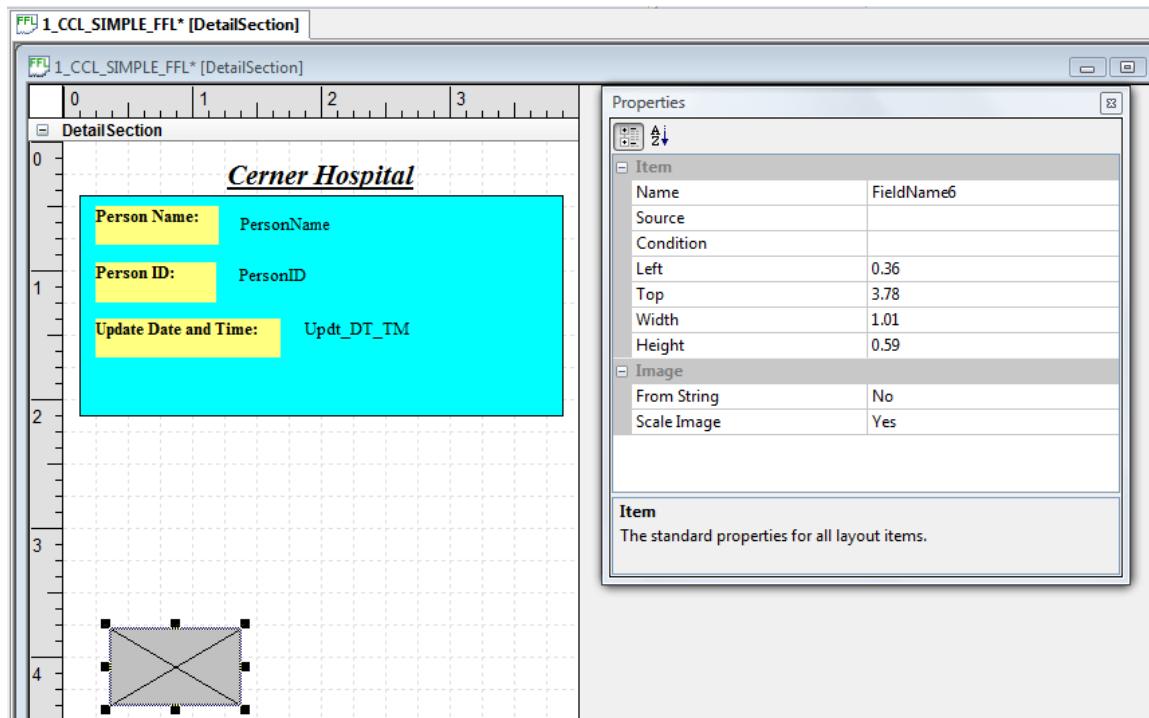


## Graphic Images

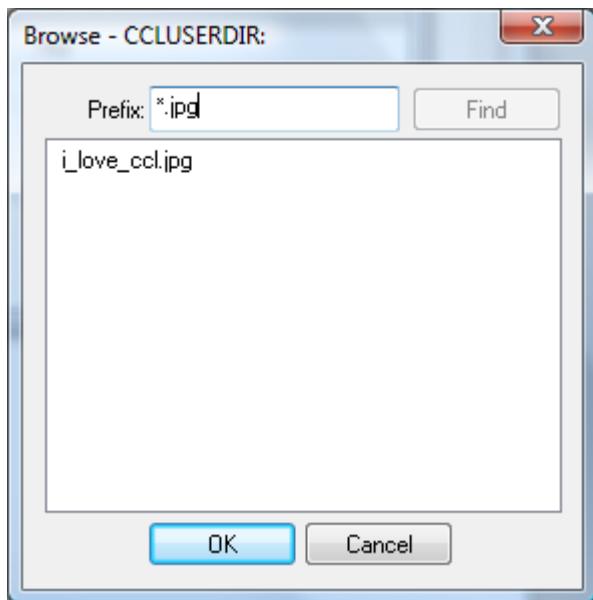
JPEG (.JPG) and Bitmap (.BMP) graphic objects can be placed in layouts using the tool. JPEG and Bitmap files are scaled to the rectangular area designated in Layout Builder for Postscript and .PDF output types. The width of monochrome Bitmap files must be a multiple of 32. Label printers only support monochrome Bitmap files and they will render to the physical bitmap size or scale in multiples of the width or height. Layout Builder does not currently facilitate sizing the image on the layout for label printers. The resolution for the label printers is 203 DPI. The resolution for Postscript and .PDF are 72 DPI (pixel per point). This difference in resolution can cause the size of the image to modify when the printer type is modified. Not all Bitmap format variations are supported and only base JPEG formats are supported.

Image files must exist on the back-end host system and must have read privileges enabled for the world. On multi-node systems that do not share directories the image file must exist on each node in a directory using the same naming structure. Binary FTP must be used to transfer image files to the host. The following examples assume that the image files exist in the CCLUSERDIR: on the host system. For actual production layouts, a standard location like CUST\_SCRIPT:, should be used for the image files. Creation of image files and the use of FTP to place them on the host system is outside the scope of this documentation. However, simple image files can be created using Microsoft® Paint and transferred to the host using a common binary FTP process. The image files referenced in this section were created using this method.

1. Select the Image tool and then click and drag in the lower portion of your layout to create a rectangular area to display an image. You can expect your layout to be similar to the following screen:

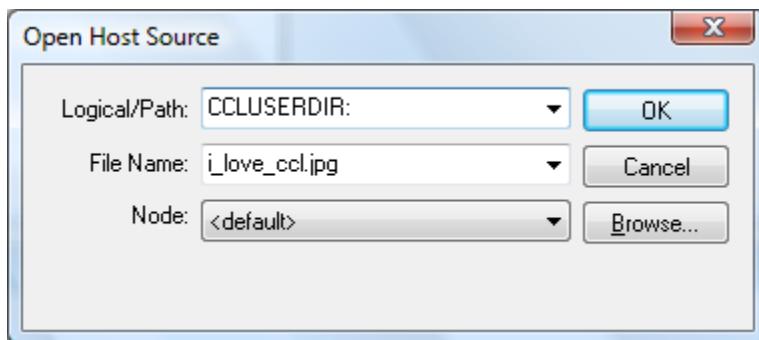


2. In the Properties dialog box, click in the Source property and then click the ellipsis button to open the Open Host Source Dialog box. Browse can be used to check for existing image files on the host.
3. Enter **CCLUSERDIR:** in the Logical/Path field on the Open Host Source dialog box and click Browse....
4. In the Browse dialog box enter \*.JPG in the Prefix field and click Find. Any files with an extension of .JPG that exist in the CCLUSERDIR: are displayed. You can expect your Browse dialog box to be similar to the following screen:

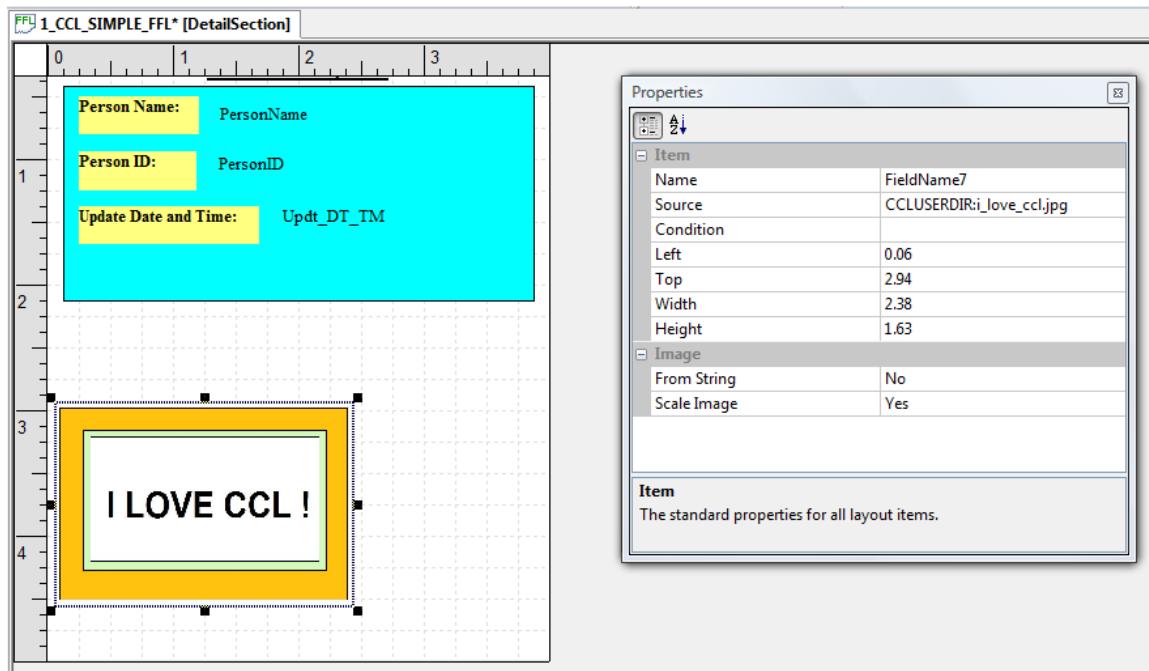


It is highly unlikely that you will have the *i\_love\_ccl.JPG* file in the CCLUSERDIR: on your host. The author created the *i\_love\_ccl.JPG* using Microsoft® Paint and transferred it to the host using a common binary FTP process in order use it for this example. If you do not have any .JPG files in CCLUSERDIR: try looking for .BMP files. You also may want to look in other common directories like CCLSOURCE: and CUST\_SCRIPT: for image files. If you do not have any image files on your host, you need to create and FTP an image file to the host before proceeding.

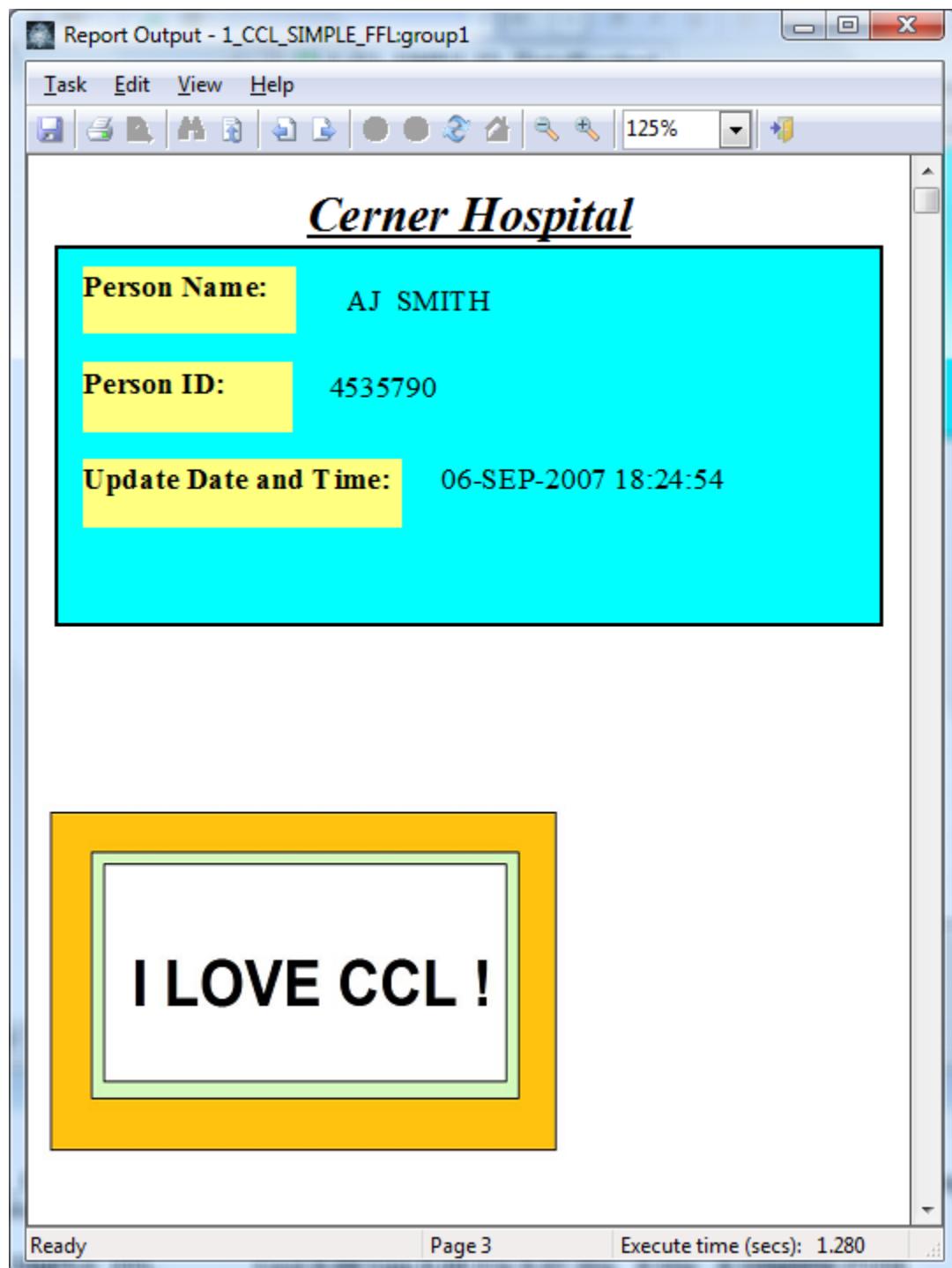
5. Select one of the image files displayed in the Browse dialog box and click OK. The filename now is displayed in the File Name: field on the Open Host Source dialog box.



6. Click OK. Your layout should resemble the following example, except the image file displayed is the one you selected instead of the *i\_love\_ccl.JPG* image.



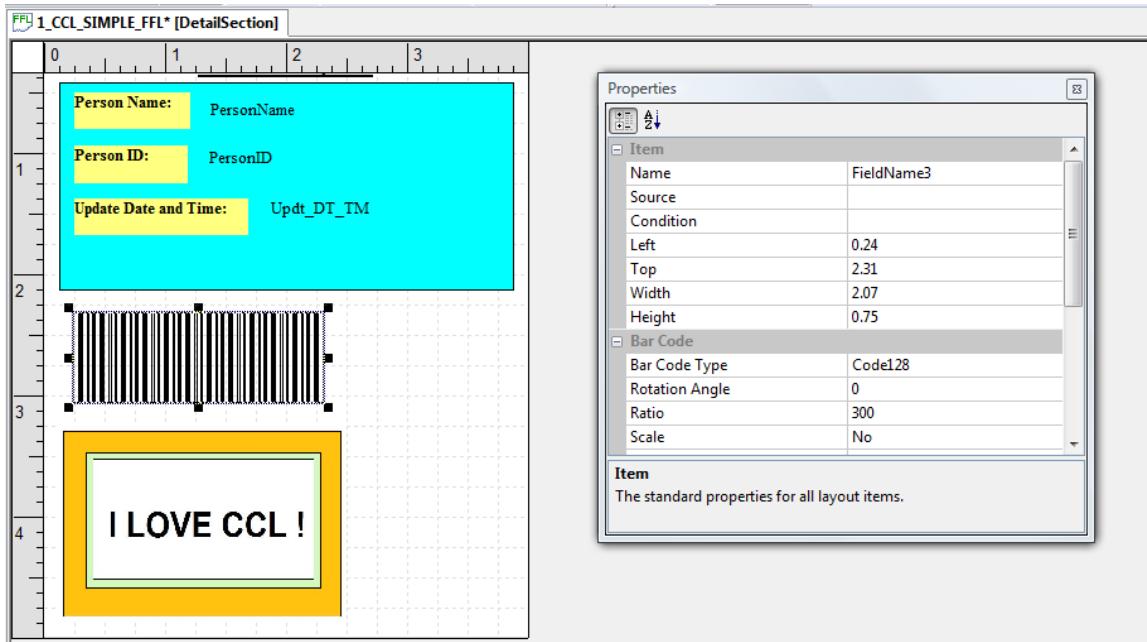
7. From the Build menu, select Run “Your\_Free\_Form\_Label” or press CTRL+F5 to execute your Free Form Label.
8. Select Yes when prompted to save the layout. The prompt form is displayed.
9. Accept the default of MINE for the output device.
10. Click Execute to run your Free Form Label. The output of your Free Form Label should be displayed similar to the following example:



## Barcodes

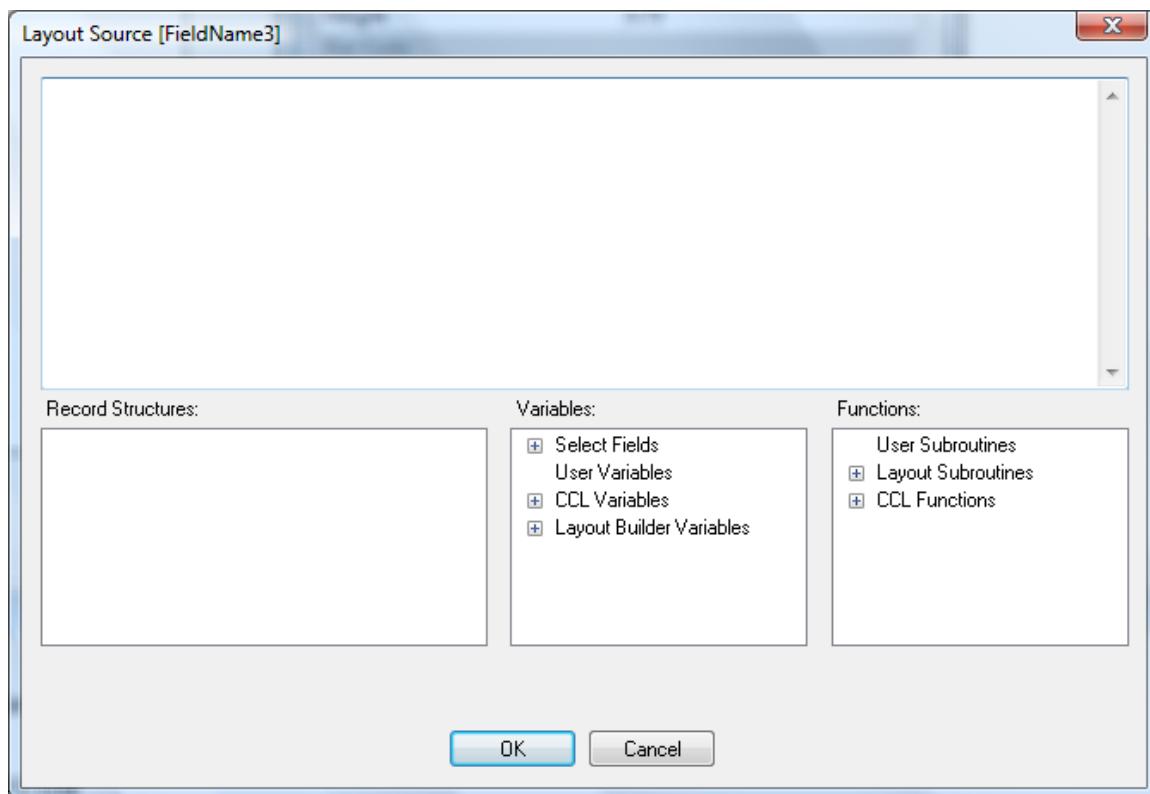
Barcodes can be placed in layouts using the Barcode  tool.

1. Select the Barcode  tool and then click and drag in the middle portion of your layout to create a rectangular area to display a barcode. You can expect your layout to be similar to the following screen:



The properties you can set on the Properties dialog box vary based on the Barcode Type and the Output type. The Output type is set on the Report Properties dialog box by selecting Report Properties from the Edit menu. For example, PostScript and .PDF output types do not support the Print Interp property. The Print Interp property displays a textual representation of the barcode source. Label printers support the Print Interp property and automatically print the textual representation of the barcode source. The textual representation does not display in the layout but is printed by the label printer. For information regarding barcode properties see **DiscernExplorerHelp.exe > Discern Visual Developer Help > Discern Layout Builder > Windows and Dialog boxes > Layout Barcode Properties Dialog box**.

2. In the Properties dialog box, click in the Source property and then click the ellipsis  button to open the Layout Source dialog box

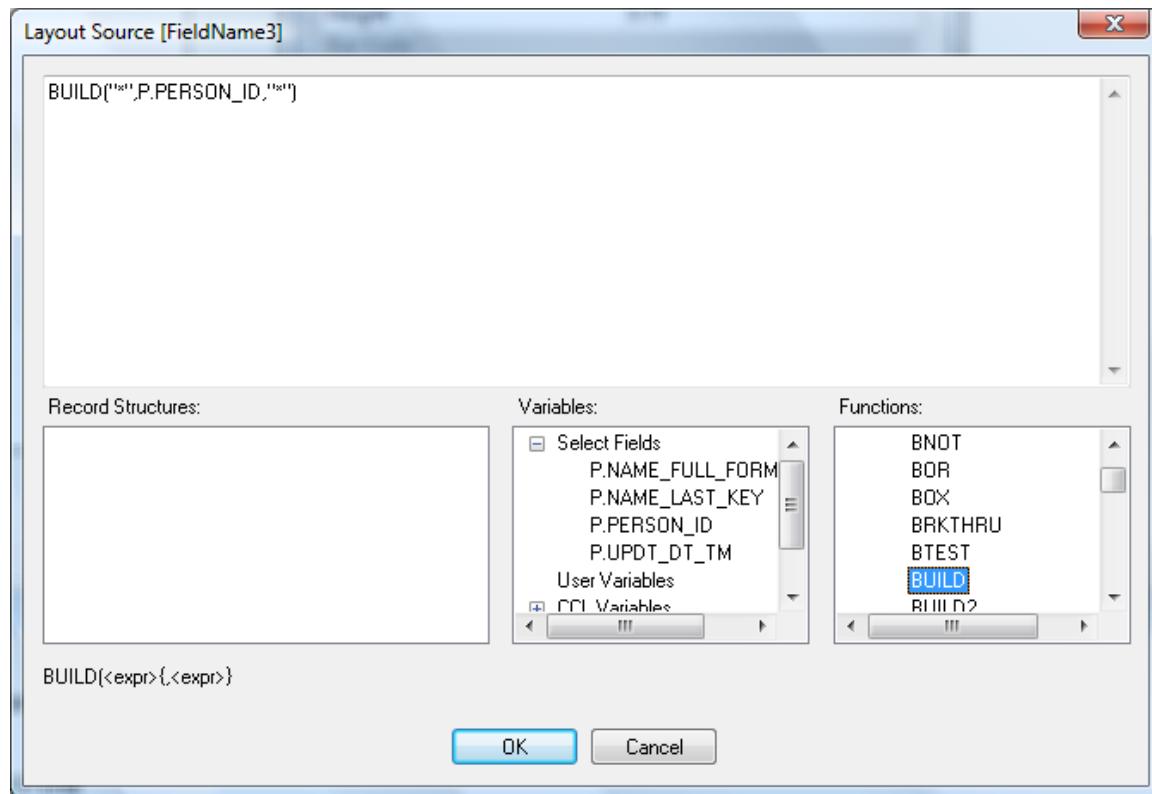


The Layout Source dialog box can be used to select or create a value that is rendered as a barcode.

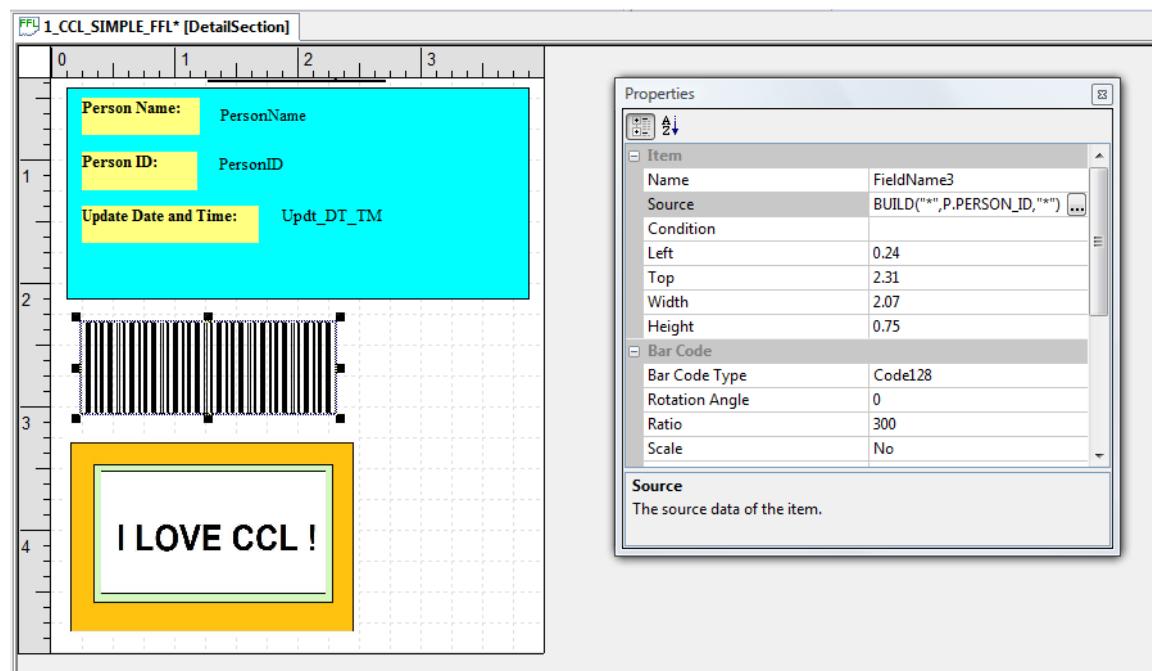
3. Expand the Select Fields list in the Variables area by clicking in the plus sign (+).
4. Double-click the P.PERSON\_ID field.

Using the P.PERSON\_ID field as the source for the barcode item will cause the value of the PERSON\_ID to be displayed as a barcode in the output. The Bar Code Type property defaults to Code 128. This bar code type requires an asterisk as a start and stop character for some printers. (Label printers may not need the start and stop characters but postscript printers generally do.) If the value that is used for the source does not already have the start and stop characters, you may need to add them. You can accomplish this by using the BUILD() function.

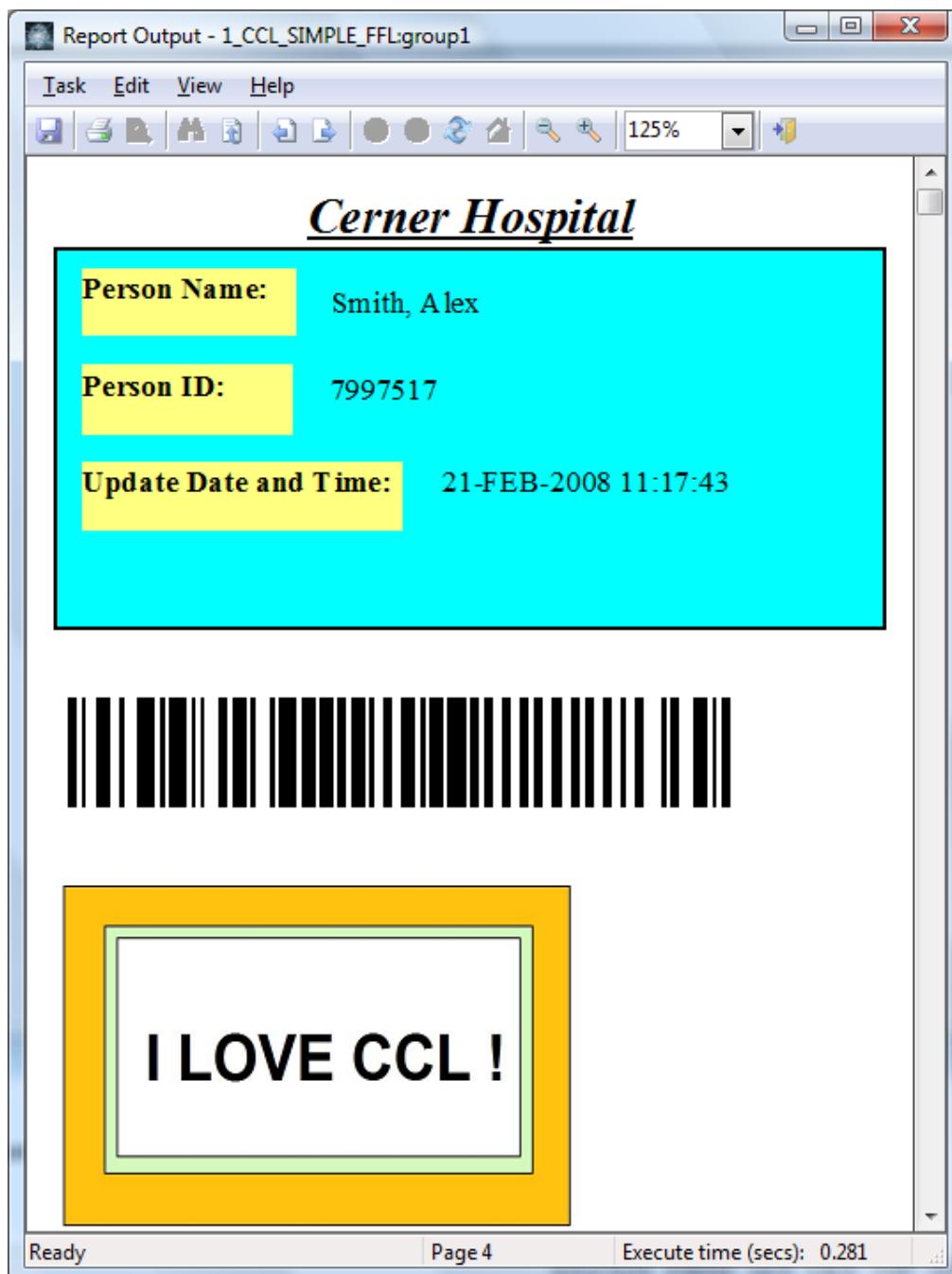
5. Place your cursor before the P.PERSON\_ID.
6. Expand the CCL Functions list in the Functions area by clicking the plus sign (+).
7. Double-click the BUILD function and place "/\*", between the opening parenthesis and the P.PERSON\_ID.
8. Place ,/\*" and a closing parenthesis after the P.PERSON\_ID field. Your Layout Source dialog box should be displayed similar to the following example:



9. Click OK to make the Person\_ID from the query that is associated with this layout the source of the barcode item. You can expect your layout to be similar to the following screen:



10. From the Build menu, select Run "Your\_Free\_Form\_Label" or press CTRL+F5 to execute your Free Form Label.
11. Select Yes when prompted to save the layout. The prompt form is displayed.
12. Accept the default of MINE for the output device.
13. Click Execute to run your Free Form Label. The output of your Free Form Label should be displayed similar to the following example:



All output types support barcodes, but an output device only supports certain barcode symbologies. The Bar Code Type property is used to set the barcode symbology that is used. The Label printers support the vast majority of the barcode symbologies embedded in the printer. Postscript and .PDF are currently limited to five barcode symbologies: Code 128 (subsets A, B and C), Code 39, CodaBar, PostNet, and Aztec.

Layout Builder represents bar codes using a bitmap placeholder in which only the height of the bar code corresponds to the actual barcode to be rendered. This is true as long as the symbology does not have an enforced height specification. PostNet is an example of a symbology that enforces a height specification. When the Bar Code Type property is set to PostNet, the height of the rendered barcode is adjusted to the enforced height. Therefore PostNet renders to the specified height, regardless of the designated area height represented in Layout Builder. The exception to this rule is with the Zebra driver which does not allow this to be enforced and requires the bar width and height to be properly set by the user.

Barcodes in Postscript and .PDF have the option to scale, with PostNet being the exception. PostNet renders an 11-digit barcode if a literal is not used for the source since it is the longest possible representation.

Barcode properties are representative when the symbologies support such a property. Scaling is not supported on label printers since the barcode symbology generation is directly related to the narrow bar width and the barcode ratio expressed in terms of 100.

2D barcode symbologies PDF417 and Code49 have additional properties that are only valid for the 2D symbologies. They only are enabled when one of these symbologies is selected as the Bar Code Type property.

## Table and Graph tools

The Table  and Graph  Tools are used to add tables and graphs to a layout. Although these items can be placed on Free Form Labels, their functionality is not practical in the context of a Free Form Label. These tools are discussed later in this document.

## Executing Free Form Labels

Up until this point you have selected Run “*Your\_Free\_Form\_Label*” from the Build menu or pressed CTRL+F5 to execute your Free Form Label. Most likely you will create Free Form Labels that need to be executed by people who do not have access to Discern Visual Developer. When Layout Builder is used to create a Free Form Label it generates a *Discern Explorer* program in the object library. This program can be executed from Explorer Menu (ExplorerMenu.exe) like any other *Discern Explorer* program. Simply use the name of your Free Form Label as the program name when adding a program item to the Explorer Menu.

## Copying Free Form Labels

You may want to use an existing Free Form Label as a starting point when creating a new Free Form Label. In Discern Visual Developer, you can use Transfer Objects... from the

Tools menu to copy an existing Free Form Label to a Free Form Label with a different name. Enter the name of the object you want to copy in the Source Object control or use the Browse button to select the object you want copy. Then use the Copy Object option on the Task menu to create a copy of the object.

## Moving Free Form Labels to another Environment

Cerner recommends creating and testing all new Free Form Labels in a non-production environment. After the Free Form Label has been created and tested, you then can move it into the production environment. Moving a Free Form Label to a different environment requires you to export the label from the source environment where it exists and import it into the target environment.

If you have a front-end file share that can be accessed from both environments, an easy way to move the Free Form Label is to open the existing Free Form Label in Discern Visual Developer.exe (DVDev) and use the Export command on the File menu to export the label to the front-end file share. A file with a .FFL extension is created during the export. Close DVDev and reopen it in the environment in which you want to move the label (target environment). From the File menu, select Import to import the .FFL file from the common front-end file share. When the import process is completed, save the layout by clicking Save from the toolbar or selecting Save from the File menu.

If you do not have a front-end file share that can be accessed from both environments but can access a different front-end file share from each environment, the process requires an additional step. From the File menu select Export to export the existing Free Form Label to a front-end file share. Again a .FFL file is created. Next, copy the .FFL file to the front-end file share that can be accessed from the target environment. Open DVDev in the target environment and select Import from the File menu to import the .FFL file from the common front-end file share. When the import process is completed, save the layout by clicking Save from the toolbar or selecting Save from the File menu.

If you cannot access front-end file shares you can move the Free Form Label to a different environment using the back-end end file structure. To use this method, select Transfer Objects from the Tools menu to open the Transfer Objects dialog box. Ensure that the Free Form Labels category is selected under Layouts in the tree on the left side of the Transfer Objects dialog. Enter the name of your Free Form Label in the Source Object: field. Use the Save to Backend... option on the Task menu to save the Free Form Label to a backend file with a .FFL extension. Copy the .FFL file to a directory in the target environment. Open DVDev in the target environment and select **File > Open > Source** to open the .FFL file. Opening the .FFL source file opens Layout Builder and imports the layout. The import process will prompt you to import the prompt form. After the import process completes, save the layout by clicking Save from the toolbar or selecting Save from the File menu.

## Creating a New Layout Program

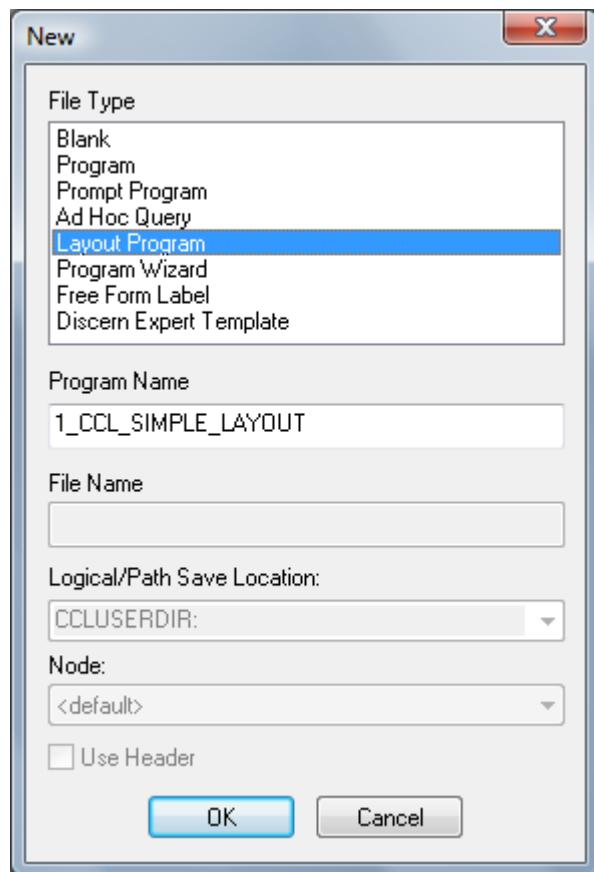
This section assumes that you have already completed the Creating a Free Form Label section to gain an understanding of some of the basic functionality of Layout Builder.

A Free Form Label can be thought of as a single page report with a single report section on the page. Layout programs can be thought of as a multi-page report that allows

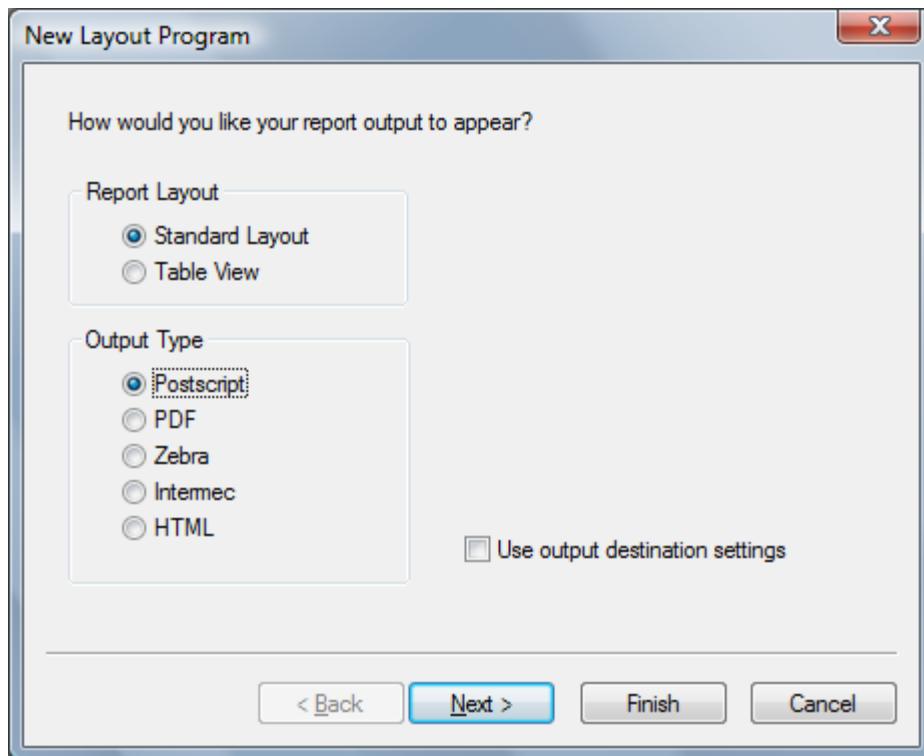
multiple layout sections on each page. Layout sections can be associated with a reportwriter section of a *Discern Explorer* select command. Multiple layout sections can be associated with a reportwriter section and a layout section can be referenced in multiple reportwriter sections. To demonstrate the functionality and usage of Layout Builder we will create a layout program that selects and displays information about people and their aliases.

## Create A New Layout Program:

1. Using DVDev, select New from the File menu. Verify the following New dialog box is displayed:

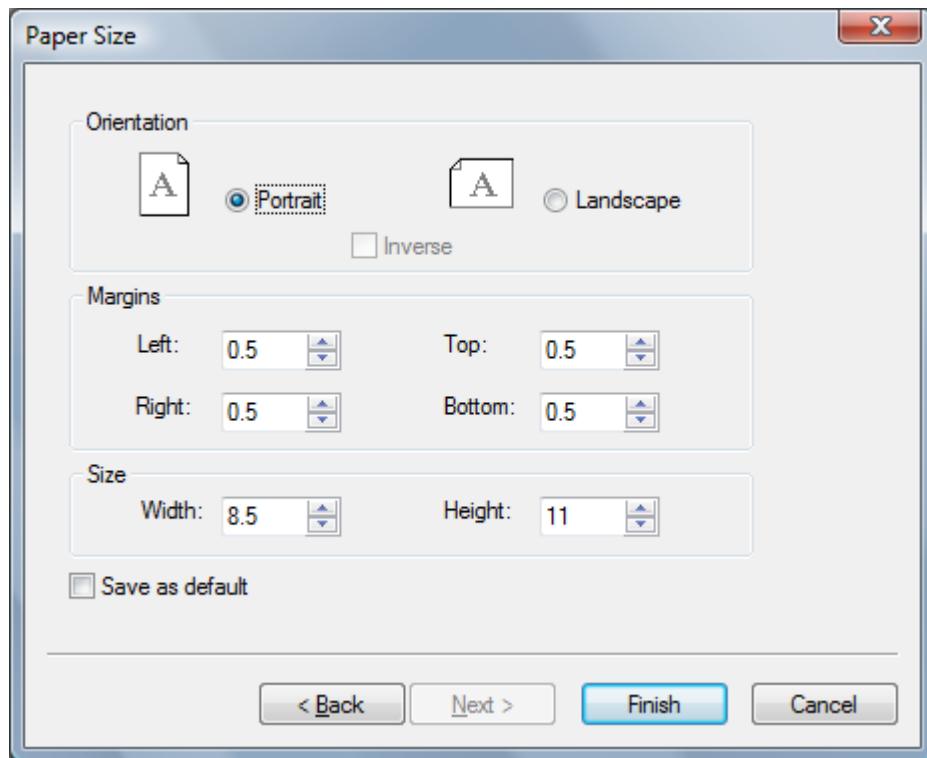


2. Select Layout Program from the File Type list.
3. Enter **1\_your\_initials\_SIMPLE\_LAYOUT** as the Program Name and click OK. The New Layout Program dialog box is displayed. This dialog box enables you to set the properties of the report layout you are creating. The Standard Layout from the Report Layout section will define a layout that can have sections and items that can be dropped in the sections. The Table View is a layout program that generates a report with data in a table format, displayed using rows and columns. Creating a Table View is discussed in detail in the Layout Builder Programming Reference Master 2007 Part 2.
4. Verify that the Standard Layout is selected.

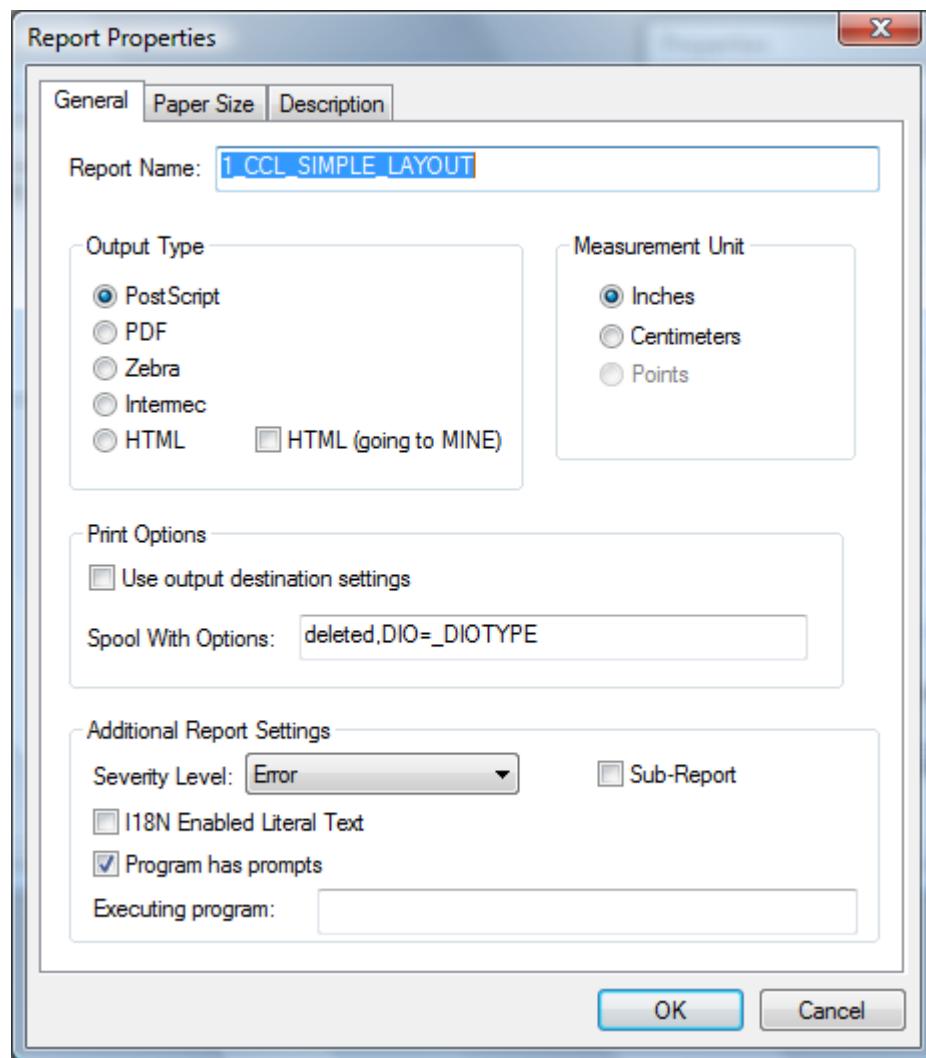


For this simple report we want to create an output that can be viewed on the screen or printed on standard size paper. This can be accomplished using PostScript or .PDF output. The output property is used to control the type of output generated when the layout program is executed. Selecting PostScript or .PDF allows you to view the output on the screen by selecting MINE when prompted for an output device when the program is executed from a *Discern Explorer* application. PostScript or .PDF output can be printed by sending the output to a printer that supports that output type. The Use output destination settings option can be used to allow the output type to be modified at run time based on the type of printer to which the output is being sent. One of the requirements for executing a layout program from a *Discern Explorer* front-end application is that the program must prompt for an output device and then select into that device. If a back-end printer queue is used at the prompt for an output device and the Use output destination settings option was selected when the layout program was created, the program creates output that matches the printer type. This functionality allows you to have one program that could return the output to the screen or print it on a PostScript, Intermec, or Zebra printer. If the output type of PostScript is selected, the Use output destination settings option is selected, and at run time MINE is used for the output device, the layout program generates PostScript output that can be rendered and displayed on your screen. If at run time an Intermec printer is used for the output device, then the layout program generates output that is compatible with the Intermec printer. If the output is directed to MINE or a file, the default output type is used. If the Use output destination settings option is used and the output is directed to a printer queue, then the program determines the type of output device and generates output to match. For this simple layout program we will create PostScript output.

5. Verify the PostScript output option is selected, the Use output destination settings option is *not* selected, and click Next. The Paper Size dialog box is displayed.

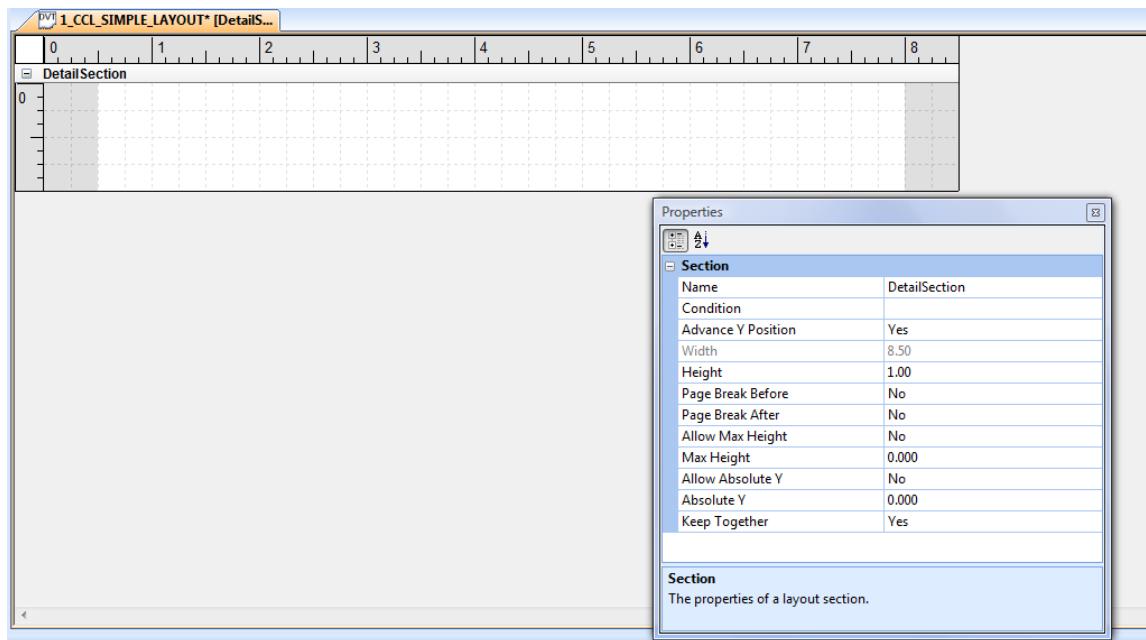


Keep the values already defaulted for our report and click Finish. The previous two dialog boxes, New Layout Program and Paper Size are populating the basic properties of the layout. These properties can be reviewed at any time by selecting Report Properties dialog box from the Edit menu.



For information regarding the Report Properties dialog box see **Discern Explorer Help (DiscernExplorerHelp.exe) > Discern Visual Developer Help> Discern Layout Builder > Windows and Dialog boxes.**

6. When you click the Finish button, a new layout program with a single section is created similar to the following example. If your layout is displayed differently, ensure you have the Properties, Horizontal Ruler, Vertical Ruler, Grid, Margins, and Section Title bars selected on the View menu.



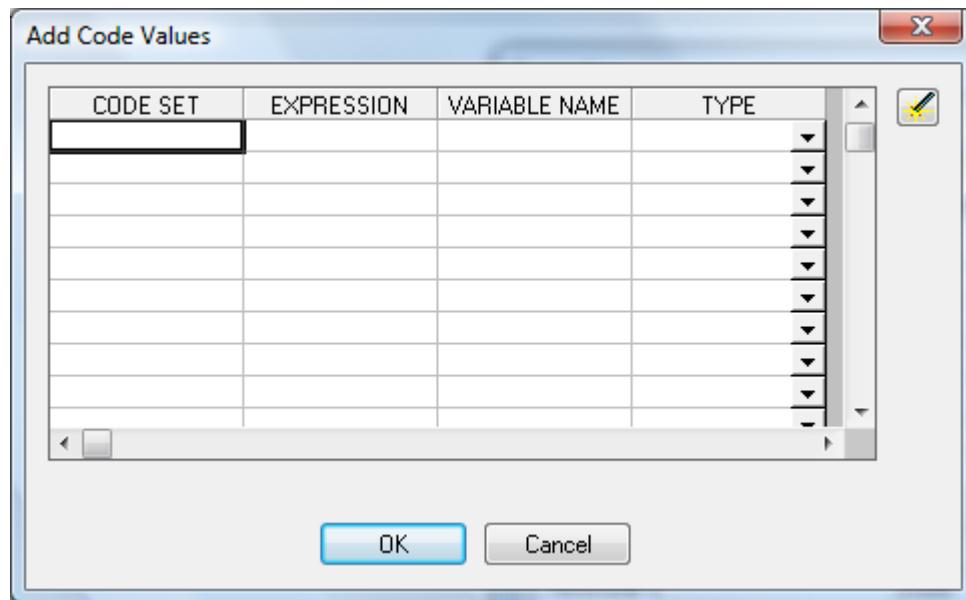
Before using the layout section, some preliminary work is necessary to retrieve people and their aliases. For our example, we will prompt the user for an output device and a last name. We want to retrieve the person ID, full formatted name, gender, birth date, medical record number and Social Security number for people with a last name equal to the name the user entered at the prompt.

## Add Code Values

**Note:** Social Security numbers (SSN) and medical record numbers (MRN) are common aliases used by many, but not all clients. If your site does not use these aliases, select a couple of common person aliases that are associated with most people.

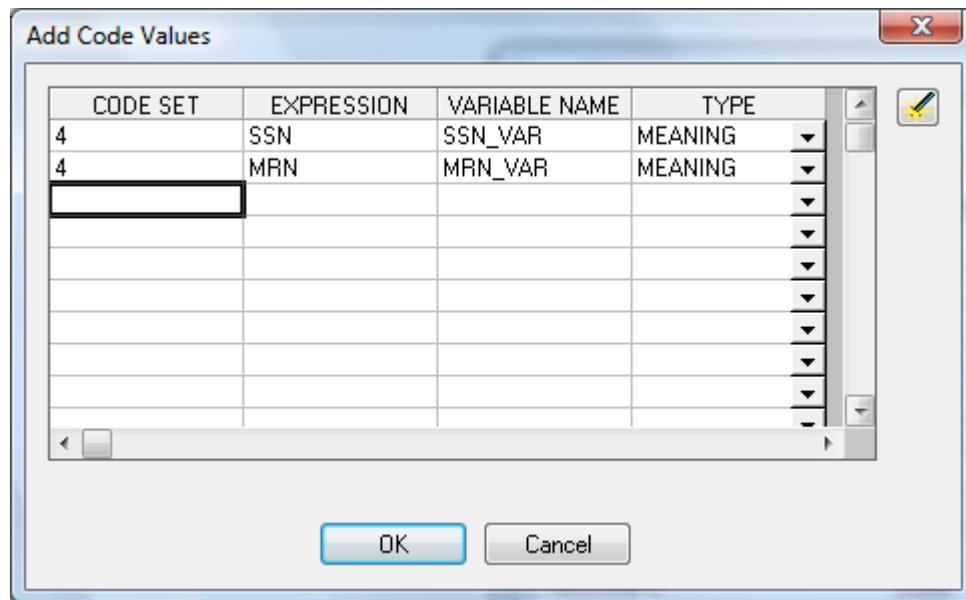
To select only MRN and SSN person aliases, we need to create a couple of global variables that can store the code values for these person alias types.

1. From the Tools menu, select Add Code Values. The Add Code Values dialog box is displayed. This dialog box is used to create and set a variable to a code value using UAR\_GET\_CODE\_BY(). For more information on the Add Code Values dialog box see **Discern Explorer Help (DiscernExplorerHelp.exe) > Discern Visual Developer Help > Windows and Dialog boxes > Add Code Values Dialog box.**



The person alias type codes come from Code Set 4.

2. Enter 4 in the Code Set column of row 1.
3. Enter SSN or the CDF\_Meaning of a common person alias in the Expression column of row 1.
4. Click the Variable Name column. The value you entered in the Expression column is displayed followed by \_VAR by default. The value of Meaning is displayed in the Type column by default.
5. Enter 4 in the Code Set column of row 2
6. Enter MRN or the CDF\_Meaning of a common person alias in the Expression column of row 2
7. Click the Variable Name column. Your Add Code Values dialog box is displayed similar to the following example:

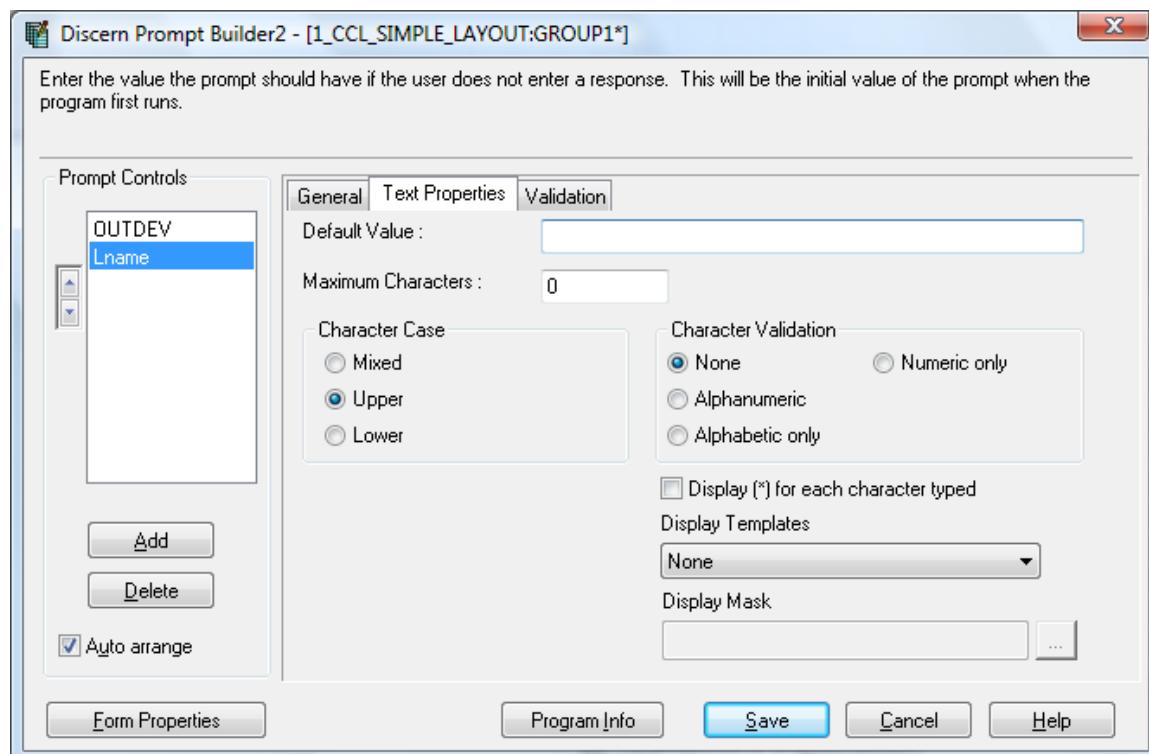


- Click OK to create the variables. The Add Code Values dialog box adds a Declare command to the source code Layout Builder is creating. To see the actual source code you can select Layout Code from the Layout menu. The code values you added are displayed at the bottom of the DVDev Declared Variables section.

## Add Prompts

Next, we need to create a couple of prompts to enable the user to view the output of the layout program on the screen or send it directly to a printer, and get a last name from the user to use in the qualifications. This tutorial assumes you are already familiar with using the Prompt Builder tool. If you have never used Prompt Builder, review the *Discern Prompt Builder Tutorial* in the *Discern Explorer Cerner Millennium Support Guide*.

1. From the Tools menu, select Prompt Builder. The Prompt Builder dialog box is displayed with a single control for an output device.
  2. Click Add to add a second prompt to retrieve a last name from the user.
  3. On the General Tab, set the following:
    - Prompt Display: Enter the Last Name
    - Prompt Name: Lname
    - Control Type: Text Edit
    - Prompt Type: String
  4. Select the Text Properties tab and select Upper as the Character Case option. Your Prompt Builder dialog is displayed similar to the following example:

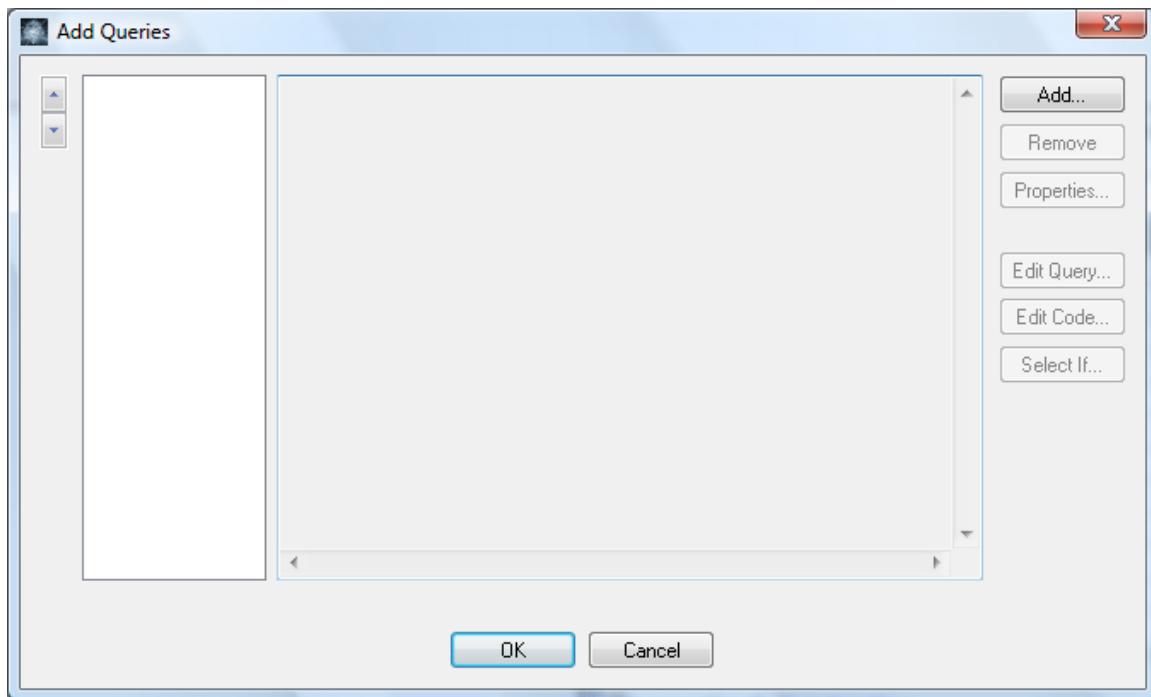


- Click Save to save the prompt form and have it associated with the layout program.

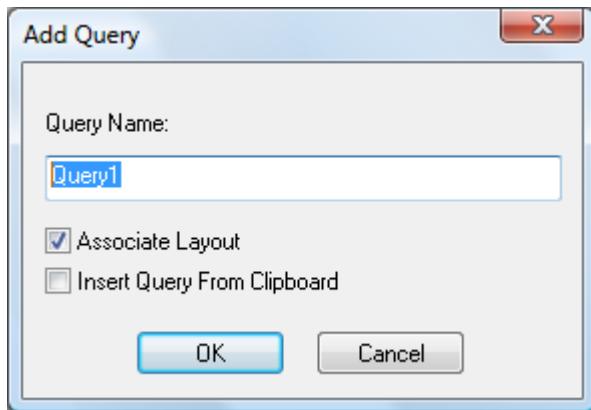
## Adding Queries

We are now ready to create the query that retrieves MRN and SSN of people with the last name the user entered at the prompt. This tutorial assumes you are familiar with using Query Builder to create *Discern Explorer* queries.

- From the Tools menu, select Query Builder. The Add Queries dialog box is displayed:



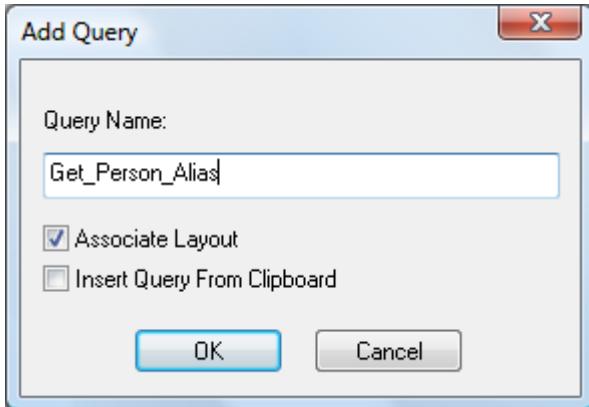
- Click Add to add a query to your layout program. The Add Query dialog box is displayed.



A layout program can have multiple queries to collect data but only one query can be associated with the layout. For example, you might use one query to get all of a person's addresses and store them in a record structure, a second query to get all of a person's phone numbers and store them in the same record structure, and then use a third query to get encounters for the person. The third query could access the information in the record structure and be associated with the layout to display information about the person, their encounters, phone numbers, and addresses. Layout Builder requires that each query be given a name. If the layout program contains multiple queries, they are executed in the order they are displayed on the Add Queries dialog box. Associating the query with the layout enables you to create layout sections that can be used to format the data returned by the query. The name of the query associated with the layout is displayed in **bold** on the Add Queries dialog box. For this simple layout program example we will

use a single query to get information about people and their aliases associated with the layout.

3. Change the Query Name from Query1 to **Get\_Person\_Aliases**.
4. Verify that the Associate Layout option is selected.



5. Click OK to open Query Builder.
6. From the Tables tab select the PERSON and PERSON\_ALIAS tables. If the PERSON or PERSON\_ALIAS table is not displayed, enter PERSON in the Table Filter and select the *Cerner Millennium* folder from the Categories list to display all table names that begin with PERSON. The rest of this section refers to P as the alias for the PERSON table and PA as the alias for the PERSON\_ALIAS table.

7. On the Fields tab select:

- P.PERSON\_ID,
- P.NAME\_FULL\_FORMATTED,
- PA.ALIAS,
- PA.PERSON\_ALIAS\_TYPE\_CD

Query Builder creates the expression named PA\_PERSON\_ALIAS\_TYPE\_DISP by default when the PA.PERSON\_ALIAS\_TYPE\_CD field is selected.

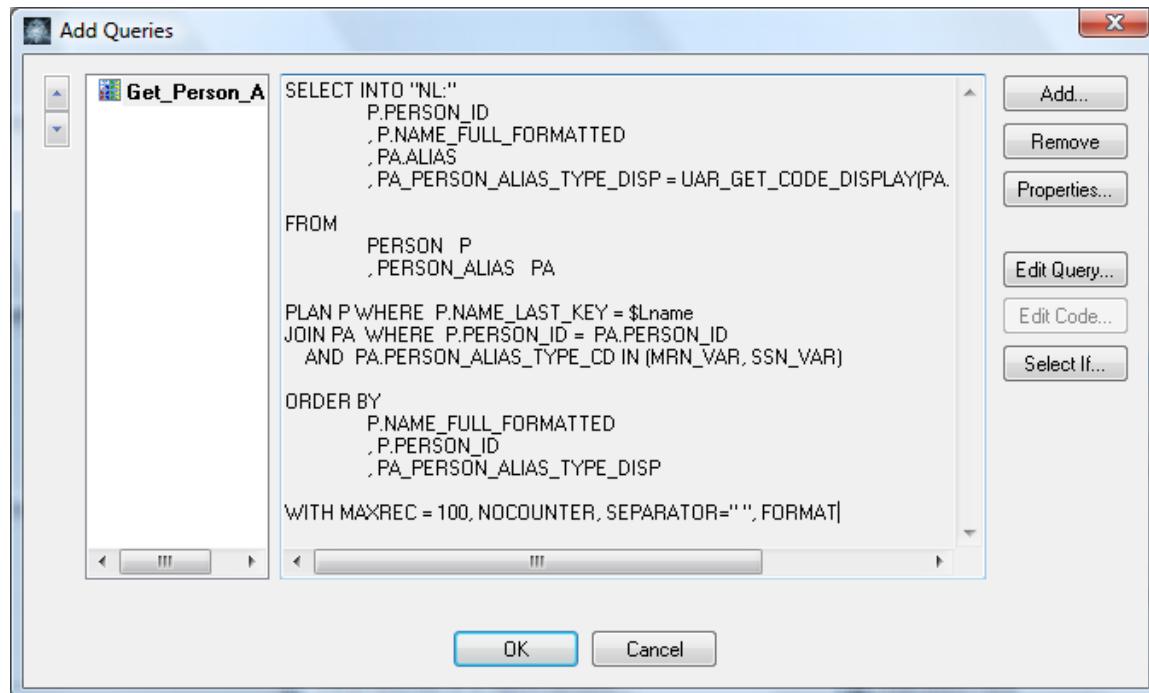
8. Add the following code to the Qualifications tab:

```
PLAN P WHERE P.NAME_LAST_KEY = $Lname  
JOIN PA WHERE P.PERSON_ID = PA.PERSON_ID  
AND PA.PERSON_ALIAS_TYPE_CD IN (MRN_VAR, SSN_VAR)
```

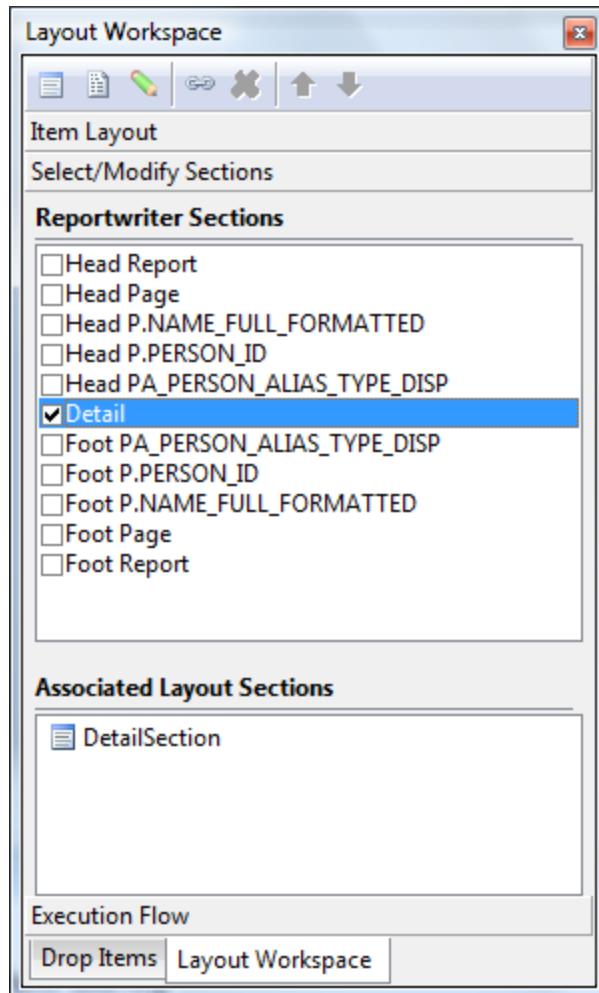
9. Using the Sort tab, sort on:

- P.NAME\_FULL\_FORMATTED,
- P.PERSON\_ID,

- PA\_PERSON\_ALIAS\_TYPE\_DISP
10. On the Control Options tab:
- Set the Max Records to 100
  - Select the Into option and verify that the box is populated with "NL:"
11. Click Close to close Query Builder. Your Add Queries dialog box is displayed similar to the following example:



12. Click OK to add the query to your layout program. The Select/Modify Sections dialog box is displayed by default on the Layout Workspace task panel. If the Layout Workspace task panel is not open, select Layout Workspace from the View menu.

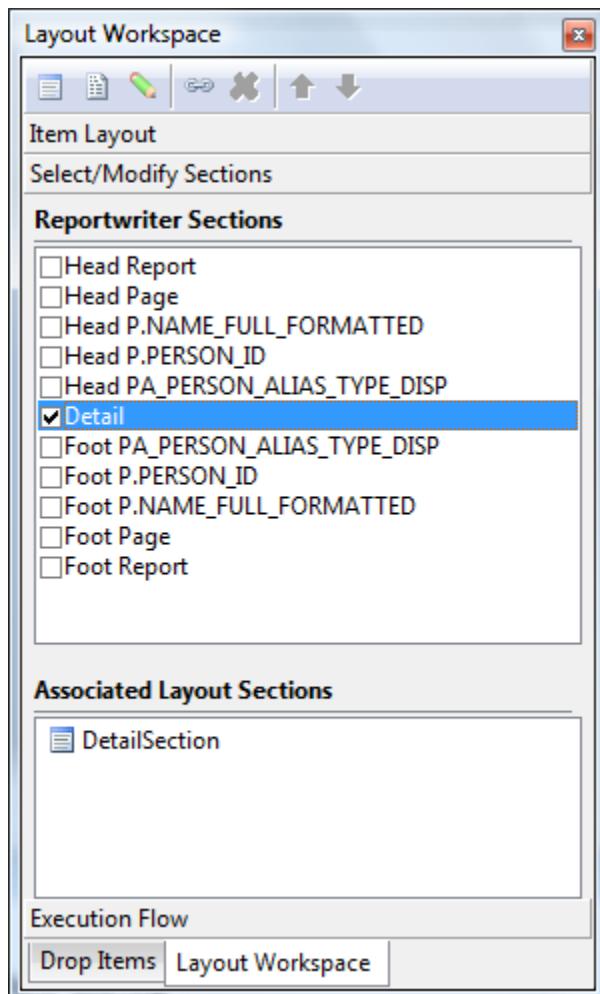


You have completed all of the preliminary work to retrieve people and their aliases. You are now ready to begin using layout sections to format the information returned by the query.

## Creating Layout Sections

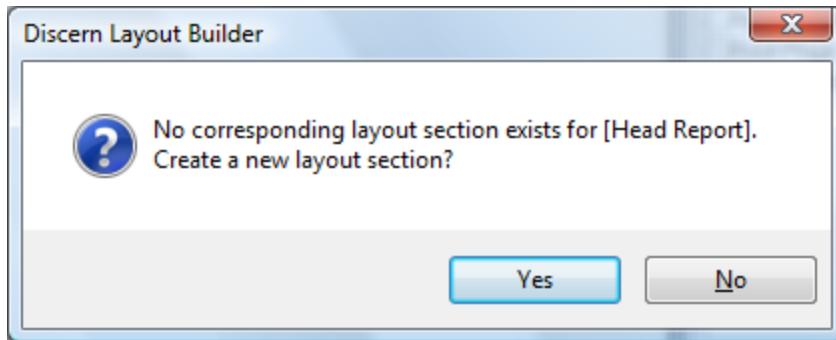
A layout program can be thought of as a multi-page report that allows multiple layout sections on each page. Layout sections can be associated with a reportwriter section of a *Discern Explorer* select command. Multiple layout sections can be associated with a reportwriter section and a layout section can be referenced in multiple reportwriter sections. When you first created your 1\_your\_initials\_Simple\_Layout program in the Create a New Layout Program topic, a new layout program with a single section was created. By default the layout section is named DetailSection.

When you completed the query that is associated with the layout, the Select/Modify Sections dialog box is displayed automatically. The Select/Modify Sections dialog box can also be accessed by selecting Select/Modify Sections from the Tools menu. The Select/Modify Sections dialog can be used to create and associate layout sections with reportwriter sections.

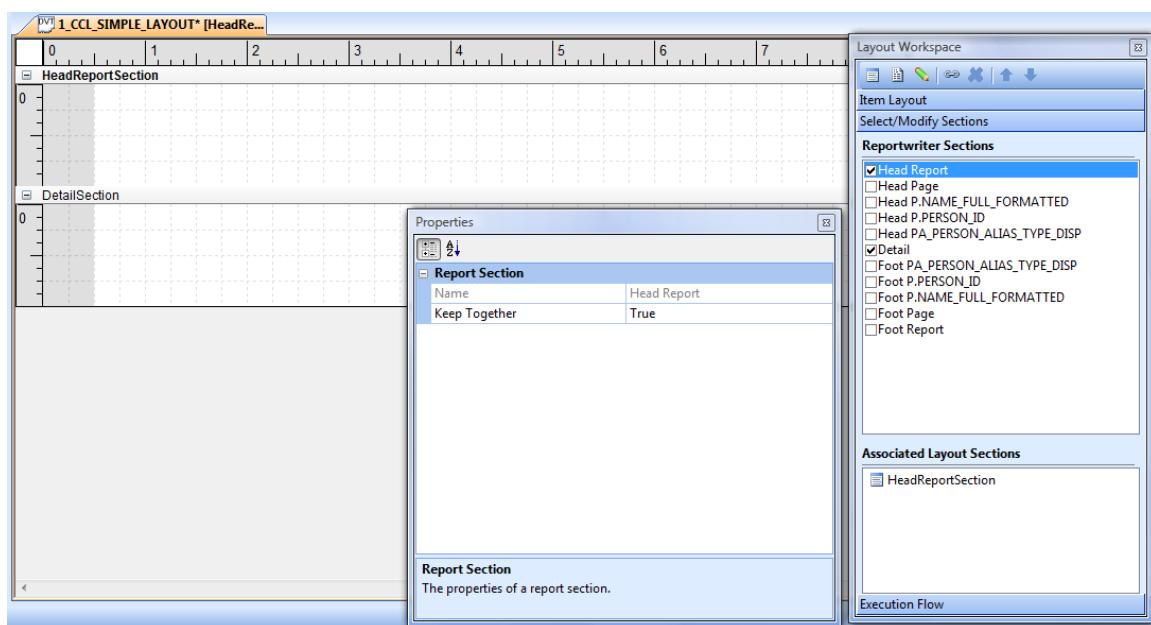


The Reportwriter sections always contain the Head Report, Head Page, Detail, Foot Page and Foot Report sections. If the query associated with the layout uses an Order clause, a head and foot reportwriter section is available for each item in the Order clause. In the simple layout program you want to display information in the following places: at the very beginning of the report, at the top of each page, for each person, for each alias, at the bottom of each page, and at the very end of the report. To accomplish this, you want at least one layout section for the head and foot report, the head and foot page, the head and foot PERSON\_ID, and the detail reportwriter sections. Selecting reportwriter sections and clicking OK generates a layout section that is associated with the reportwriter section.

13. Select the Head Report option. The following Discern Layout Builder message is displayed.



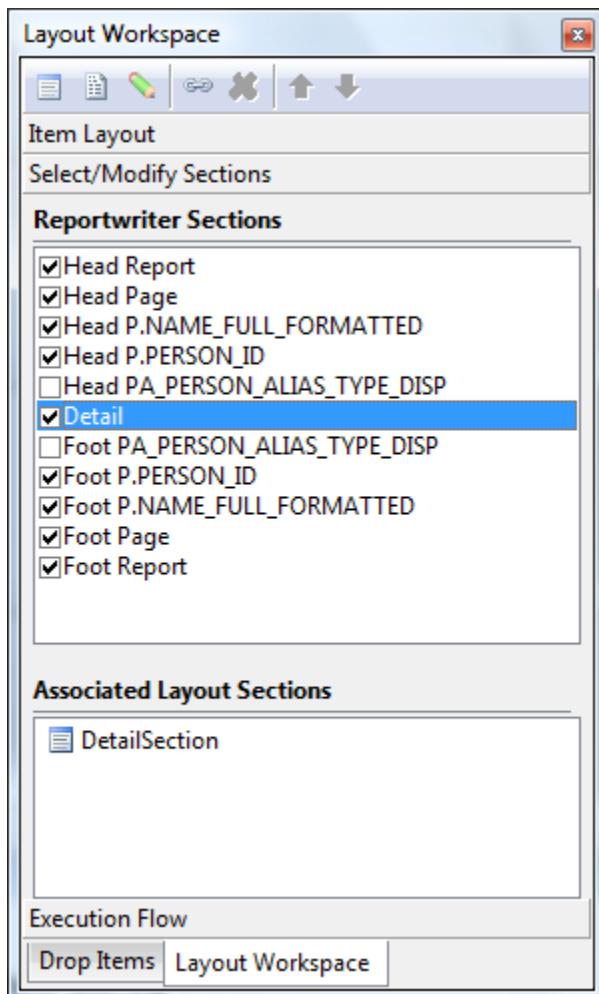
14. Click Yes to create a new HeadReportSection as shown in the example:



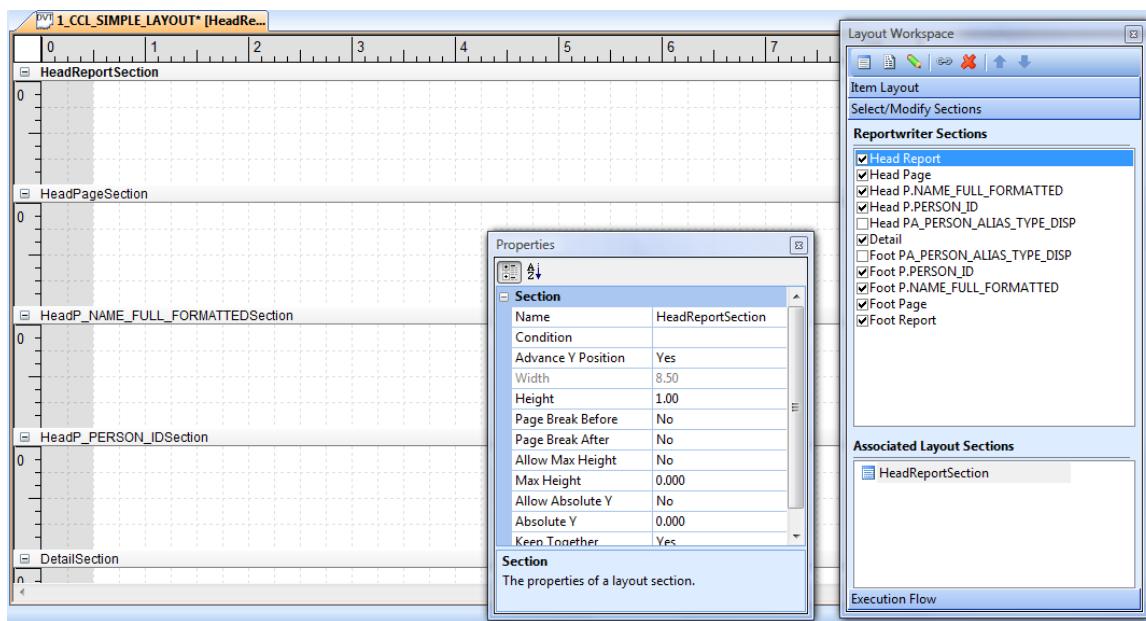
15. Repeat this process by selecting the following reportwriter sections:

- Head Page
- Head P.NAME\_FULL\_FORMATTED
- Head P.PERSON\_ID
- Detail (since a layout section named DetailSection already exists, you will not be prompted to create one)
- Foot P.PERSON\_ID
- Foot P.NAME\_FULL\_FORMATTED
- Foot Page
- Foot Report

The Select/Modify Sections will look similar to the following example:



Your layout should be displayed similar to the following example:



If your layout is displayed differently, make sure you have Properties, Horizontal Ruler, Vertical Ruler, Grid, Margins, and Section Title bars selected on the View menu.

## Moving Layout Sections

The Layout Builder attempts to put the sections in the order according to its own logic. Confirm that the sections are listed in the following order:

HeadReportSection

HeadPageSection

HeadP\_NAME\_FULL\_FORMATTEDSection

HeadP\_PERSON\_IDSection

DetailSection

FootP\_PERSON\_IDSection

FootP\_NAME\_FULL\_FORMATTEDSection

FootPageSection

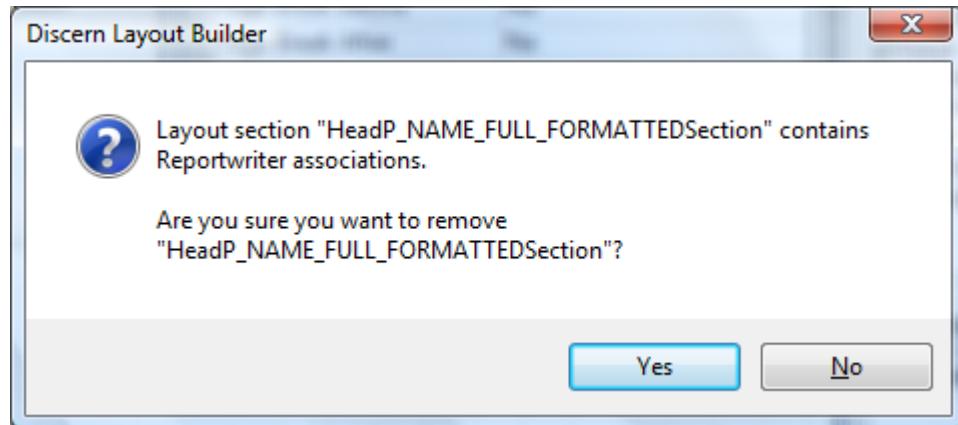
FootReportSection

If you find that the sections are out of order, click the ruler below the Section. When a layout section is active, the name is displayed in bold on the DVDEV title bar. Drag and drop the Section to where you want the section to be placed. You may also click and drag the section title bar to the area where you want it placed.

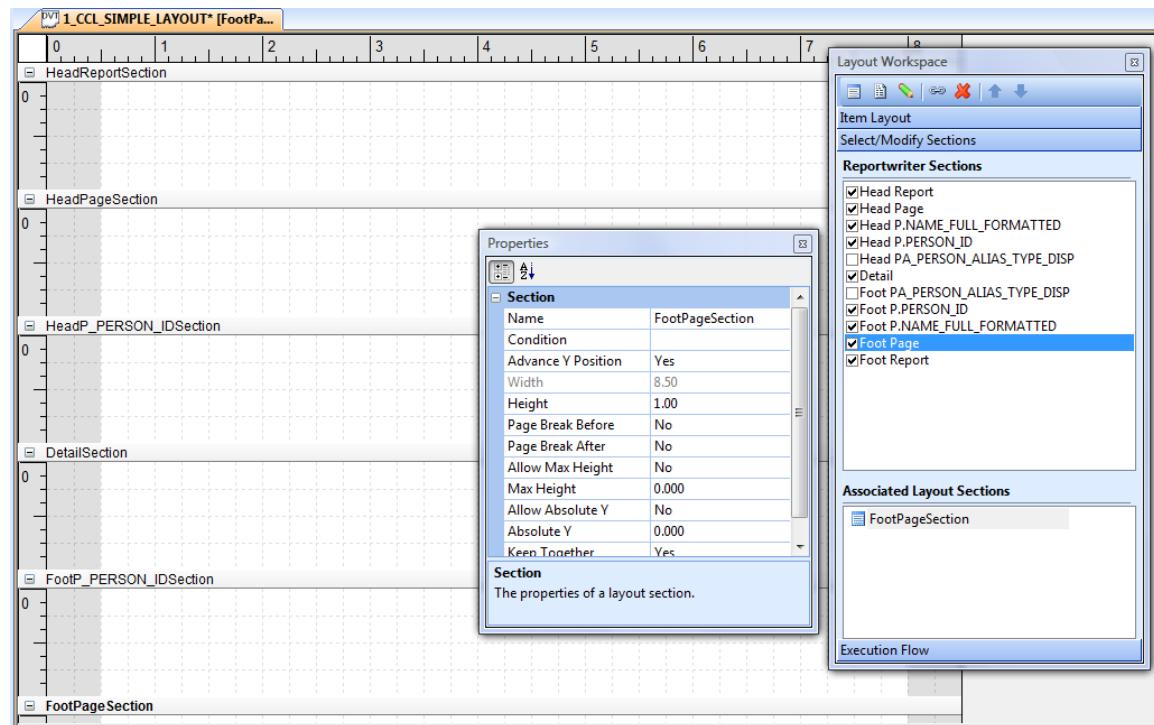
# Removing Layout Sections

In the preceding steps, you created a HeadP\_NAME\_FULL\_FORMATTEDSection layout. This section will not be used, so you should remove it.

1. Click the HeadP\_NAME\_FULL\_FORMATTEDSection to ensure it is active and from the Edit menu, select Remove > Section. The following Discern Layout Builder message box is displayed:



2. Click Yes to remove the HeadP\_NAME\_FULL\_FORMATTEDSection.
3. Repeat the above steps to remove the FootP\_NAME\_FULL\_FORMATTEDSection. You can expect your layout to be similar to the following screen:



In the above steps we associated a layout section to a reportwriter section. However, it is not required to create an association between the layout and reportwriter section as they are not directly linked. Although you deleted the Head and FootP\_NAME\_FULL\_FORMATTED layout section, the Head and Foot P.NAME\_FULL\_FORMATTED Reportwriter Section are still selected. The Reportwriter sections are independent of the layout sections unless you create the association. You can associate the reportwriter sections to different layout sections. Keeping the Head and Foot P.NAME\_FULL\_FORMATTED group section can be important for possible code segments such as incrementing a counter.

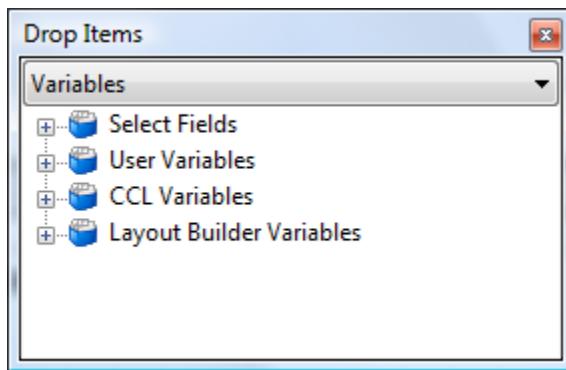
## Adding Layout Sections

Layout sections can be added using Insert > Section on the Edit menu. When a new layout section is inserted, it needs to be added to a reportwriter section using Select/Modify Sections on the Tools menu. You will learn about this process later in this tutorial.

## Adding Labels and Fields to Sections

You are now ready to begin adding items to your layout to format the output from the query.

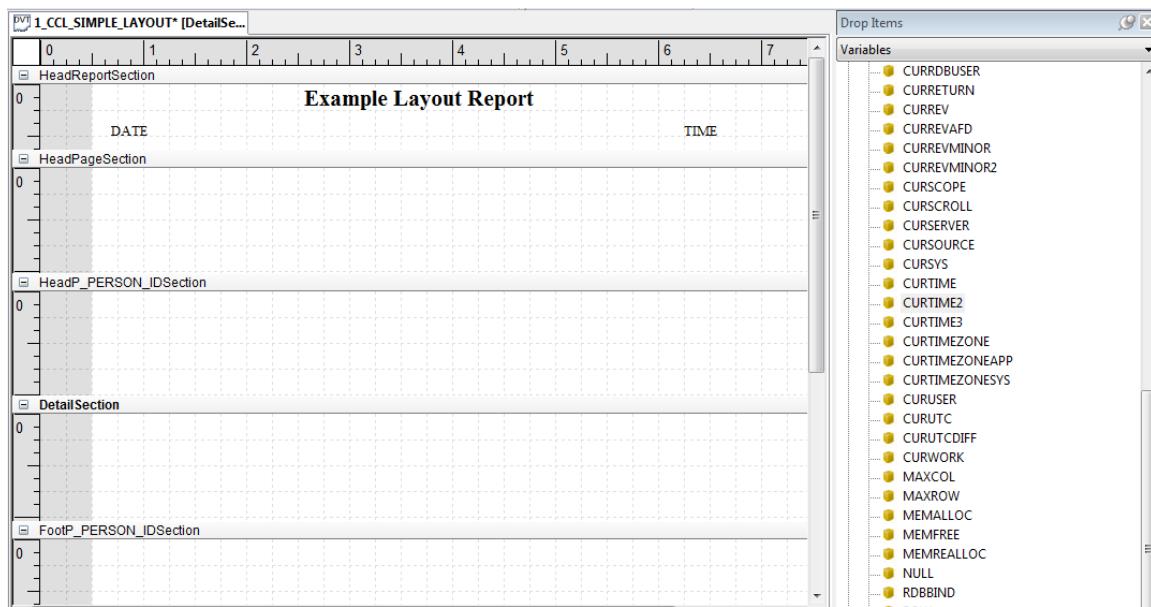
1. Using the Label tool , add the title **Example Layout Report** to the HeadReportSection.
2. In the Properties dialog box, set the Font Name to Times, the Font Size to 16 and the Font Bold to Yes. Move the title to the center of the section, towards the top.
3. Expand the CCL Variables by clicking on the plus sign (+) from the Drop Items window. If the Drop Items window is not open, select Drop Items from the View menu. The Drop Items dialog is shown below.



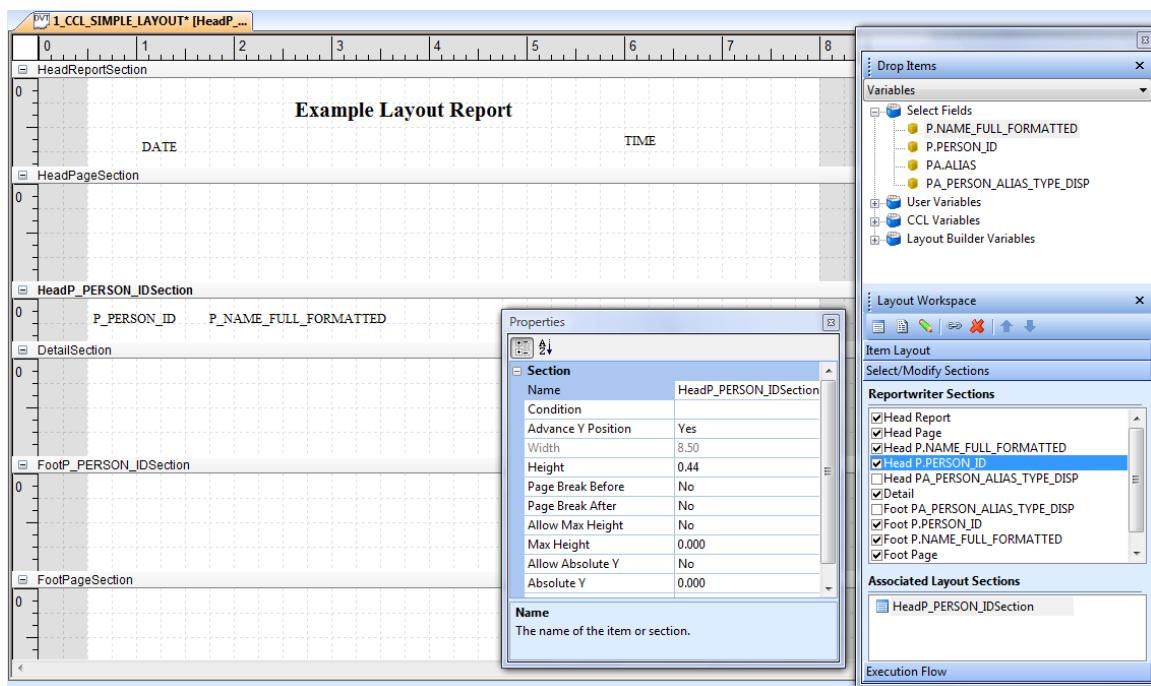
4. Click and drag the CURDATE variable from the CCL Variables list and drop it in the HeadReportSection under the title and to the left of the section. Use the handles to increase the size of the field as needed to display the entire field name. In the Properties dialog box, modify the Name property to **Date**.
5. Click and drag the CURTIME2 variable from the CCL Variables list and drop it in the HeadReportSection under the title and to the right of the section. Use the handles to

increase the size of the field as needed to display the entire field name. In the Properties dialog box, modify the Name property to **Time**.

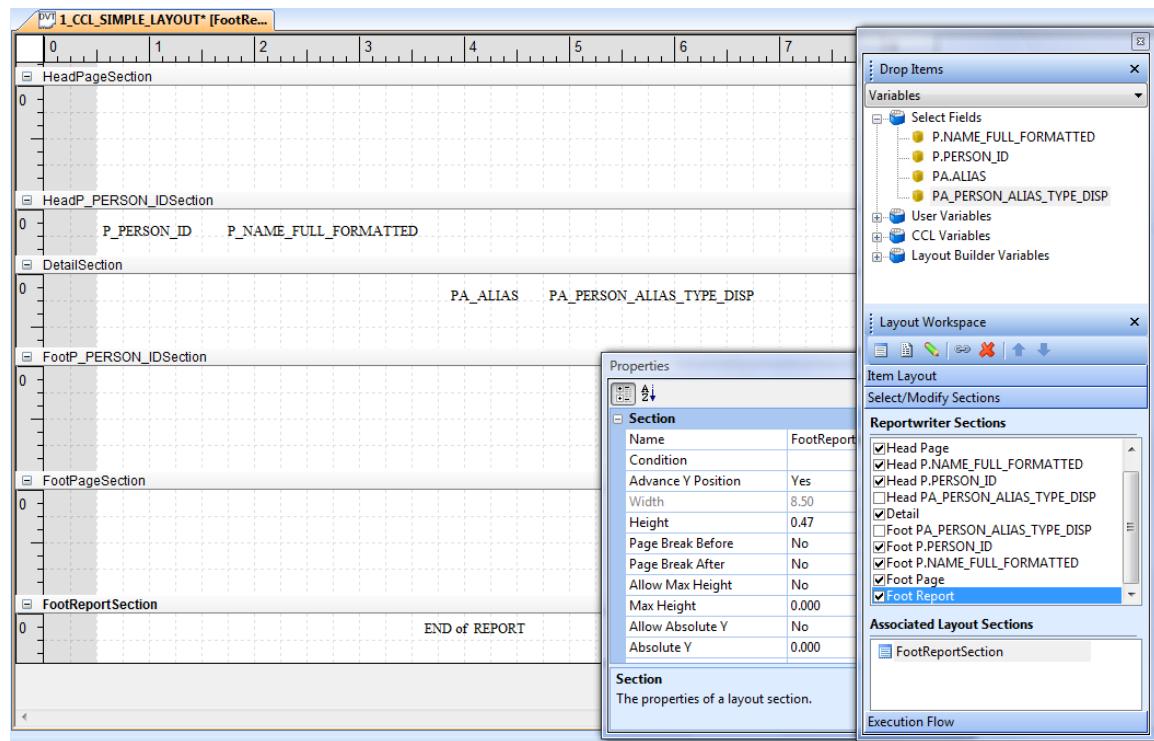
6. Get rid of any extra spacing between the HeadReportSection and the HeadPageSection by slowly moving your pointer over the HeadPageSection title bar. At the top of the title bar the pointer changes to a Vertical Resize pointer. When the pointer changes, click and drag the HeadPageSection title bar up to the bottom of the date and time fields. Your layout should be similar to the following screen:



7. Expand the Select Fields list on the Drop Items dialog by clicking the plus sign (+) .
8. Click and drag the P.Person\_ID field from the Select Fields list and drop it in the HeadP\_Person\_IDSection to display the P.Person\_ID field. Use the handles to increase the size of the field as needed to display the entire field name.
9. Click and drag the P.Name\_Full\_Formatted field from the Select Fields list and drop it in the HeadP\_Person\_IDSection to display the P.Name\_Full\_Formatted field. Use the handles to increase the size of the field as needed to display the entire field name.
10. Using the vertical resize, click and drag the DetailSection up to the bottom of the fields you just added. You layout should be similar to the following screen:



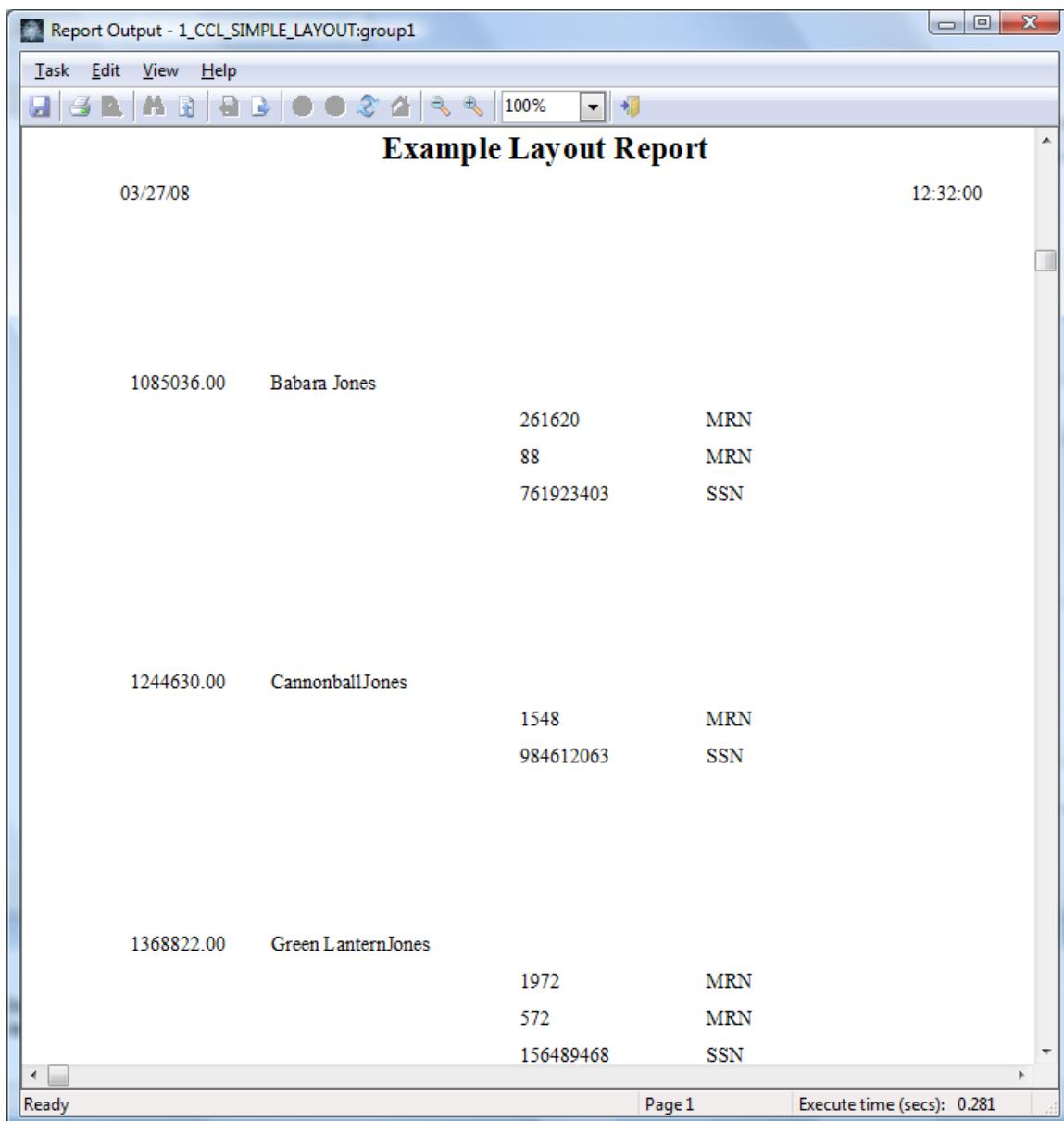
11. Click and drag the PA.Alias field from the Select Fields list and drop it in the DetailSection (towards the middle of the section). Use the handles to increase the size of the field as needed to display the entire field name.
12. Click and drag the PA\_Person\_Alias\_Type\_Dispatch field from the Select Fields list and drop it in the DetailSection to the right of the PA.ALIAS. Use the handles to increase the size of the field as needed to display the entire field name.
13. Using the vertical resize, click and drag FootPersonIDSection up to the bottom of the fields you just added.
14. Using the Label tool add the label **End of Report** to the FootReportSection.
15. Using the vertical resize, click and drag the bottom of the FootReportSection up to just below the End Report label you just added. Your layout should be similar to the following screen:



Next, test the layout program to see what the output will look like.

16. From the Build menu, select Run “*Your\_Layout\_Program*” or press CTRL+F5 to execute your layout program.
17. Select Yes when prompted to save the layout program.

When prompted, enter the last name of a person that you know has an MRN and or SSN and click Execute. Once your layout program has executed, the output should be similar to following example:

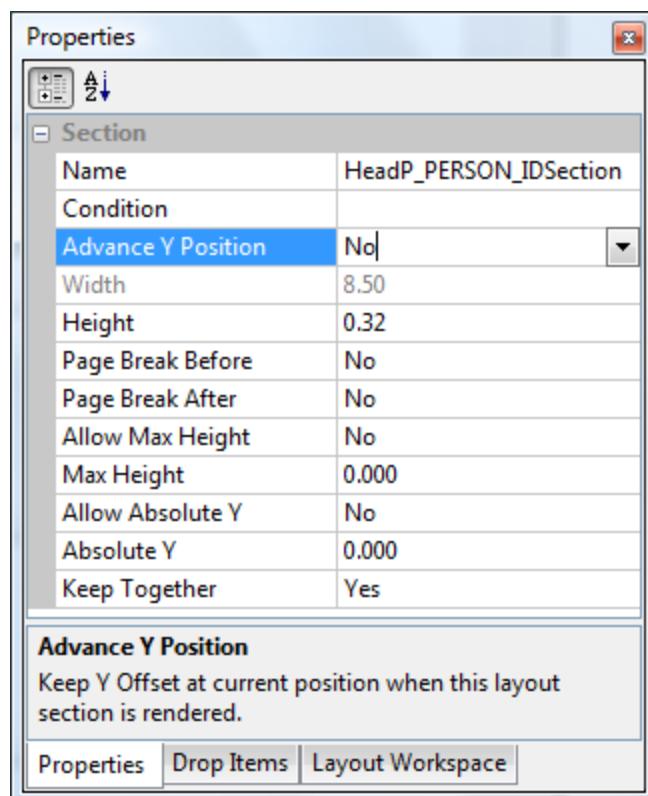


If you receive errors when you attempt to execute your layout program, remember this is the first time you have attempted to compile and execute the program. Any typos or errors you might have made in the preliminary steps while adding the code values, prompts, query, or the layout sections can result in errors at this point. Use the error messages and review the prior steps to correct any errors you receive.

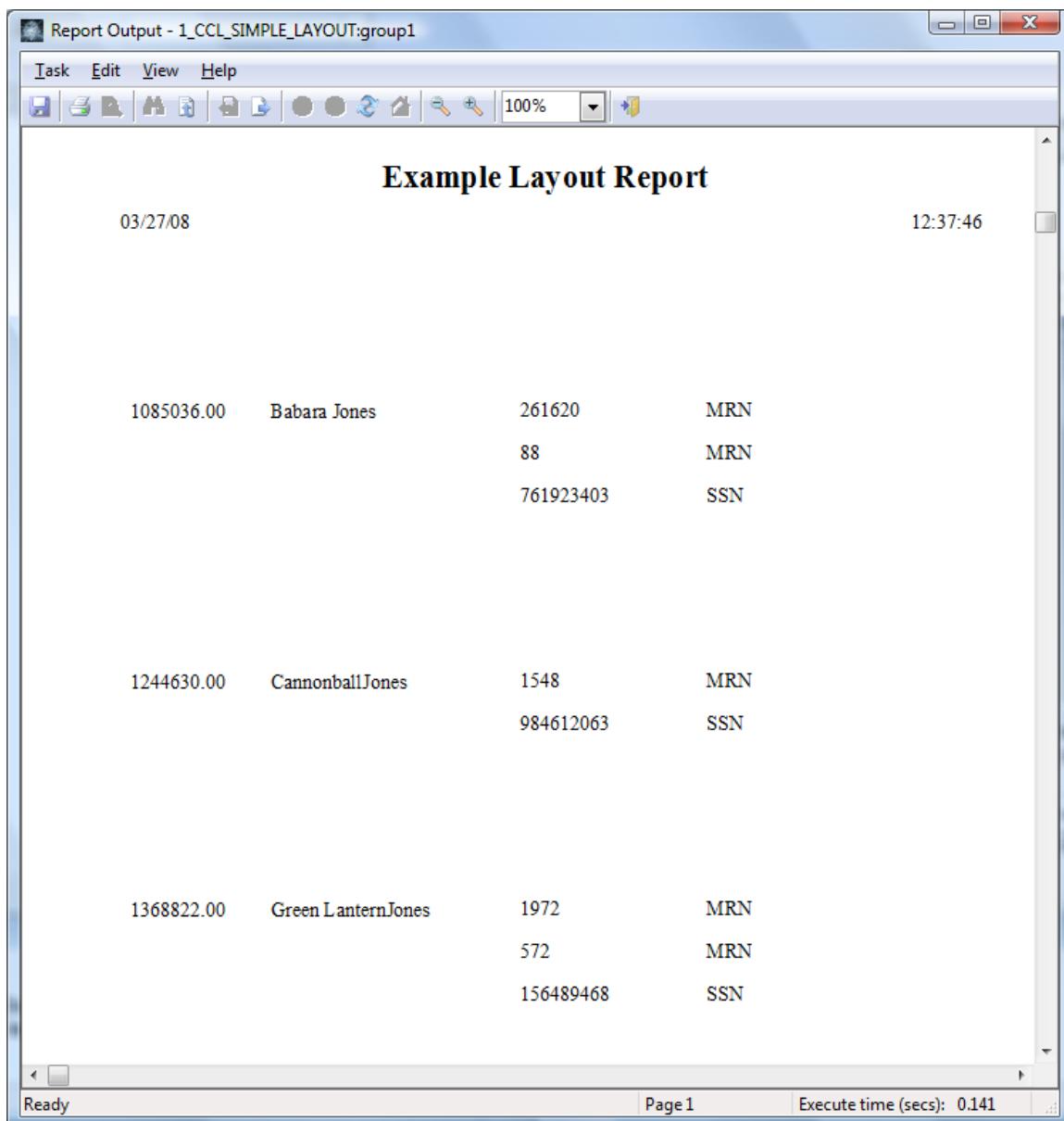
Looking at the output, note that there is a lot of white space. Most of the white space is caused by the empty layout sections. For example, the HeadPageSection, FootPageSection, and FootP\_Person\_IDSection all are empty. When the layout program is executed, any white space in a section is rendered as white space in the output. That is why you use the vertical resize pointer to drag the section title bar of the following section up to the bottom of the items you placed in a particular section. You will use and resize the empty sections that are currently in your layout later in this tutorial, so at this point do not worry about the white space.

You also may notice a person's first alias is not on the same line as their name and person ID. A layout program will automatically move down the page at the end of each section. You can modify the behavior of the section by modifying the section properties. To have the person's first alias display on the same line as their name and person ID, modify the properties on the HeadP\_Person\_IDSection.

18. Close the Report Output window and click the HeadP\_Person\_IDSection to ensure it is active.
19. In the Properties dialog box, modify the Advance Y Position from Yes to No. Your Properties dialog box is displayed similar to the following example:



20. From the Build menu, select Run “Your\_Layout\_Program” or press CTRL+F5 to execute your layout program.
21. Select Yes when prompted to save the layout program.
22. When prompted, enter the last name of a person that you know has a MRN and or a SSN and click Execute. Once your layout program is executed, the output should be similar to following example:



23. Close the Report Output when finished.

## Page of Page

A common request is for reports to display the current page number and the total number of pages. Using only *Discern Explorer* reportwriter sections in a select command to provide this functionality requires a lot of custom programming. However, layout programs provide this functionality using the special RPT\_PageOfPage variable. This variable is created by the layout program and only can be referenced in programs that use layouts.

1. Expand the Layout Builder Variables list on the Drop Items dialog by clicking on the plus sign (+) from the Drop Items.

2. Click and drag the RPT\_PAGEOPPAGE variable from the list and drop it in the FootPageSection to the left of the section. Use the handles to increase the size of the field as needed to display the entire field name. In the Properties dialog box, modify the Name to Page\_Of\_Page.
3. Using the vertical resize, click and drag FootReportSection up to the bottom of the field you just added.

## Column Headers

1. Use the Label tool  to add some column headers to the HeadPageSection. Place the following items in the HeadPageSection in vertical alignment with the corresponding items in the HeadPersonIdSection and the DetailSection:

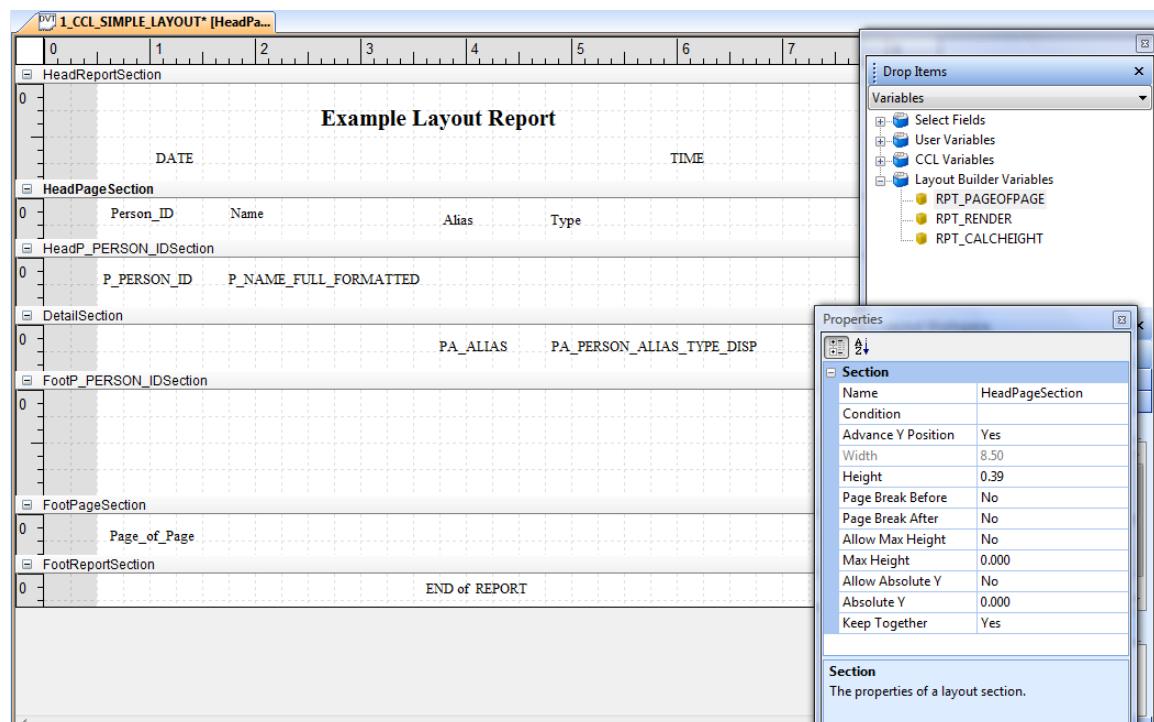
Person ID

Name

Alias

Type

2. Using the vertical resize, click and drag the HeadPersonIdSection up to the bottom of the labels you just added. Your layout should be similar to the following screen:



3. Select Run "Your\_Layout\_Program" from the Build menu or press CTRL+F5 to execute your layout program.

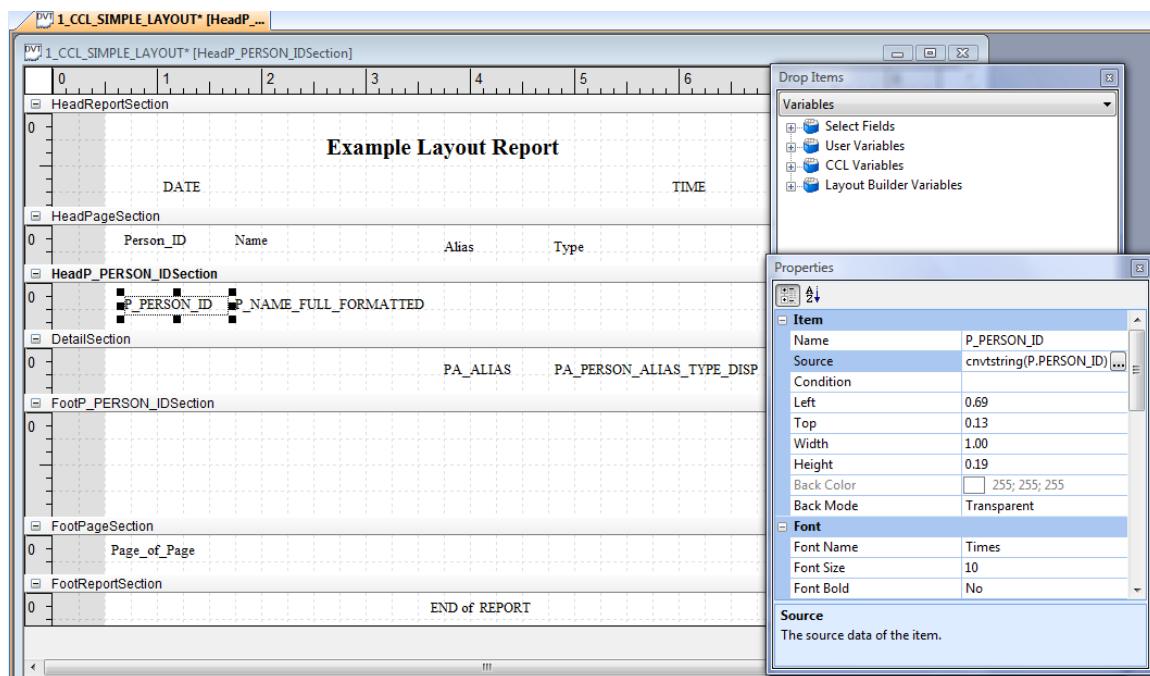
4. Select Yes when prompted to save the layout program.
5. When prompted enter the last name of a person you know has a MRN and or a SSN and click Execute. Once your layout program is executed, the output should be similar to following example:

#### Aligning data with different data types

Notice in the output example above, the Person\_ID: label and the actual person IDs are not aligned. Since the Person\_ID: label is a character data type, it is left-justified within the layout field, and since the actual Person IDs are a numeric data type they are right-justified within the layout field. There are several ways to correct this apparent misalignment. One simple method is to ensure the layout fields are the same width and

then click the Right Justify button  on the Formatting toolbar to right-justify the label. Another issue with the display of the actual Person IDs is that because they are F8 data type fields, the default display format is to show two digits to the right of the decimal point. A simple method to eliminate the .00 from the actual person IDs and have them left-justified is to convert them to a string.

1. Click the Person\_ID field in the HeadP\_PERSON\_IDSection and modify the Source from P.Person\_ID to CNVTSTRING(P.Person\_ID). You can expect your layout to be similar to the following screen:



2. Select Run “Your\_Layout\_Program” from the Build menu or press CTRL+F5 to execute your layout program.
3. Select Yes when prompted to save the layout program.
4. When prompted, enter the last name of a person that you know has an MRN or SSN and click Execute. Once your layout program is executed, the output should be similar to following example:

The screenshot shows a Windows application window titled "Report Output - 1\_CCL\_SIMPLE\_LAYOUT:group1". The menu bar includes "Task", "Edit", "View", and "Help". The toolbar contains icons for file operations like Open, Save, Print, and zoom controls. The main area displays four distinct layout sections, each containing a table of data. The first section has a header row with Person ID, Name, Alias, and Type. It lists three entries for Babara Jones. The second section lists two entries for CannonballJones. The third section lists three entries for Green LanternJones. The fourth section lists two entries for JONES, JENNIFER. The bottom status bar shows "Ready", "Page 1", and "Execute time (secs): 2.217".

Person ID	Name	Alias	Type
1085036.00	Babara Jones	261620	MRN
		88	MRN
		761923403	SSN
1244630.00	CannonballJones	1548	MRN
		984612063	SSN
1368822.00	Green LanternJones	1972	MRN
		572	MRN
		156489468	SSN
5243596.00	JONES, JENNIFER	1313	MRN
		238746873	SSN

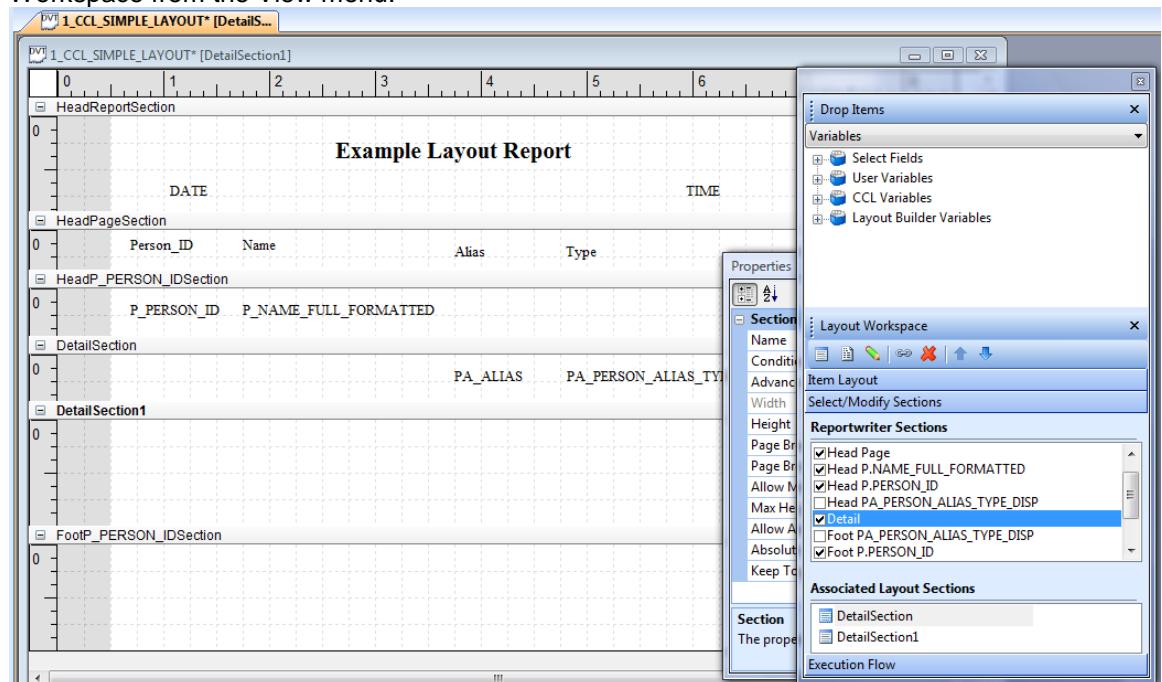
## Using Multiple Layout Sections in a Reportwriter Section

Layout programs allow you to use more than one layout section in a reportwriter section.

A common instance for using multiple layout sections within a reportwriter section is when you want to display information if a condition is true. For example, suppose in addition to displaying the MRN as text, you also want to display the MRN as a bar code below the

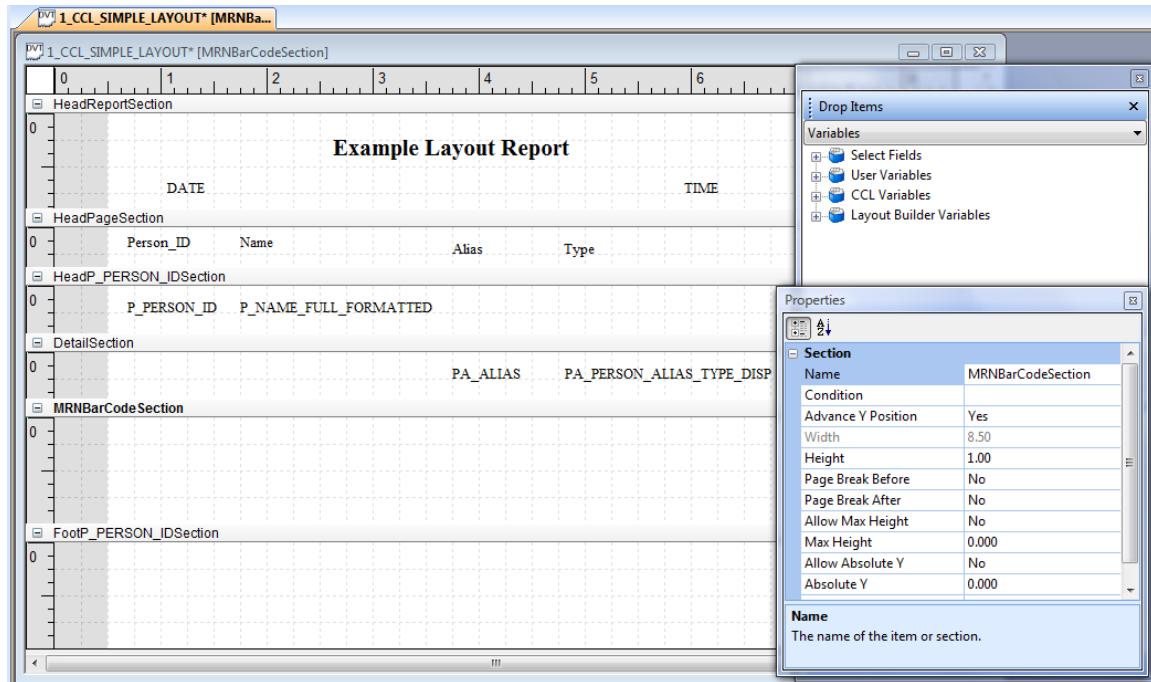
text. You can do this by using the Barcode  tool to place the bar code below the alias and use a condition to only display the bar code if the alias is a MRN. A possible problem with this method is that when the alias is not an MRN, white space is displayed in the bar code area when the layout program is executed. To eliminate the extra white space when the alias is not an MRN, you can create a second layout section in the Detail reportwriter section. You then can place the bar code item in this layout section and use a condition on the layout section to only render when the alias is an MRN. Layout sections can be added and associated to the reportwriter section by using the New Layout Section icon on the Layout Workspace dialog box.

1. Click the DetailSection in your layout to ensure it is active.
2. Click the New Layout Section button  on the Layout Workspace toolbar. If the Layout Workspace toolbar is not in view in your window pane, select Layout Workspace from the View menu.

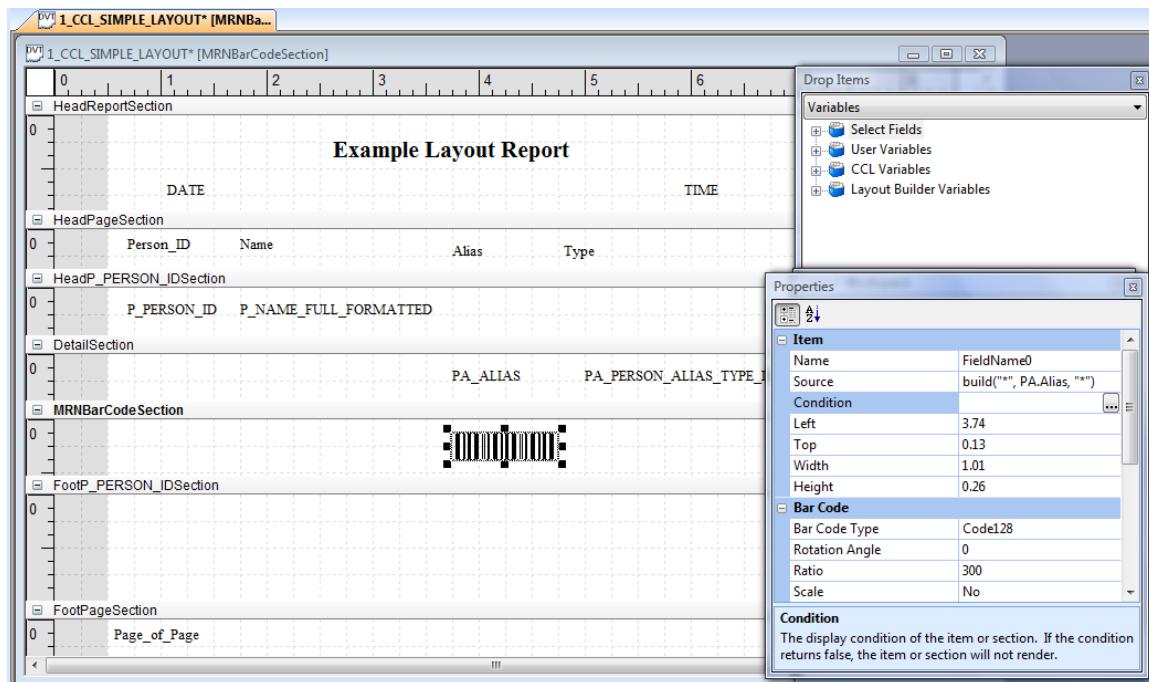


The new section is automatically inserted in the ordered position based on the selected Reportwriter section. In our example, the DetailSection1 is created directly below the DetailSection. As a layout section can be associated to a Reportwriter section, for each section, there is an Associated Layout Section which displays a list of associated layout sections. In the above screenshot, note that the DetailSection1 layout section is active. The Associated Layout Sections lists both the DetailSection and the DetailSection1. Adding the new layout section below the Detail reportwriter section will help to keep the layout view looking like the output. When your layout program is executed, the query associated with the layout is executed and returns a result set. For each record returned by the query, the Detail reportwriter section is executed. Each time the Detail reportwriter section is executed, the DetailSection and DetailSection1 layout sections are also executed.

3. Use the Properties dialog to modify the name of your new layout section to **MRNBarCodeSection**. Your layout should be similar to the following example:



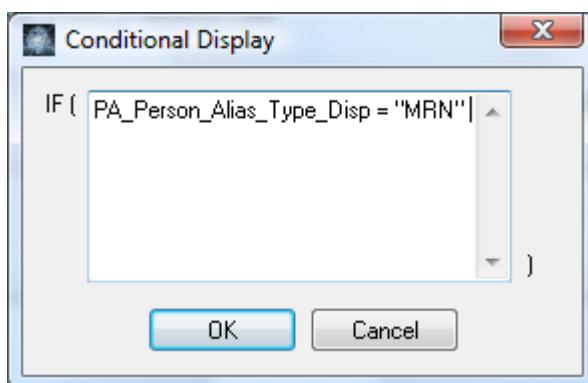
4. Use the Barcode tool to place a barcode field in the MRNBarCodeSection. Place the field so that it is vertically aligned with the Alias field in the DetailSection.
5. In the properties dialog enter **build("\*, PA.Alias, ")** as the source. Since the default Bar Code Type is Code128, a "\*" is added as start and stop characters to the PA.Alias field using the Build() function. Your layout should be similar to the following screen:



6. Use vertical resize to click and drag the FootP\_Person\_IDSection up to the bottom of the bar code field you just added.

You now have created a second layout section (MRNBarcodeSection) that displays each alias as a bar code. You must add a condition to the MRNBarcodeSection so that it only executes when the alias is an MRN.

7. Click the MRNBarcodeSection bar and verify the Properties dialog box is displaying the properties for the MRNBarcodeSection.
8. Click the Condition property and then the ellipsis [...] button to open the Conditional Display dialog box.
9. Enter **PA\_Person\_Alias\_Type\_Disp = "MRN"** in the IF statement.



10. Click OK to close the Conditional Display dialog box. Using the conditional display will cause the section to only be executed when the condition is true.

11. Select Run “*Your\_Layout\_Program*” from the Build menu or press CTRL+F5 to execute your layout program.
12. Select Yes when prompted to save the layout program.
13. When prompted, enter the last name of a person that you know has an MRN or SSN and click Execute. Once your layout program is executed, the output should be similar to following example:

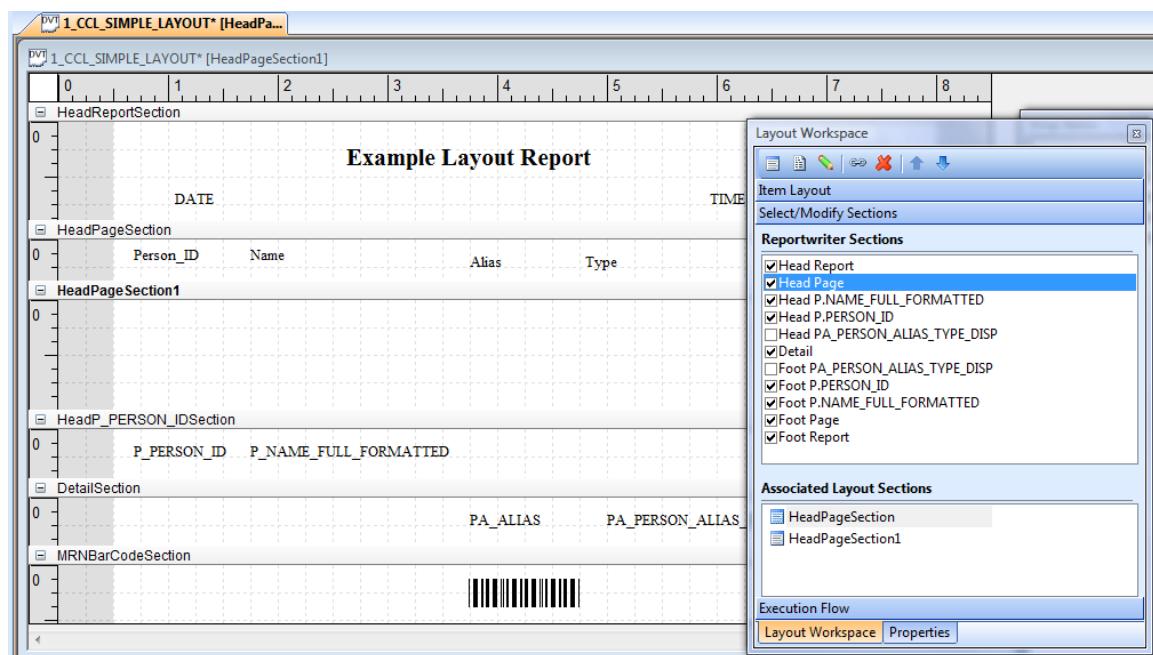
The screenshot shows a Windows application window titled "Report Output - 1\_CCL\_SIMPLE\_LAYOUT:group1". The window has a menu bar with "Task", "Edit", "View", and "Help". Below the menu is a toolbar with various icons. The main area is titled "Example Layout Report" and contains the following data:

Person ID	Name	Alias	Type
1085036.00	Babara Jones	261620	MRN
			MRN
		88	
			SSN
		761923403	
1244630.00	CannonballJones	1548	MRN
			MRN
		984612063	
1368822.00	Green LanternJones	1972	MRN
			MRN
		572	

At the bottom of the window, there are status bars for "Ready", "Page 1", and "Execute time (secs): 0.234".

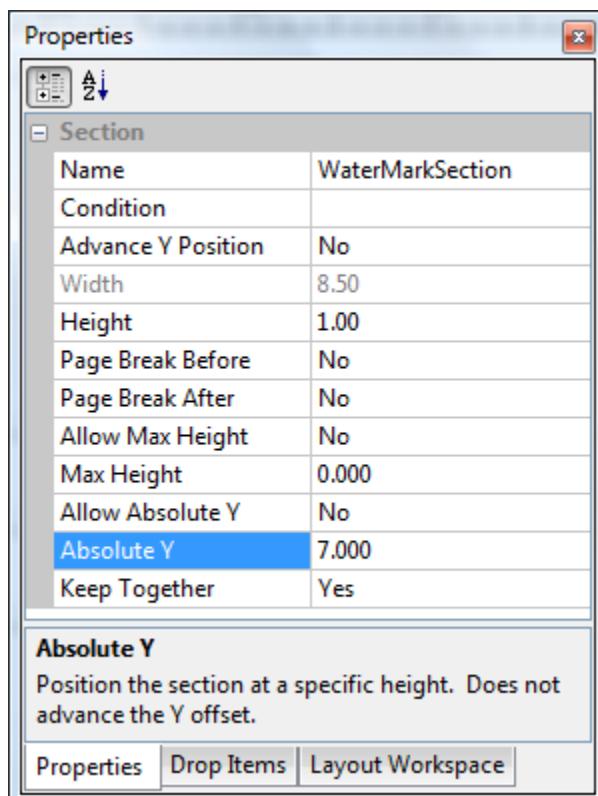
Another example of using multiple layout sections within a reportwriter section is when you want to display large or irregular items.. For example, if you want to display some information on the side of each page rotated to a vertical position and some other information across the top of the page in a horizontal position, you can use one large layout section in either the head or foot page reportwriter section. However, using the large section might make the layout view cluttered and difficult to read. Using two layout sections, one for the vertical text and the other for the horizontal text, will help alleviate this problem. A similar example that is useful in your person alias report is to display a watermark diagonally across the page that says "Confidential" to remind the person reviewing the report it contains confidential information. Using a separate layout section for the watermark allows it to be laid down first and then other items can be displayed over it. To make the layout view easier to read you could place the watermark section at the end of the layout but associate it to the Head Page reportwriter section.

14. Click the HeadPageSection to ensure that it is active.
15. Click the New Layout Section button  on the Layout Workspace toolbar. If the Layout Workspace toolbar is not in view in your window pane, select Layout Workspace from the View menu. The new section is created directly below the HeadPageSection and is associated with the Head Page reportwriter section. Your layout should be similar to the following example:

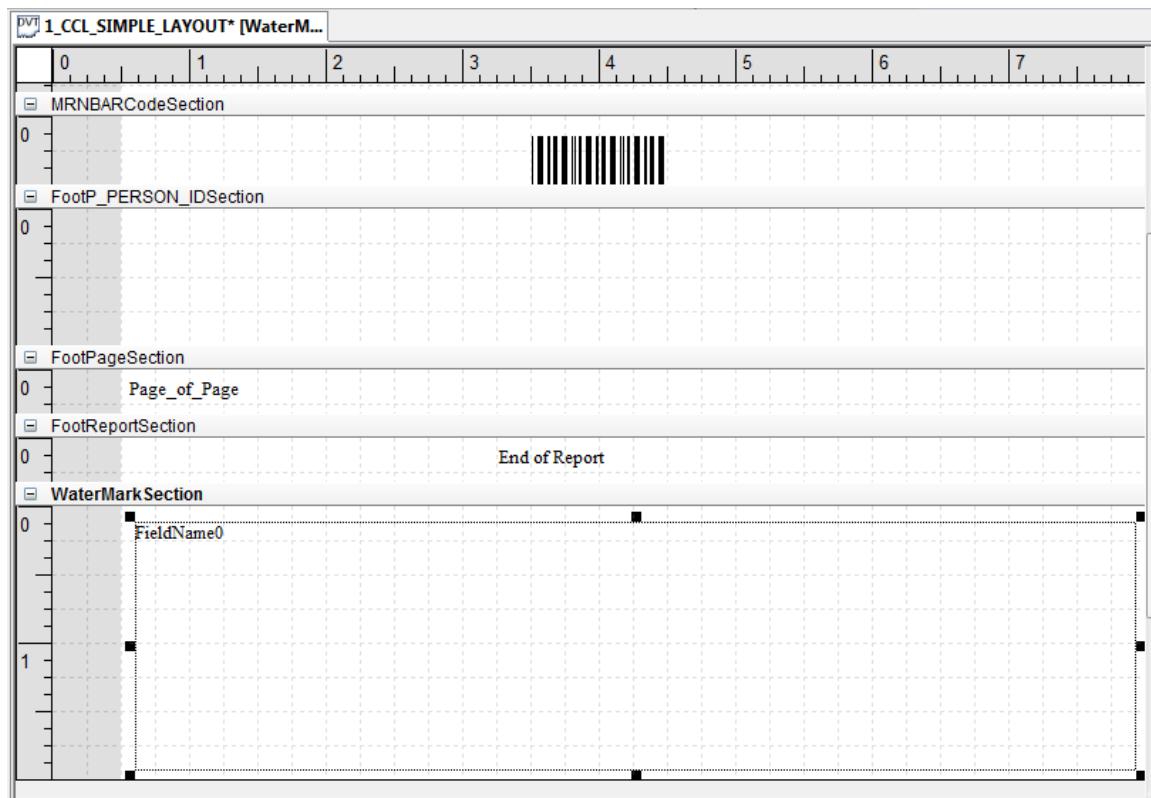


16. Click on the new section name (HeadPageSection1) listed in the Associated Layout Sections. Click the move up button  to move the new section to the top. Moving the new section (HeadPageSection1) to the top of the Selected Sections list enables it to be rendered before the HeadPageSection is rendered. Since these two layout sections are added to the Head Page reportwriter section, each layout section is rendered each time a page break is generated. Having the new section (HeadPageSection1) rendered as the first layout section on the page ensures that any other layout section is rendered over the watermark

17. Move the new section to the bottom of all of the layout sections by selecting the section bar header or the ruler underneath the header and dragging the section down. Drop it once your cursor is in the middle of the FootReportSection. Placing the section at the bottom will make the layout view easier to read and appear less cluttered.
18. Use the Properties dialog box to change the name of your new layout section to **WaterMarkSection**.
19. Modify the Advance Y Position to **No**. Not advancing the Y position allows the top of the next section to be rendered in the same location as the top of this section.
20. Modify Allow Absolute Y to **Yes**.
21. Modify Absolute Y to **7.0**. Allowing Absolute Y and setting Absolute Y to 7.0 causes the bottom left corner of this section to be rendered 7 inches down the physical page. Your Properties dialog box should be displayed similar to the following example:



22. By default the section is created with a height of one inch. Modify Height to **2.00**. You could also use the vertical resize to click and drag the bottom of the section down.
23. Use the Label tool  to add a field to the WaterMarkSection.
24. Use the handles to expand the size of the field until it is large enough to cover most of the WaterMarkSection.

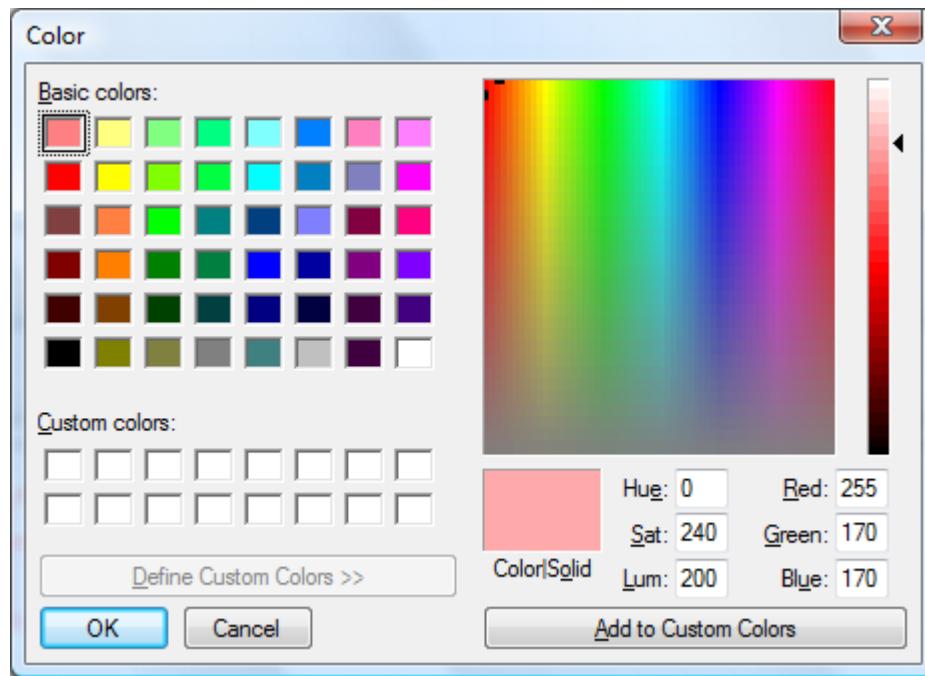


25. In the Properties dialog, enter **Confidential** as the source.

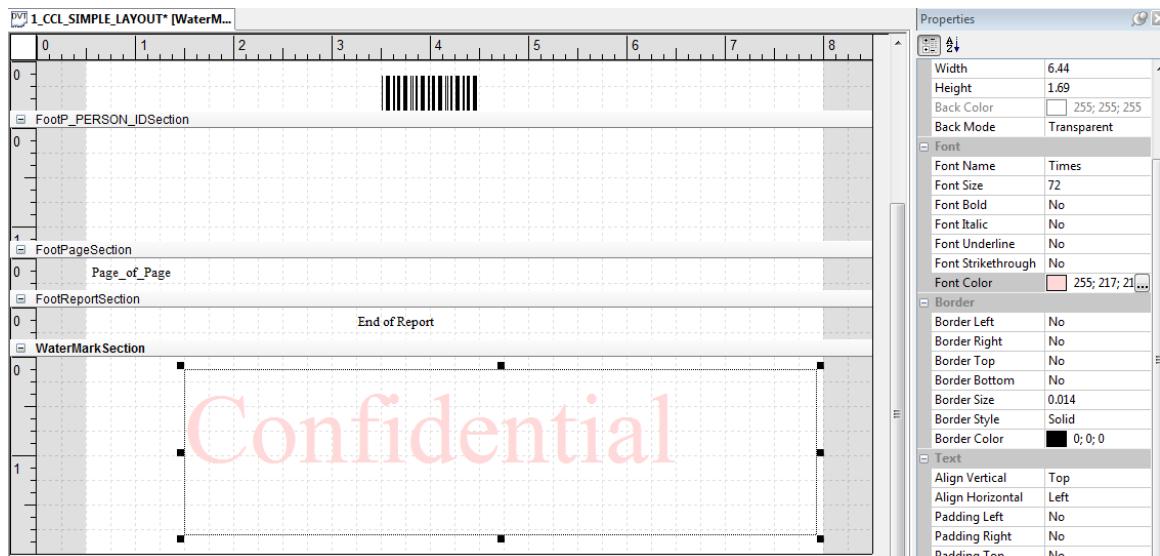
26. Set the Font Size to 72.

27. Set the Font Color to a very light red.

To get the color light enough for the watermark, use the color sliding scale by clicking on the Define Custom Colors >> button on the Color dialog box.

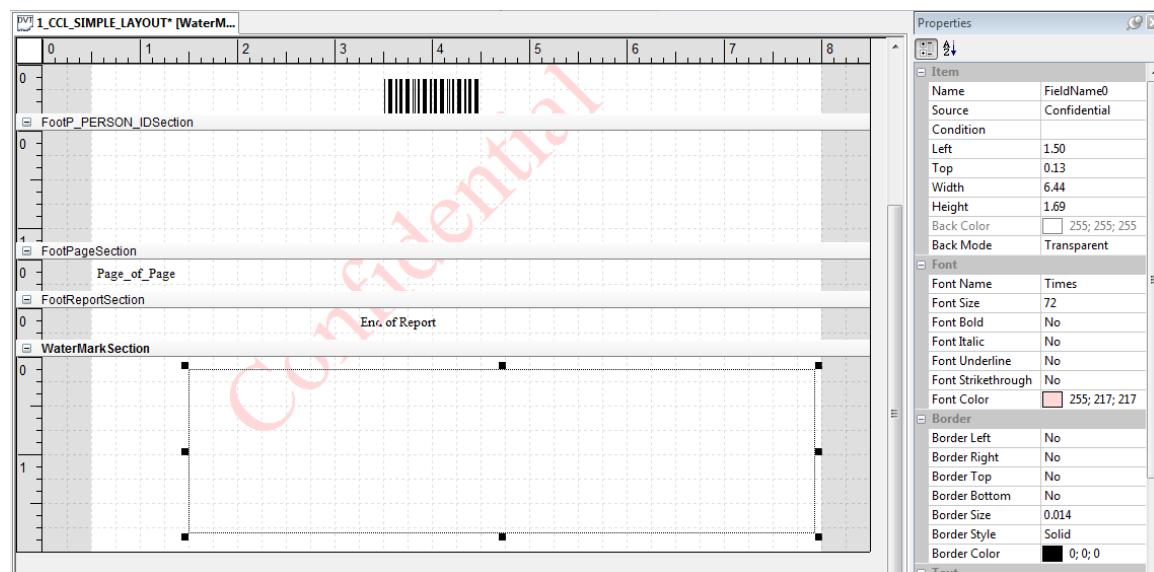


Click OK. Your layout should be similar to the following screen:

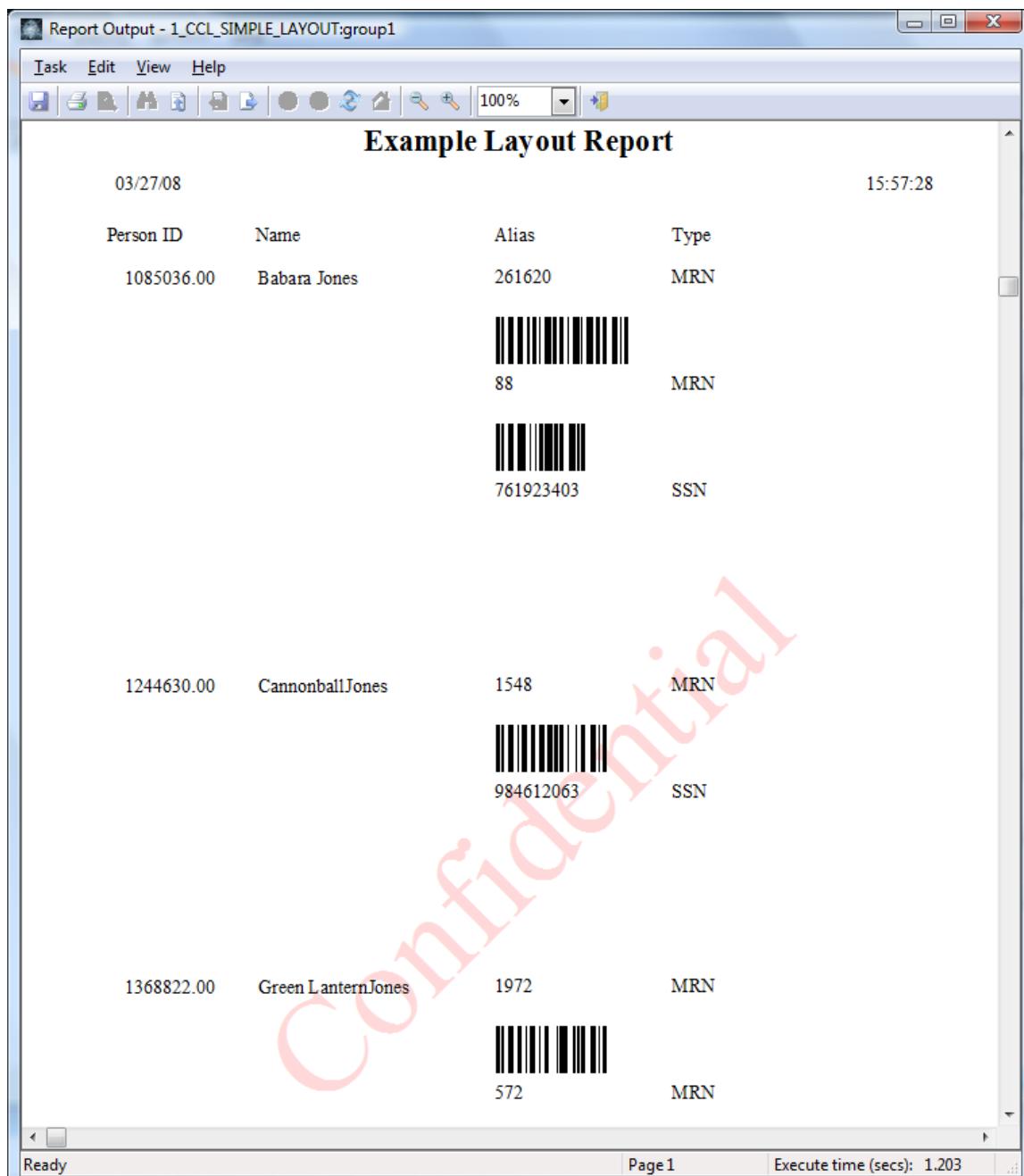


28. Set the Rotation Angle to 45.

Changing the rotation angle will cause the text to be rotated within the rectangular area. When the text is rendered it is placed at a 45-degree angle across and up the page. Your layout should resemble the following example after setting the rotation angle:



29. From the Build Menu, select Run “Your\_Layout\_Program” or press CTRL+F5 to execute your layout program.
30. Select Yes when prompted to save the layout program.
31. When prompted, enter the last name of a person that you know has an MRN or SSN and click Execute. Once your layout program is executed, the output should be similar to following example:

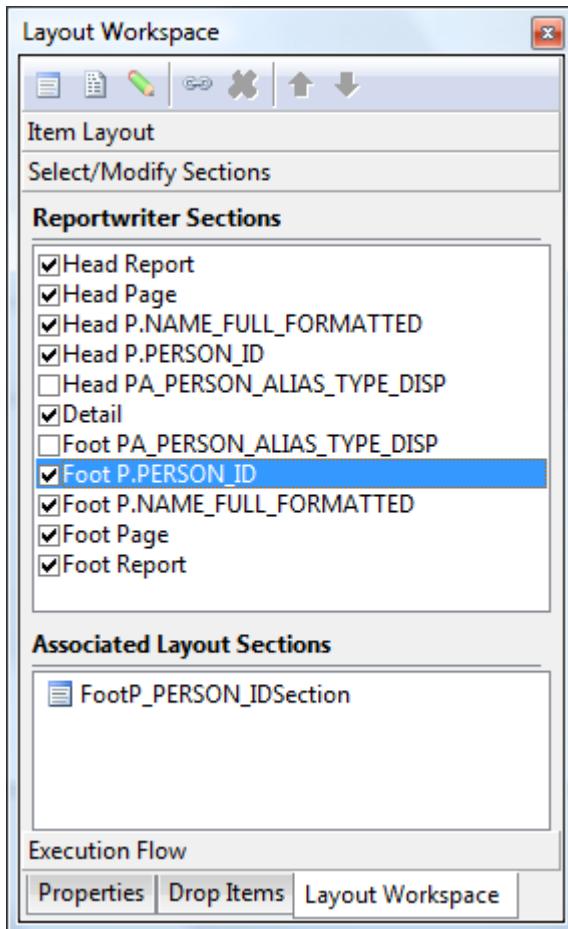


## Using Programming Commands in Sections

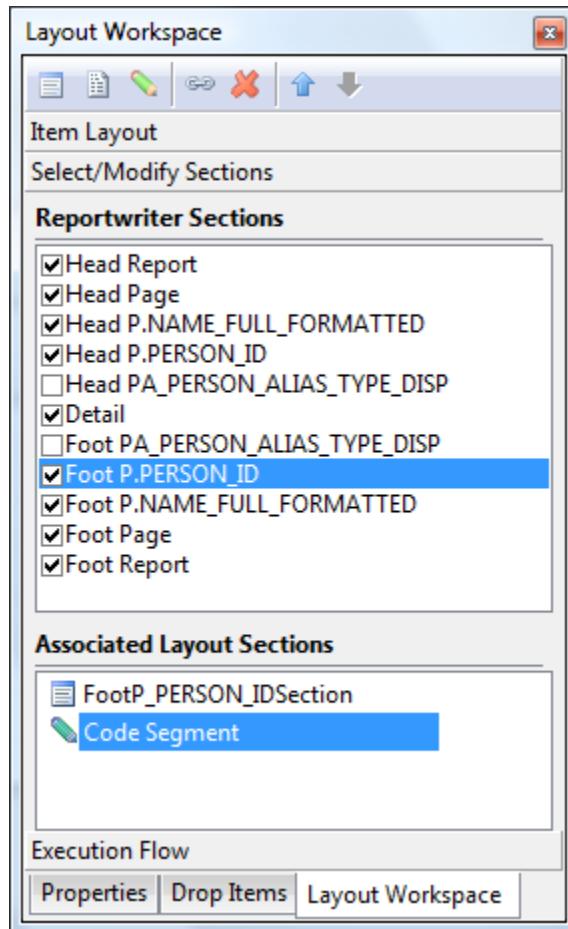
It is often necessary to use programming commands in reportwriter sections. For example, you might want to use aggregate functions to display counts or averages of data fields, or you might want to manipulate variables in one section and then use or display them in another section. The example report you have been working on does not require the use of aggregate functions, however, to demonstrate this process and functionality we will use the Count() aggregate function to display the number of aliases for a person. The layout program enables you to add code to a section without having it displayed on the

output. You can accomplish this by adding a New Code Segment on the Layout Workspace dialog box.

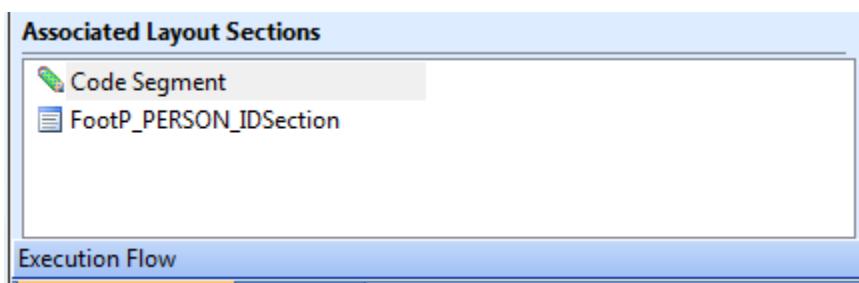
1. Within the Select/Modify Sections dialog box, select the Foot P.Person\_ID section by clicking the text (not the check box). FootP\_PERSON\_IDSection is displayed in the Associated Layout Section box.



2. Click the New Code Segment button on the Layout Workspace toolbar. The code segment is automatically inserted in to the Reportwriter Section.



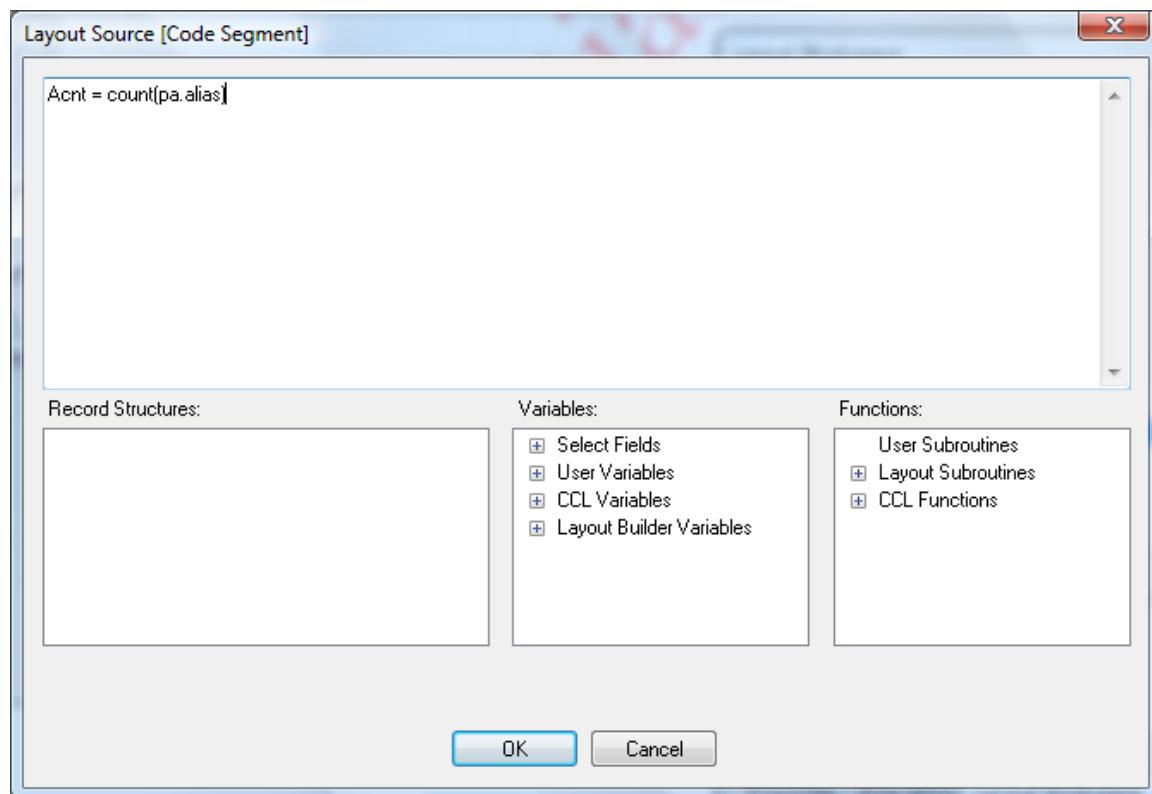
3. Click Code Segment in Associated Layout Section and click the up Arrow button to move it to the top of the list. Code Segments and Layout Sections are executed in the order that they appear in the Associated Layout Sections list. Moving the Code Segment to the top of the list causes the commands in the Code Segment to be executed before the FootP\_PPERSION\_IDSection Layout Section is rendered.



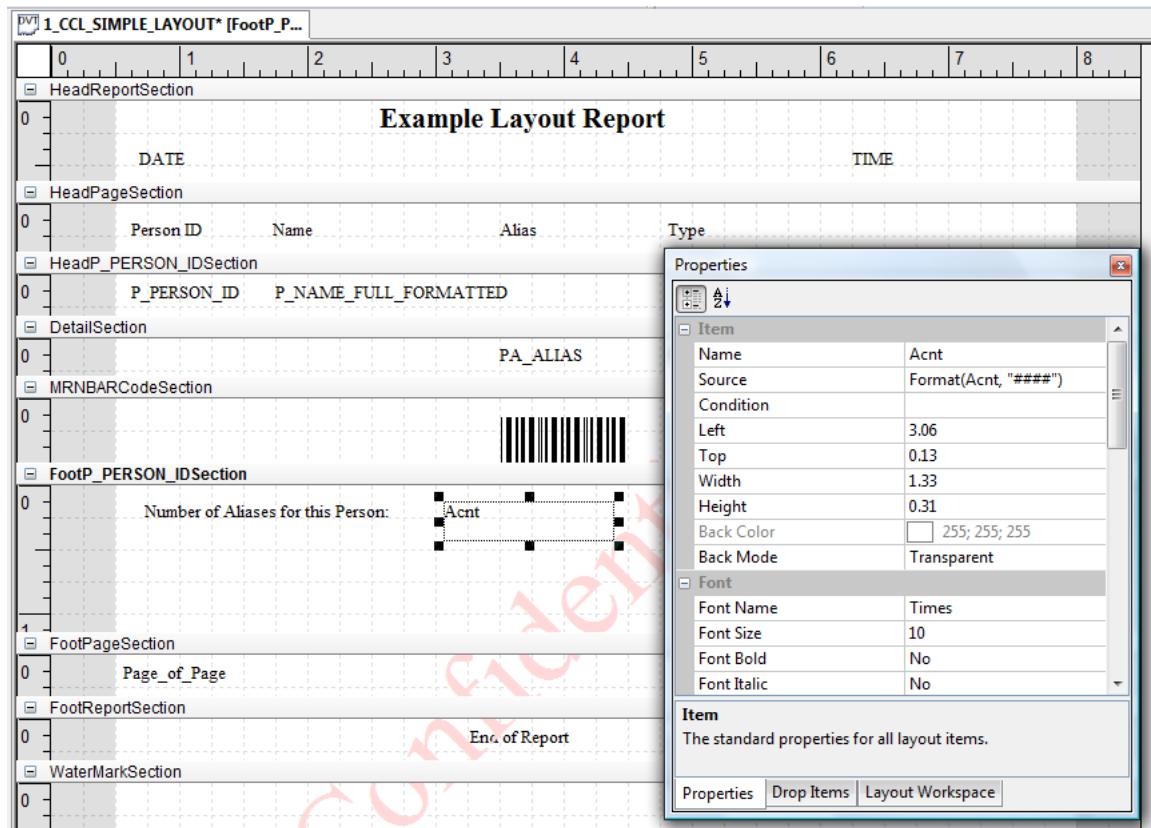
4. In the Associated Layout Sections double-click the Code Segment to open the Layout Source [Code Segment] dialog and enter the following command in the source window:

```
Acnt = count(pa.alias)
```

Note: You can use the CCL Functions list in the Functions window and the Select Fields list in the Variables window to build this command, or you can simply enter it.



5. Click OK to close the Layout Source [Code Segment] dialog.
6. Using the Label tool add the label: Number of Aliases for this Person: to the FootP\_Person\_IDSection.
7. Using the Text tool add a field to the FootP\_Person\_IDSection to display the Acnt variable you created above. In the Properties dialog box, modify the Name to **Acnt** and the Source to **Format(Acnt, "####")**.
8. Because Acnt is created as a numeric data type, it is displayed in a right-justified format with several leading spaces when it is rendered by the layout. Using the Format() function with the "####" template converts Acnt to a string data type and displays it in four columns. The Format function is not required; however, using it significantly improves the look of the display. If the person had more than 9999 aliases, the count would be inaccurate because only four digits of the count are displayed. Although this is unlikely with our example, this issue could be encountered in other situations. Your layout should be similar to the following screen:



9. Use the vertical resize to click and drag the FootPageSection title bar up to the bottom of the label and field you just added.
10. From the Build menu, select Run “Your\_Layout\_Program” or press CTRL+F5 to execute your layout program.
11. Select Yes when prompted to save the layout program.
12. When prompted, enter the last name of a person that you know has an MRN or SSN and click Execute. Once your layout program is executed, the output should be similar to following example:

Report Output - 1\_CCL\_SIMPLE\_LAYOUT:group1

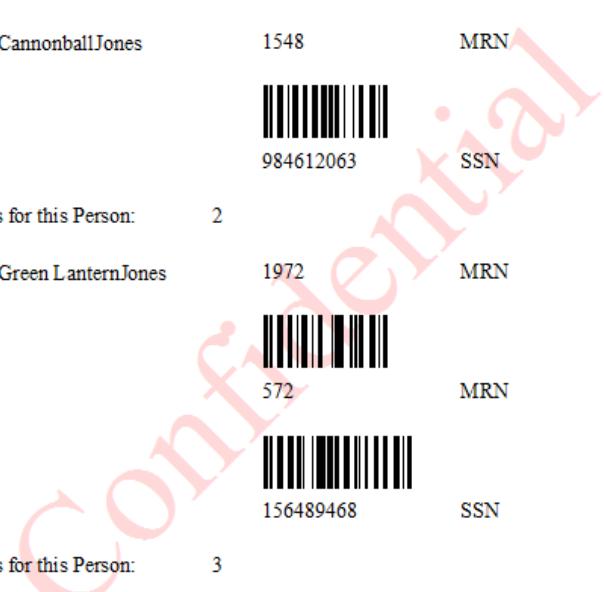
Task Edit View Help

03/27/08 16:03:41

Example Layout Report

Person ID	Name	Alias	Type
1085036.00	Babara Jones	261620	MRN
			88 MRN
			761923403 SSN
			Number of Aliases for this Person: 3
1244630.00	CannonballJones	1548	MRN
			984612063 SSN
			Number of Aliases for this Person: 2
1368822.00	Green LanternJones	1972	MRN
			572 MRN
			156489468 SSN
			Number of Aliases for this Person: 3

Ready Page 1 Execute time (secs): 0.203



Again, displaying a count of the aliases is not something you would normally do in this simple report. However, you will use this concept in many of the real layout reports you create in the future. A more realistic example of using commands in the layout source for this simple report is to add something to the output to draw attention to the fact that a person is missing either an MRN or SSN. Providing this type of functionality requires adding commands to the layout source of several sections. For example, each time you encounter a new person you can use code in the Head P.Person\_ID section to set a couple of flag variables to false to indicate the person does not have an MRN or SSN. Then in the Detail section you can use an IF statement to set the flags to true when a MRN or SSN is encountered. Finally, in the Foot P.Person\_ID section you can use the

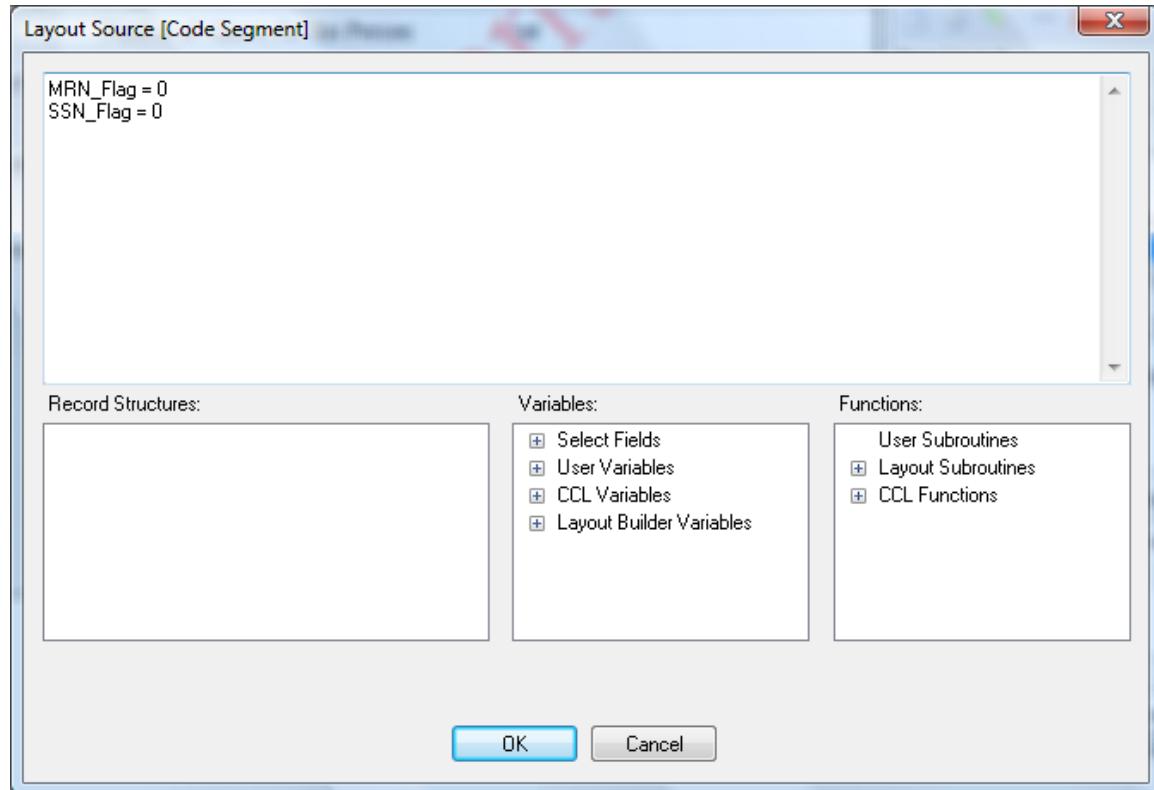
flag variables as a condition to display a specific warning if the person is missing one of the aliases.

13. Within the Select/Modify Sections dialog box of the Layout Workspace, select the Head P.Person\_ID section by clicking the text, not on the check box. Head P.Person\_ID is displayed in the Associated Layout Section box.

14. Click the New Code Segment  button on the LayoutWorkspace toolbar. The code segment is automatically inserted in to the Reportwriter Section.
15. Double-click the Code Segment to open the Layout Source [Code Segment] dialog and enter the following commands in the source window:

```
MRN_Flag = 0  
SSN_Flag = 0
```

Your layout should be similar to the following screen:

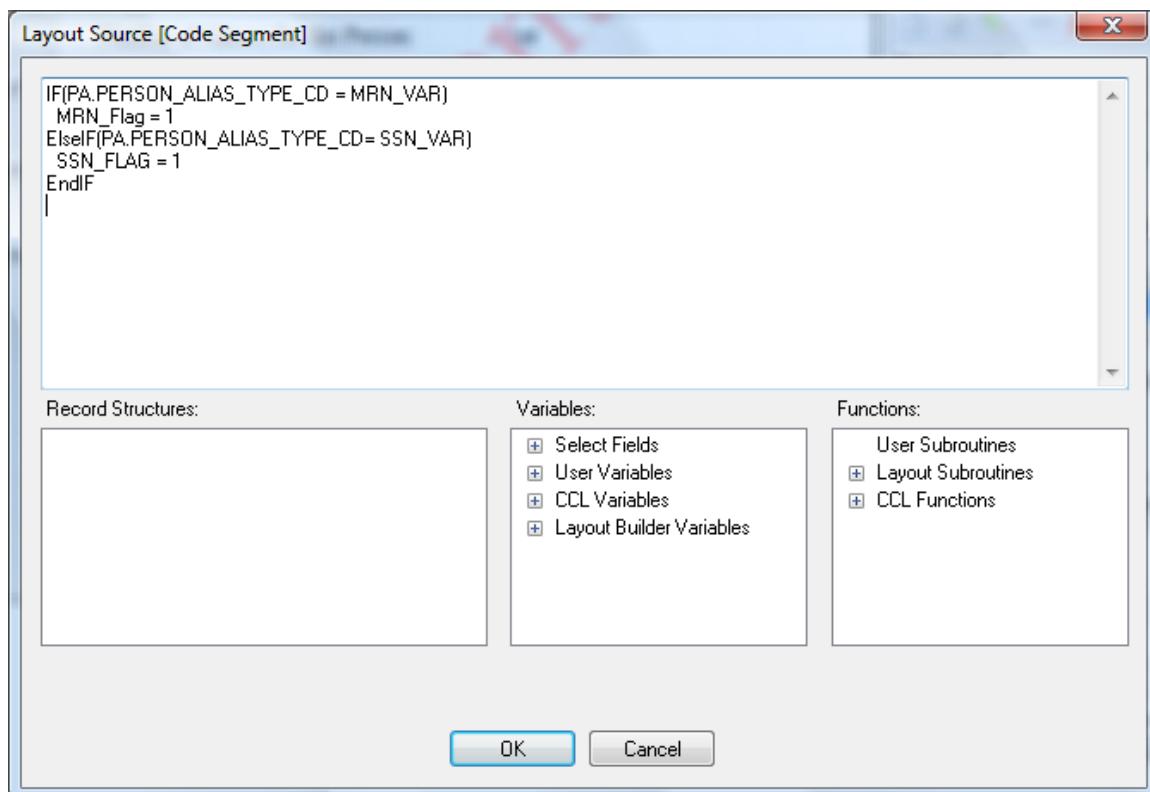


16. Click OK to close the Layout Source [Code Segment] dialog.
17. Within the Select/Modify dialog box, select the Detail section by clicking the text (not the check box). Detail is displayed in the Associated Layout Section box.
18. Click the New Code Segment button on the Layout Workspace toolbar to add to the Reportwriter Section.

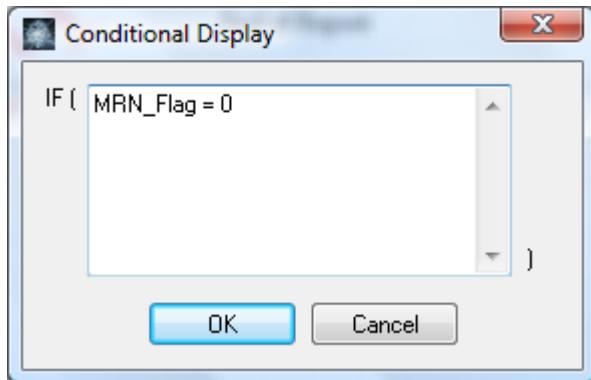
19. In the Associated Layout Sections, double-click the Code Segment to open the Layout Source [Code Segment] dialog and enter the following commands in the source window:

```
IF(PA.PERSON_ALIAS_TYPE_CD = MRN_VAR)
    MRN_Flag = 1
ElseIf(PA.PERSON_ALIAS_TYPE_CD= SSN_VAR)
    SSN_FLAG = 1
EndIF
```

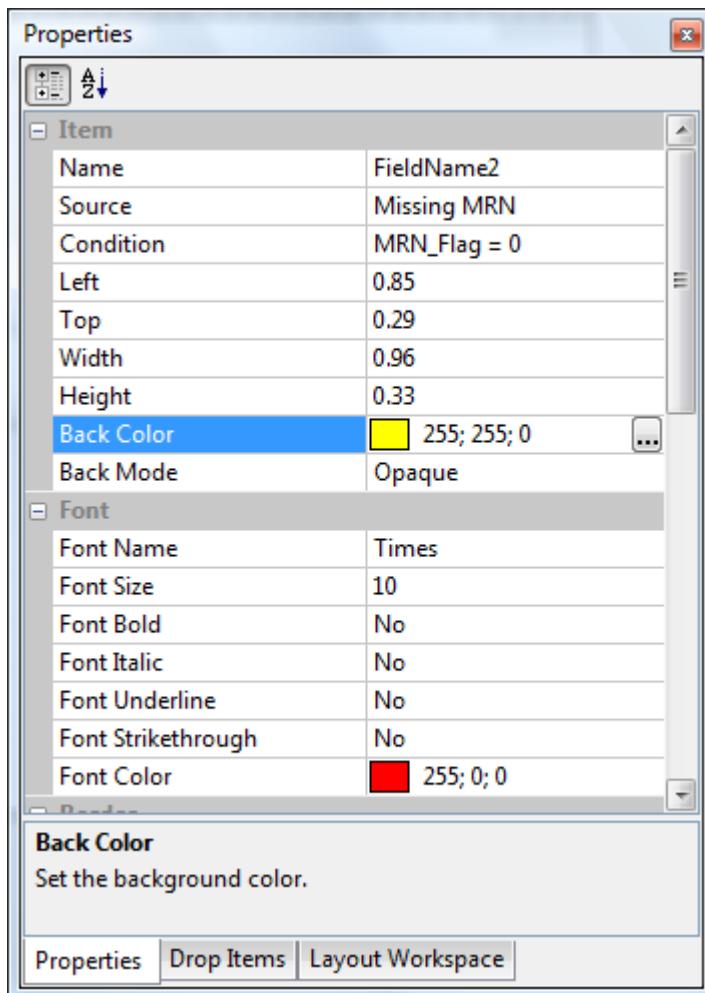
You created the MRN\_VAR and SSN\_VAR variables in the Add Variables topic earlier in this tutorial.



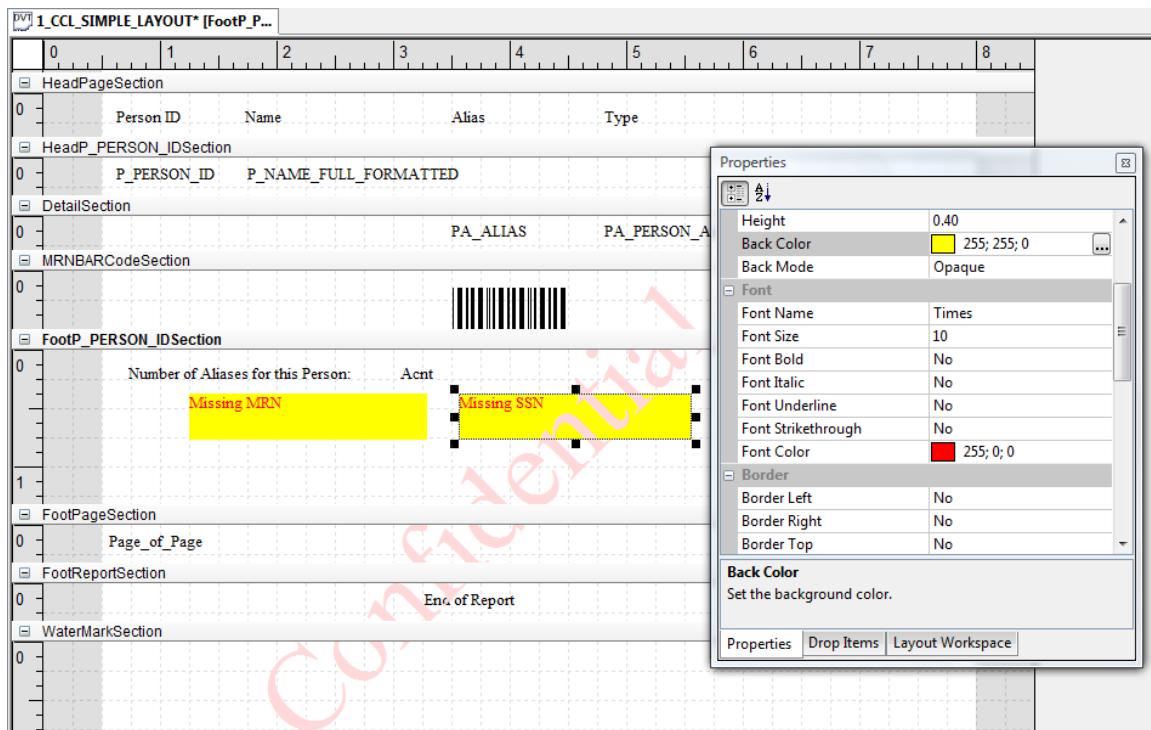
20. Click OK to close the Layout Source [Code Segment] dialog box.
21. Use the vertical resize to increase the height of the FootP\_Person\_IDSection.
22. Using the Label tool add a Missing MRN label to the FootP\_Person\_IDSection.
23. In the Properties dialog box, click the Condition property to activate the ellipsis button.
24. Click the ellipsis button to open the Conditional Display dialog box.
25. Enter **MRN\_Flag = 0** in the IF statement on the Conditional Display dialog box.



26. Click OK to close the Conditional Display dialog box and return to the Properties dialog box.
27. Modify the Font Color to Red.
28. Modify the Back Mode to Opaque.
29. Modify the Back Color to Yellow. Your Label Properties dialog box is displayed similar to the following example:



30. Using the Label tool , add a Missing SSN label to the FootP\_Person\_IDSection.
31. In the Properties dialog box, click the Condition property to activate the ellipsis 
32. Click the ellipsis  button to open the Conditional Display dialog box.
33. Enter **SSN\_Flag = 0** in the IF statement on the Conditional Display dialog box.
34. Click OK to close the Conditional Display dialog box and return to the Properties dialog box.
35. Modify the Font Color to Red.
36. Modify the Back Mode to Opaque.
37. Modify the Back Color to Yellow. Your layout should be similar to the following screen:



38. From the Build menu, select Run “*Your\_Layout\_Program*” or press CTRL+F5 to execute your layout program.
39. Select Yes when prompted to save the layout program.
40. When prompted, enter the last name of a person that you know has a MRN or SSN and click Execute. Once your layout program is executed, the output should be similar to following example:

Report Output - 1\_CCL\_SIMPLE\_LAYOUT:group1

Task Edit View Help

1066355.00 Jason John Jones 261416 MRN

Number of Aliases for this Person: 1

Missing SSN

1083166.00 Johnny Jones MRN1021007 MRN

Number of Aliases for this Person: 1

Missing SSN

1047953.00 Jones, Adrian 65465161 SSN

Number of Aliases for this Person: 1

Missing MRN

1416517.00 Jones, Bob 1234455 MRN

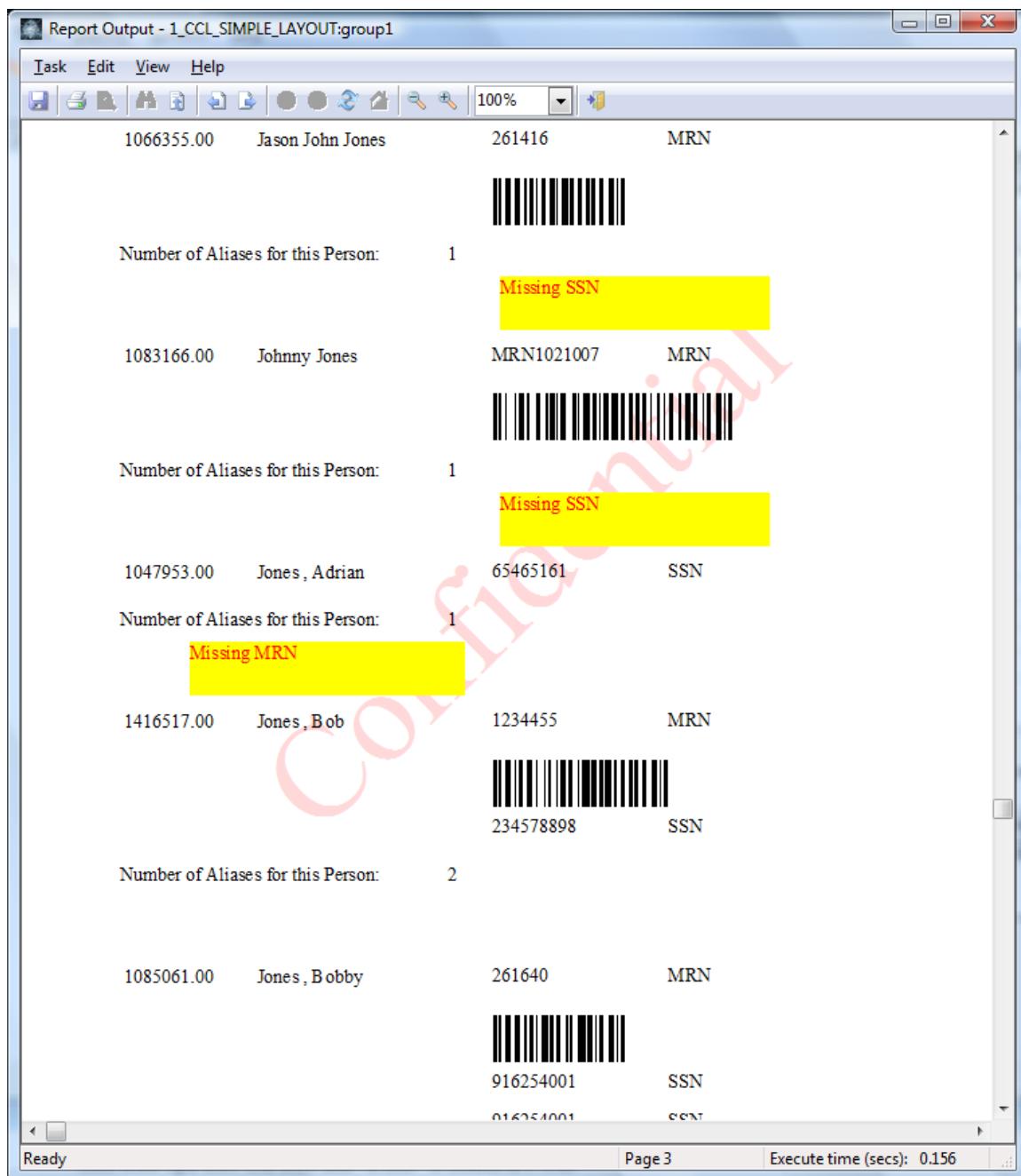
Number of Aliases for this Person: 2

1085061.00 Jones, Bobby 261640 MRN

916254001 SSN

016254001 SENT

Ready Page 3 Execute time (secs): 0.156



41. Close the Output Viewer.

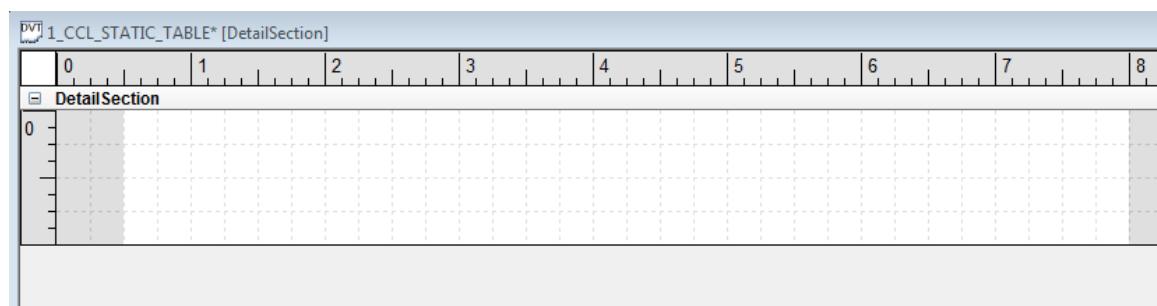
## Adding a Static Table

You can add information from a query or static text to a report that is displayed in a grid, table type format, or bordered in a box. For example, on an application form, you may see a section labeled *For Office Use Only*. This section is boxed off and has static information and a box to be filled out by the office staff. You can also show data from a query in a grid format. You can accomplish this by using a Static Table . A Static

Table is an item that can be placed in a section. A Static Table can be placed in a new section or in any preexisting section. You can place text, variables, or fields from a query to the Static table. However, when the Static Table is used, the file cannot be created as HTML.

To demonstrate the functionality and usage of a Static Table, create a layout program that displays orders and order details in a date range for a person's most recent encounter. Use a Static Table to display the order information in a grid-like format for each individual person. Also use a Static Table to create a section specifically for the office staff to fill out.

1. Using DVDev, select New from the File menu. Verify the New dialog box is displayed.
2. Select Layout Program from the File Type list.
3. Enter **1\_your\_initials\_STATIC\_TABLE** as the Program Name and click OK. Verify the New Layout Program dialog box is displayed.
4. Verify that the Standard Layout is selected for the Report Layout and Postscript is selected for the Output Type. Click Finish. A new layout program with a single section is created similar to the following example:



Before using the layout section, some preliminary work is necessary to retrieve people and their order information. For our example, we will prompt the user for an output device and a date range. We want to retrieve the person ID, full formatted name, encounter ID, order ID, status of the order, order mnemonic and the details for the orderable for orders given in the date range the user entered at the prompt.

To begin, create prompts to enable the user to view the output of the layout program or send it directly to a printer, and to get a date range from the user to use in a qualification.

5. From the Tools menu, select Prompt Builder. Verify the Prompt Builder dialog box is opened with a single control for an output device.
6. Click Add to a second prompt to retrieve the beginning of a date range from the user.
7. On the General Tab, set the following:
  - Prompt Display: Enter a beginning date for orders completed:
  - Prompt Name: Sdate
  - Control Type: Date Time

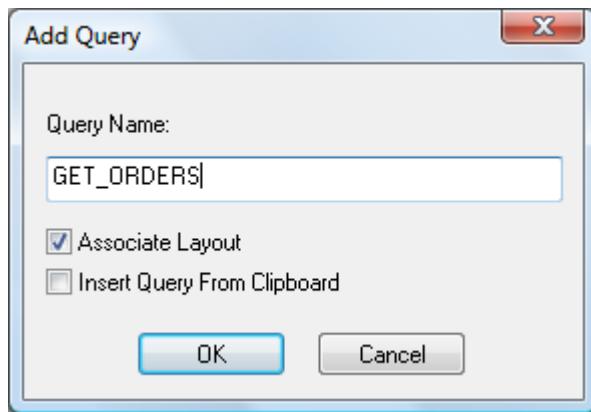
- Prompt Type: String
8. On the Date / Time tab, verify that the Date Only option is selected and the Command Line Format is DD-MMM-YYYY.
  9. In the Anchor date & time area on the Calculate Default tab, uncheck the Current date & time option. Enter a negative value in the Day or Month control to make the default start date far enough in the past to allow a query to qualify orders that were completed on several days of the week.

The negative value you enter should depend on the amount of data that exists in your environment. If you have a lot of data, set the Day field to -7 to make the default start date one week in the past. If you do not have a lot of data, you may need to set the Month field to -3 to make the default start date three months in the past.

10. Click Add to add a third prompt to get an end date from the user.
11. On the General Tab, set the following:
  - Prompt Display: Enter an ending date for orders completed:
  - Prompt Name: Edate
  - Control Type: Date Time
  - Prompt Type: String
12. On the Date / Time tab, verify that the Date Only option is selected and the Command Line Format is DD-MMM-YYYY.
13. Click Save to save the prompt form and close the Prompt Builder dialog box.

We are now ready to create the query will retrieve orders with the date range the user entered at the prompt.

14. From the Tools menu, select Query Builder. Verify the Add Queries dialog box is displayed.
15. Click Add to add a query to your layout program. Verify the Add Query dialog box is displayed.
16. Change the Query Name from Query1 to **Get\_Orders**.
17. Verify the Associate Layout option is selected. Your Add Query dialog box should be similar to the following:



18. Click OK to open the Query Builder.
19. From the Tables tab, select the ORDERS and PERSON tables. The rest of this section refers to P as the alias for the PERSON table and O as the alias for the ORDERS table.
20. On the Fields tab select:
  - P.PERSON\_ID,
  - P.NAME\_FULL\_FORMATTED,
  - O.ENCNTR\_ID
  - O.ORDER\_ID
  - O.ORDER\_MNEMONIC
  - O.ORDER\_STATUS\_CD
  - O.ORIG\_ORDER\_DT\_TM
  - O.ORDER\_DETAIL\_DISPLAY\_LINE

21. Add the following code to the Qualifications tab:

```
PLAN O WHERE O.PERSON_ID+0 > 0
    AND O.ORIG_ORDER_DT_TM BETWEEN CNVTDATETIME($SDate)
    AND CNVTDATETIME(CONCAT($EDate,CHAR(32),"235959"))
    AND O.ENCNTR_ID = (SELECT MAX(E.ENCNTR_ID) FROM ENCOUNTER E
        WHERE E.PERSON_ID = O.PERSON_ID)
```

JOIN P WHERE P.PERSON\_ID = O.PERSON\_ID

The qualification on O.ENCNTR\_ID will help to eliminate older orders and bring back orders only for the person's most recent encounter.

22. Using the Sort tab, sort on:

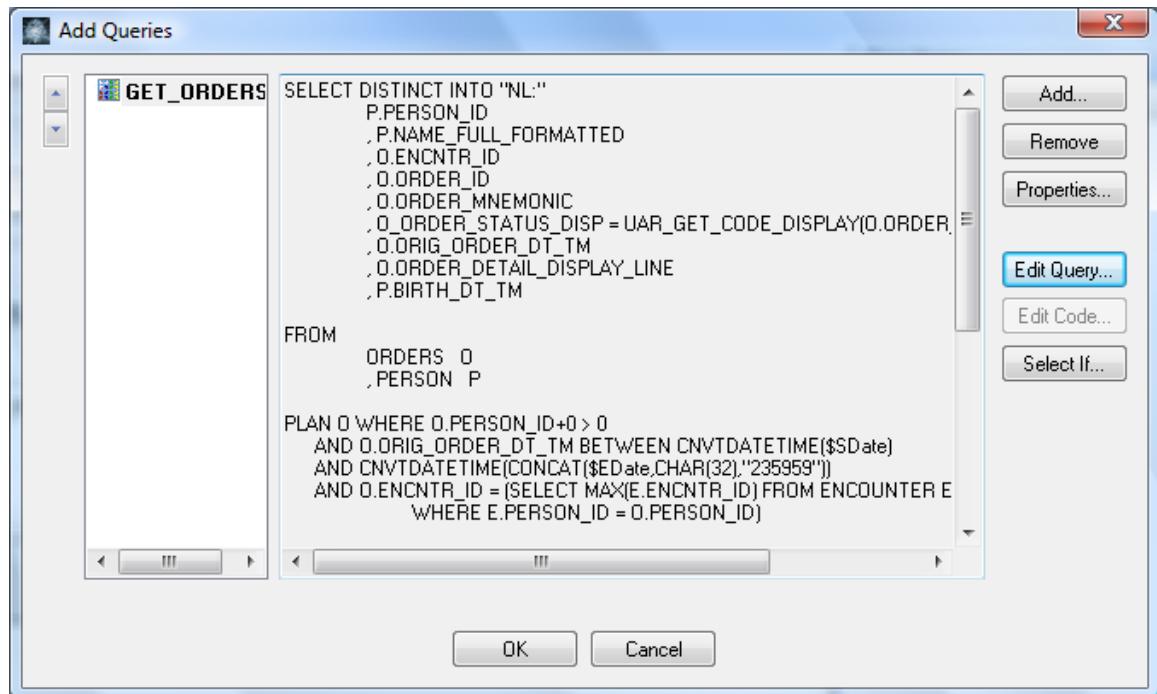
- P.PERSON\_ID

- O\_ORDER\_STATUS\_DISPLAY

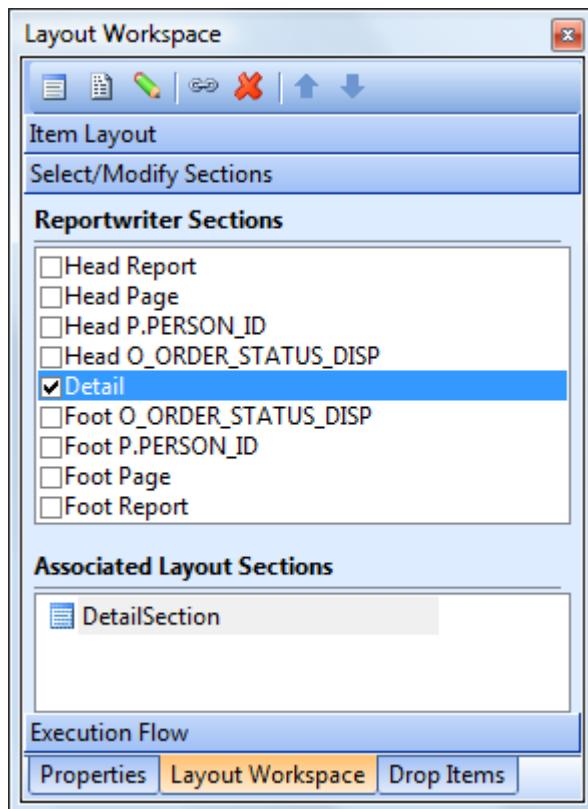
23. On the Control Options tab:

- Set the Max Records to 100.
- Select the Into option and verify that the box is populated with "NL:"

24. Click Close to close Query Builder. Your Add Queries dialog box is displayed similar to the following example:



25. Click OK to add the query to your layout program. The Select/Modify Sections dialog box is displayed by default on the Layout Workspace task panel. If the Layout Workspace task panel is not open, select Layout Workspace from the View menu.

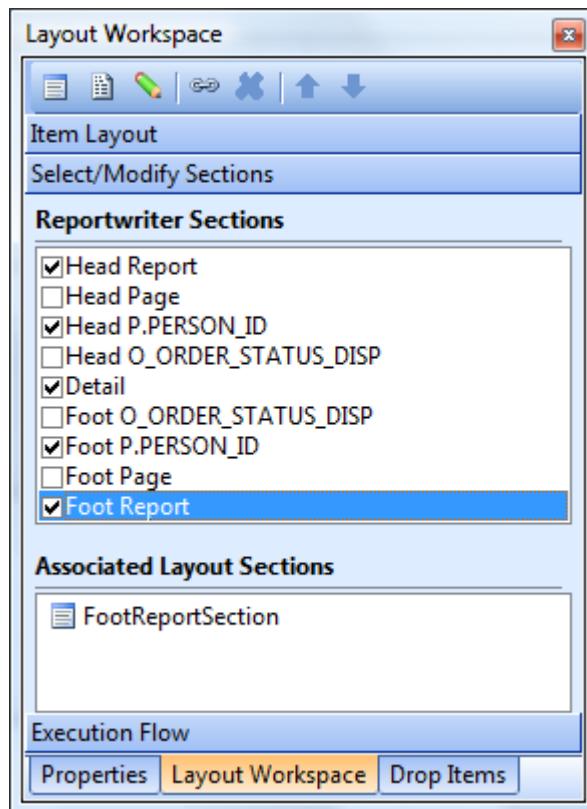


When you complete the query associated with the layout, the Select/Modify Sections dialog box is displayed automatically and associates the DetailSection to the Detail Reportwriter Section.

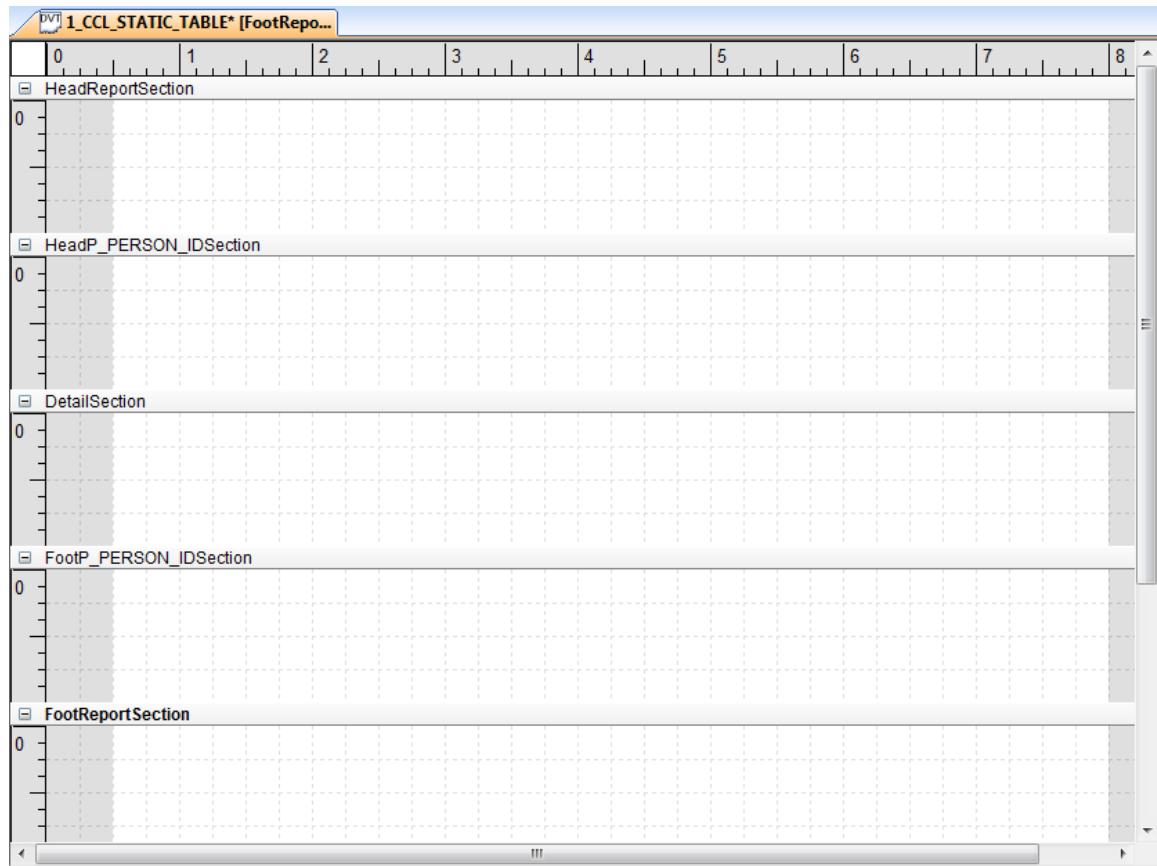
Since this query used an Order clause, a head and foot reportwriter section is available for each item in the Order clause. You should use at least one layout section for the head and foot report to write items once at the beginning and at the very end of the report. Use one section for the head and foot PERSON\_ID where you can process information about the person once at the beginning and once at the end. Use one detail reportwriter section where you would show all of the orders for a person.

26. Select the Head Report Reportwriter Section and click Yes to create a new HeadReportSection.
27. Repeat this process by selecting the following reportwriter sections:
  - Head P.PERSON\_ID
  - Foot P.PERSON\_ID
  - Foot Report

The Select/Modify Sections will look similar to the following example:



Your layout should be displayed similar to the following example:



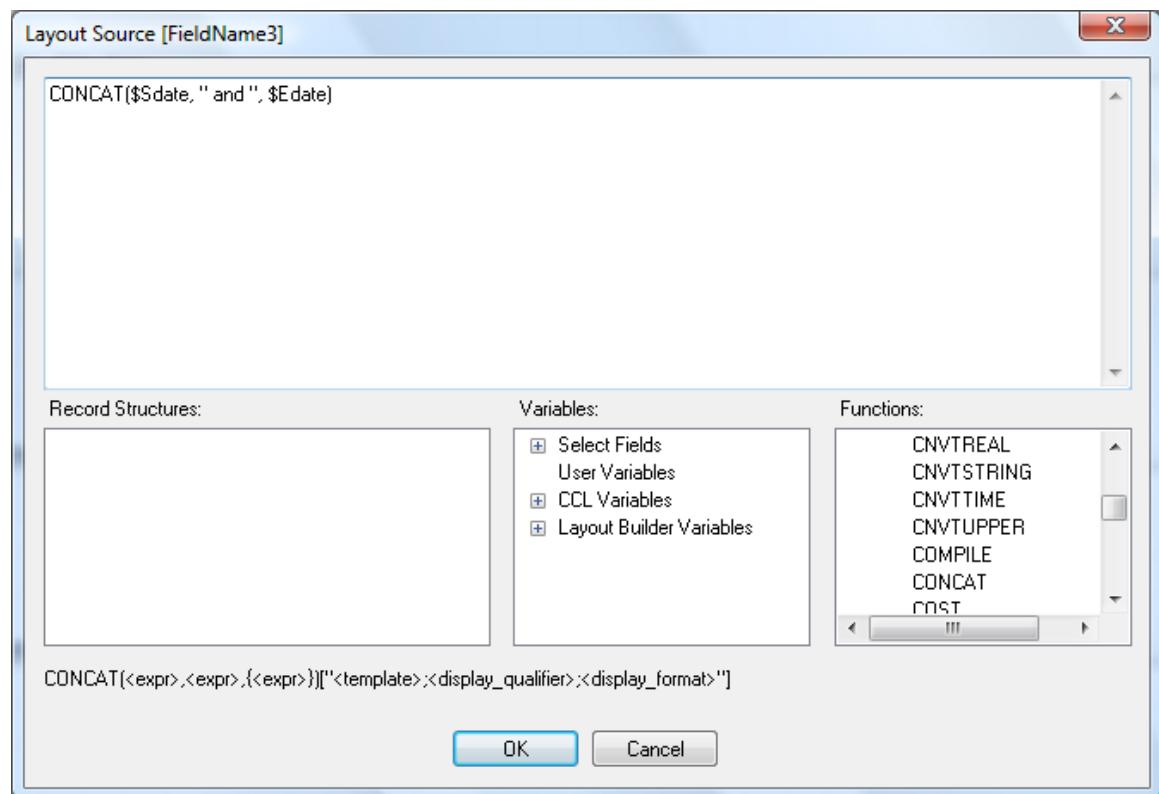
If your sections out of order, click the ruler below the Section. When a layout section is active, the name is displayed in bold on the DVDev title bar. Drag and drop the Section to where you want it placed. You can also click and drag the section title bar to the area where you want it placed.

28. Using the Label tool , add the title **Order Details Report** to the HeadReportSection.
29. In the Properties dialog box, set the Font Name to the Times, the Font Size to 16, the Font Bold to Yes and the Align Horizontal to Center. Move the title to the center of the section, towards the top.
30. Expand the CCL Variables tree in the Drop Items window. If the Drop Items window is not open, select Drop Items from the View menu.
31. Drag the CURDATE variable from the CCL Variables list and drop it in the HeadReportSection to the left of the title. Use the handles to increase the size of the field as needed to display the entire field name. In the Properties dialog box, modify the Name property to **Date**.
32. Using the Label tool, add the text **For Orders requested between:** below the title and towards the left border of the HeadReportSection.
33. In the Properties dialog box, set the Font Size to 16.

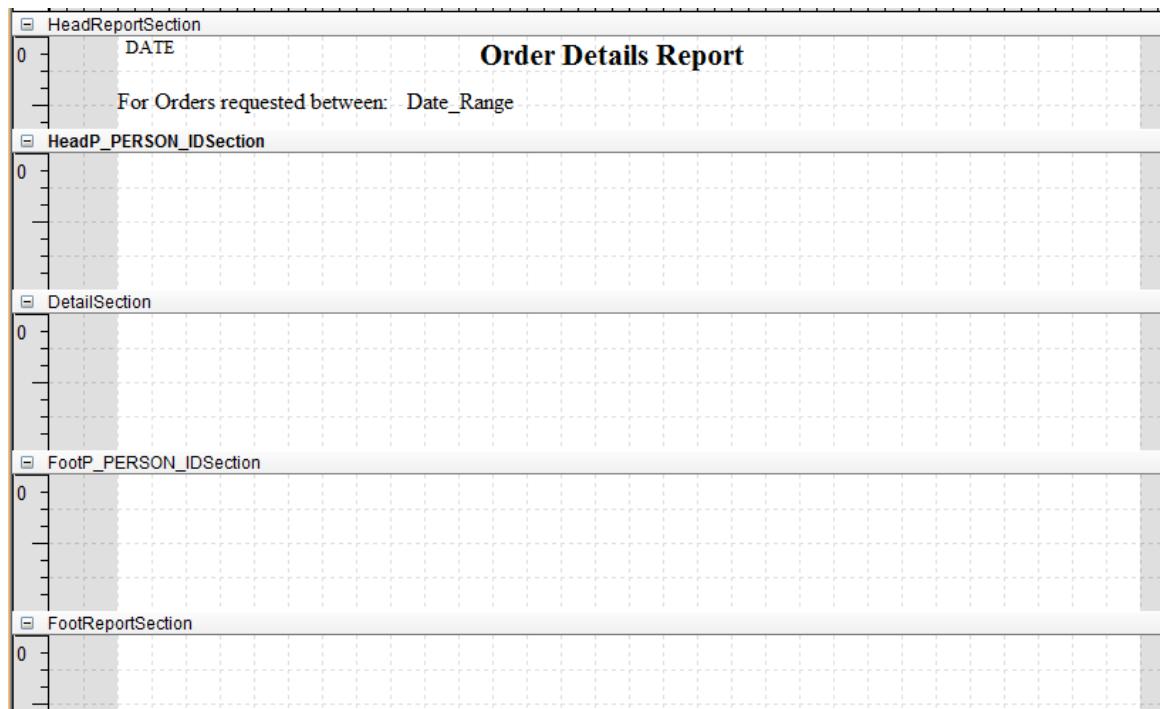
34. Use the Text tool  to place a text field to the right of the text **For Orders requested between.**
35. Use the handles to expand the text field until it takes up all of the space to the right of the section.
36. Select the Source property on the Properties dialog box, and click the ellipsis button. The Layout Source dialog box is displayed.

Enter the following command: **CONCAT (\$Sdate, " and ", \$Edate)**

Your Layout Source dialog box should look similar to the following:



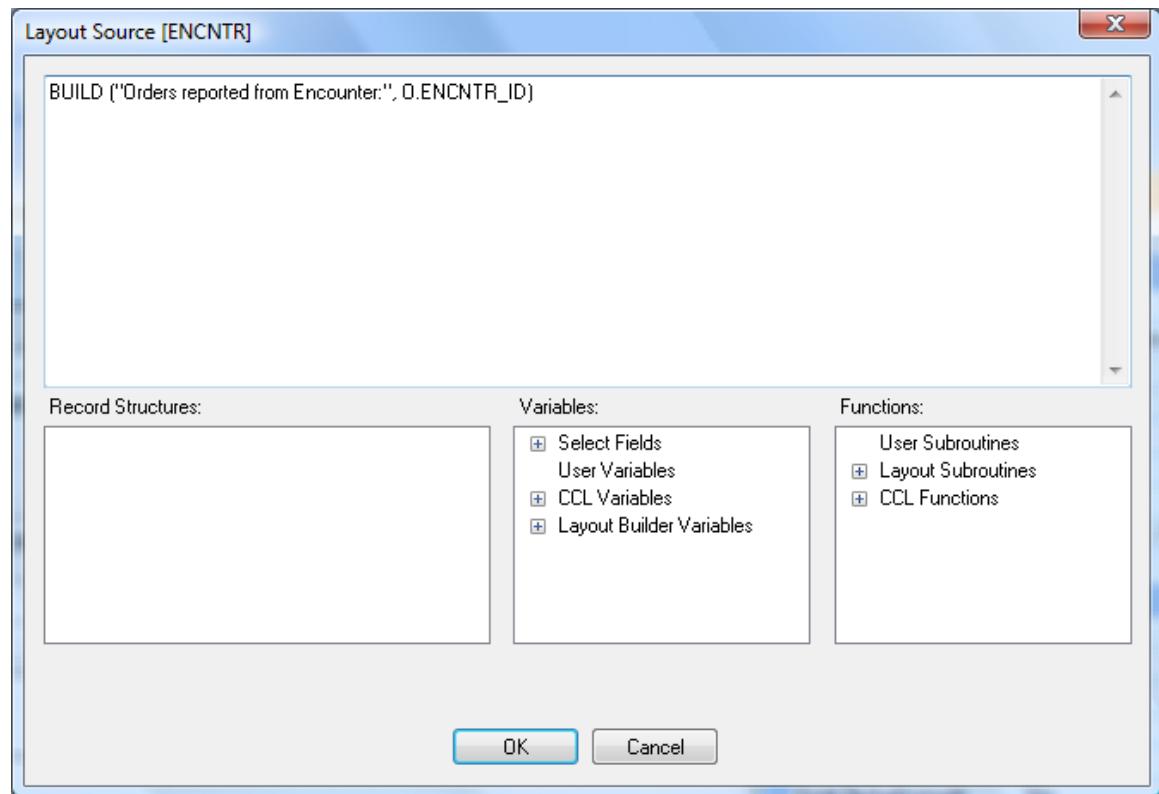
37. Click OK. Change the Name property to Date\_Range and the Font Size to 12 on the Properties dialog box.
38. Get rid of any extra spacing between the HeadReportSection and the HeadP\_PERSON\_IDSection by slowly moving your pointer over the HeadP\_PERSON\_IDSection title bar. At the top of the title bar the pointer changes to a Vertical Resize pointer. When the pointer changes, click and drag the HeadP\_PERSON\_IDSection title bar up to the bottom of the text and the date range. Your layout should be similar to the following:



39. Use the Label tool to add the static text **Person ID:** to the top left hand side of the HeadP\_PERSON\_IDSection.
40. From the Drop Items window, expand the Select Fields tree and drag the P.PERSON\_ID to the right of the text Person ID. Use the handles to increase the size of the field.
41. Drag the P.NAME\_FULL\_FORMATTED to the right of the field P.PERSON\_ID. Use the handles to increase the size of the field.
42. Use the Text tool to place a text field underneath the Name, towards the left-hand side of the HeadP\_PERSON\_IDSection. Use the handles to increase the size of the field.
43. Select the Source property on the Properties dialog box, and click the ellipsis button.
44. Enter the following command:

**BUILD ("Orders reported from Encounter:", O.ENCNTR\_ID)**

Your Layout Source dialog box should look similar to the following:



45. Click OK. Change the Name property to **ENCNTR**.

Before we create the static table for the orders, create column headers.

46. Using the Label Tool, add the following column headers side by side in the order listed below the encounter information in the HeadP\_PERSON\_IDSection.

OID

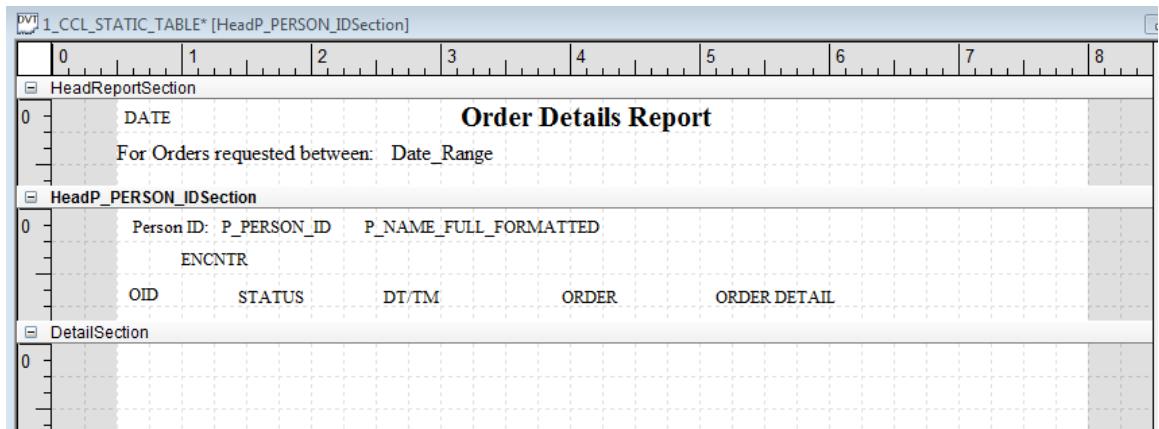
STATUS

DT/TM

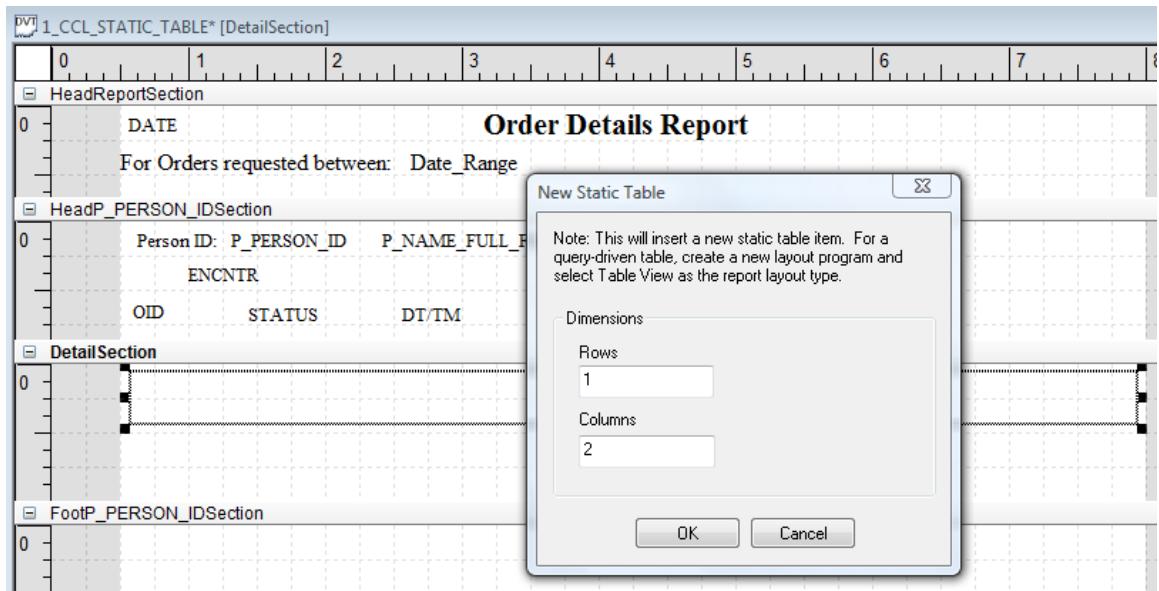
ORDER

DETAILS

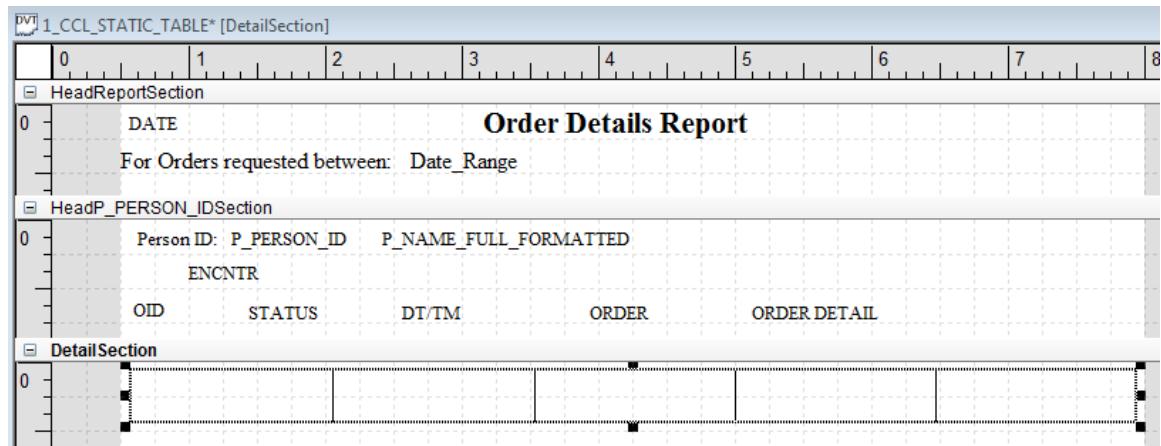
Your layout should look similar to the following:



47. Using the Static Table tool , add a table to the DetailSection section that covers most of the section in width and about  $\frac{1}{4}$  inch in height. The New Static Table dialog box is displayed.

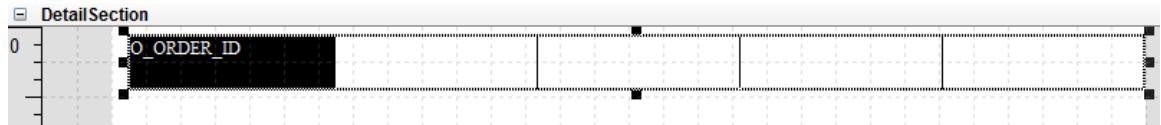


48. Leave the default value of 1 for the Rows and change the number of columns to **5**. Click OK.

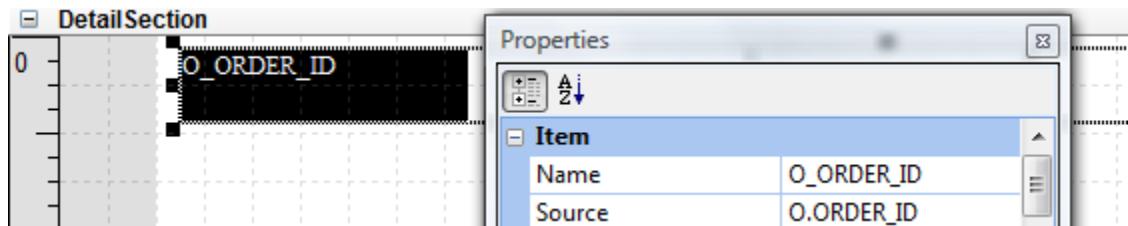


The table is created with 1 row and 5 evenly-spaced columns.

49. From the Drop Items window, expand the Select Fields tree and drag the O.ORDER\_ID to the first cell in the table. Your table should look similar to the following:



50. Click the Properties dialog box for the cell. The Name assigned to the cell is O\_ORDER\_ID. The source for the cell is O.ORDER\_ID.



The cell that displays the order ID does not need to be as large as the default width. There are several options for changing the width of the cell.

First if a single cell is selected and the pointer is moved over a vertical edge of that cell, the pointer changes to the horizontal resize . When the pointer changes to the horizontal resize you can click and drag the vertical edge of the cell to change the size of the cell. If multiple, or no, cells are selected, the horizontal resize can be used to click and drag the vertical edge of all cells that share a vertical edge.

51. Validate that the focus is in the first cell, and move the pointer over the vertical edge. When the pointer changes to the horizontal resize , click and drag the vertical edge of the cell to the left to make the size of the cell about one inch. (The grid lines on the layout are 1/4 inch apart.)
52. From the Drop Items window, expand the Select Fields tree and drag the O\_ORDER\_STATUS\_DISP to the second cell in the table.

The cell that displays the status does not need to be as large as the default width.

53. Validate that the focus is in the second cell and move the pointer over the vertical edge. When the pointer changes to the horizontal resize, click and drag the vertical edge of the cell to the left to make the size of the cell about one inch. Your layout should look similar to the following:

HeadP_PERSON_IDSection							
0	Person ID: P_PERSON_ID	P_NAME_FULL_FORMATTED	ENCNR	OID	STATUS	DT/TM	ORDER
DetailSection							
0	O_ORDER_ID	O_ORDER_STAT					

54. From the Drop Items window, expand the Select Fields tree and drag the O\_ORIG\_ORDER\_DT\_TM to the third cell in the table.
55. Validate that the focus is in the third cell and use the horizontal resize to make the cell around  $\frac{3}{4}$  an inch.

HeadP_PERSON_IDSection							
0	Person ID: P_PERSON_ID	P_NAME_FULL_FORMATTED	ENCNR	OID	STATUS	DT/TM	ORDER
DetailSection							
0	O_ORDER_ID	O_ORDER_STAT	O_ORIG_ORDER_DT_TM				

56. From the Drop Items window, expand the Select Fields tree and drag the O\_ORDER\_Mnemonic to the fourth cell in the table.
57. Validate that the focus is in the fourth cell and use the horizontal resize to make the cell around  $1 \frac{1}{4}$  inch.

HeadP_PERSON_IDSection							
0	Person ID: P_PERSON_ID	P_NAME_FULL_FORMATTED	ENCNR	OID	STATUS	DT/TM	ORDER
DetailSection							
0	O_ORDER_ID	O_ORDER_STAT	O_ORIG_ORDER_DT_TM	O_ORDER_Mnemonic			

58. From the Drop Items window, expand the Select Fields tree and drag the O\_ORDER\_DETAIL\_DISPLAY\_LINE to the fifth cell in the table.

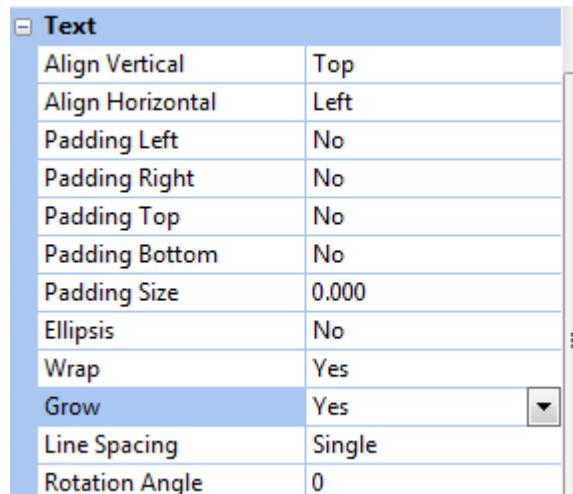
HeadP_PERSON_IDSection				
0	Person ID: P_PERSON_ID	P_NAME_FULL_FORMATTED		
	ENCNTR			
	OID	STATUS	DT/TM	ORDER
Detail Section				
0	O_ORDER_ID	O_ORDER_STATUS	O_ORIG_ORIO_ORDER_MNEMONIC	O_ORDER_DETAIL_DISPLAY_LINE

59. Double-click in the fifth cell. The properties for that cell are displayed in the Properties dialog box.

60. Modify the Wrap property to Yes.

61. Modify the Grow property to Yes.

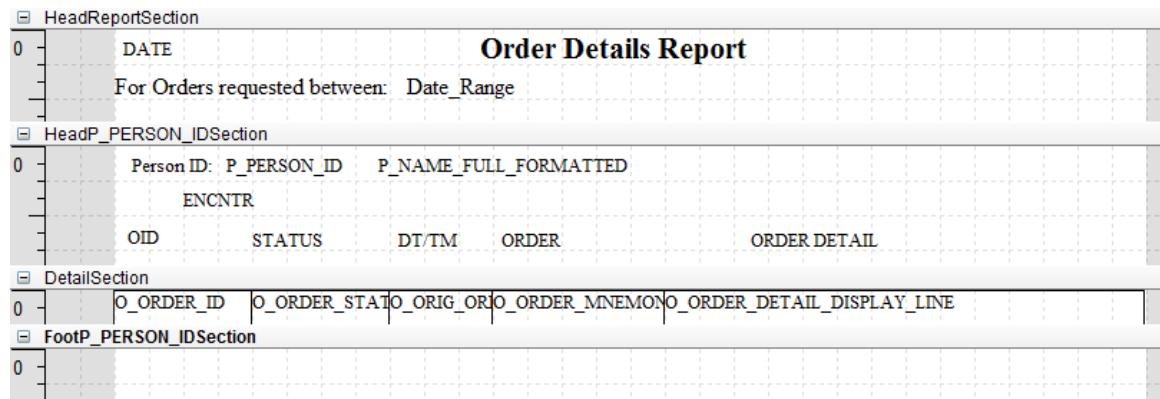
Setting the Wrap and Grow properties to Yes enables the O\_ORDER\_DETAIL\_DISPLAY\_LINE to be wrapped across multiple lines within the cell and to grow the size of the cell if needed to display all of the information contained in O\_ORDER\_DETAIL\_DISPLAY\_LINE.



62. Get rid of any extra spaces between the DetailSection title bar and the top border of your table by moving your pointer slowly over the top line of the table. When the pointer changes to a down block arrow , click and drag the line to the top of the DetailSection title bar.

63. Decrease the height of the row of the table by moving your pointer slowly over the middle point of the bottom line of the table. When the pointer changes to the vertical resize, click and drag the line up to the top of the fields.

64. Get rid of any extra spaces between the FootPersonIDSection and the bottom of the table by moving your pointer slowly over the top of the FootPersonIDSection. When the pointer changes to the vertical resize, click and drag the FootPersonIDSection to the bottom line of the table. Your layout should look similar to the following:



65. From the Build menu, select Run “*Your\_Layout\_Program*”, or press CTRL+F5 to execute your layout program.
66. Select Yes when prompted to save the layout program.

When prompted, enter a date range that you know will have orders and click Execute. The following report is an example of what the output may look like. Your report should be similar in format showing patients, and a table containing orders for each patient.

Order Details Report				
For Orders requested between: 01-MAY-2008 and 01-SEP-2008				
OID	STATUS	DT/TM	ORDER	ORDER DETAIL
58096257.00	Completed	07/29/08	ACT	Blood, 07/29/08 15:00:00, ST, ST - Stat, CERHDP, Collected Y/N, Venous Draw, 07/29/08 16:56:00, CENTRAL PROCESS, CERHDP, 07/29/08 15:00:00
56034432.00	Completed	05/27/08	AST-DW	Blood, Collected Y/N, Routine, CERHDP, 05/27/08 15:04:00, ROUTINE, Venous Draw, 05/27/08 15:04:00, CENTRAL PROCESS, CERHDP, Constant Indicator
55822289.00	Completed	05/12/08	Albumin level	Blood, 05/12/08 7:00:00, Routine, RT - Routine, CERHDP, Collected Y/N, Venous Draw, 05/12/08 7:49:00, CENTRAL PROCESS, CERHDP, Print label Y/N, 05/12/08 7:00:00, Ankle, None, None
58227554.00	Ordered	08/01/08	ACT	Blood, 08/01/08 11:00:00, Routine, ROUTINE, CERHDP, Collected Y/N, Venous Draw, 08/01/08 11:50:00, CENTRAL PROCESS, CERHDP, 08/01/08 11:00:00
56046644.00	Ordered	05/27/08	AST-DW	Amniotic Fl, Collected Y/N, Routine, CERHDP, 05/27/08 11:00:00, ROUTINE, Body Fluid, 05/27/08 15:50:00, CENTRAL PROCESS, CERHDP, Constant Indicator
57794595.00	Ordered	07/16/08	Auto Differential	Blood, Collected Y/N, ST, CERHDP, 07/16/08 15:00:00, RT - Routine, Venous Draw, 07/16/08 17:17:00, CENTRAL PROCESS, CERHDP, Constant Indicator
57613589.00	Ordered	07/08/08	BUN	Blood, ST, ST - Stat, Collected, 07/08/08 14:00:00 CERHDP, 07/08/08 14:00:00, Venous Draw, CENTRAL PROCESS, PRINT DANG IT!, 07/08/08 14:18:00

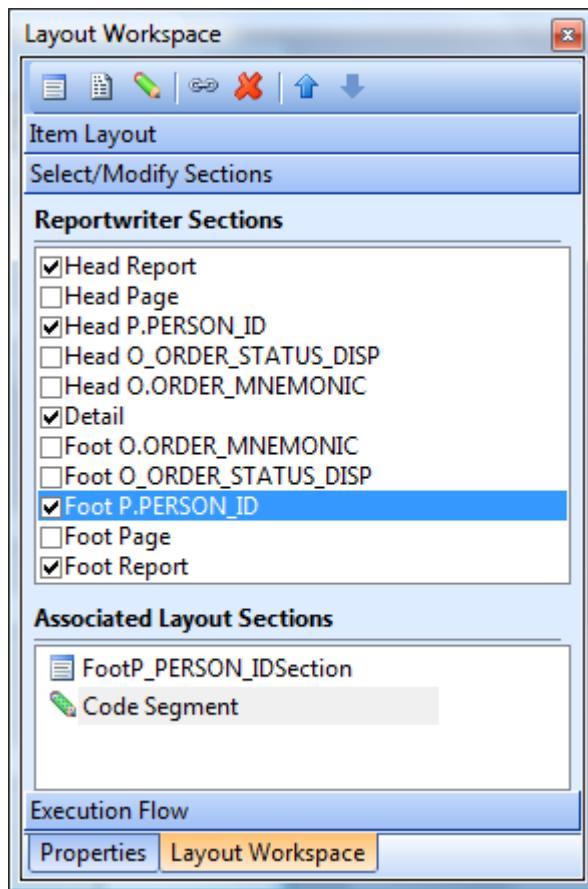
Order Details Report				
For Orders requested between: 01-MAY-2008 and 01-SEP-2008				
OID	STATUS	DT/TM	ORDER	ORDER DETAIL
56294158.00	Ordered	06/09/08	Albuterol 0.83mg/mL	See Rx Instructions, PO, 75 mL, 5, 5, 06/09/08 0:00:00, DAW, 12/09/09 23:59:59, Hard Stop, Constant Indicator

In the above report, the cell containing the order details is different in size from orderable to orderable. Within the cell, the data is wrapped and the height of the entire row is adjusted based on the amount of information stored in the column.

Close the Output Viewer. Add the total number of orders written for each person by adding a code segment on the Layout Workspace dialog box.

67. Within the Select/Modify Sections dialog box, select the Foot P.Person\_ID section by clicking the text (not the check box).

68. Click the New Code Segment  button on the Layout Workspace toolbar. The code segment is automatically inserted in to the Reportwriter Section.

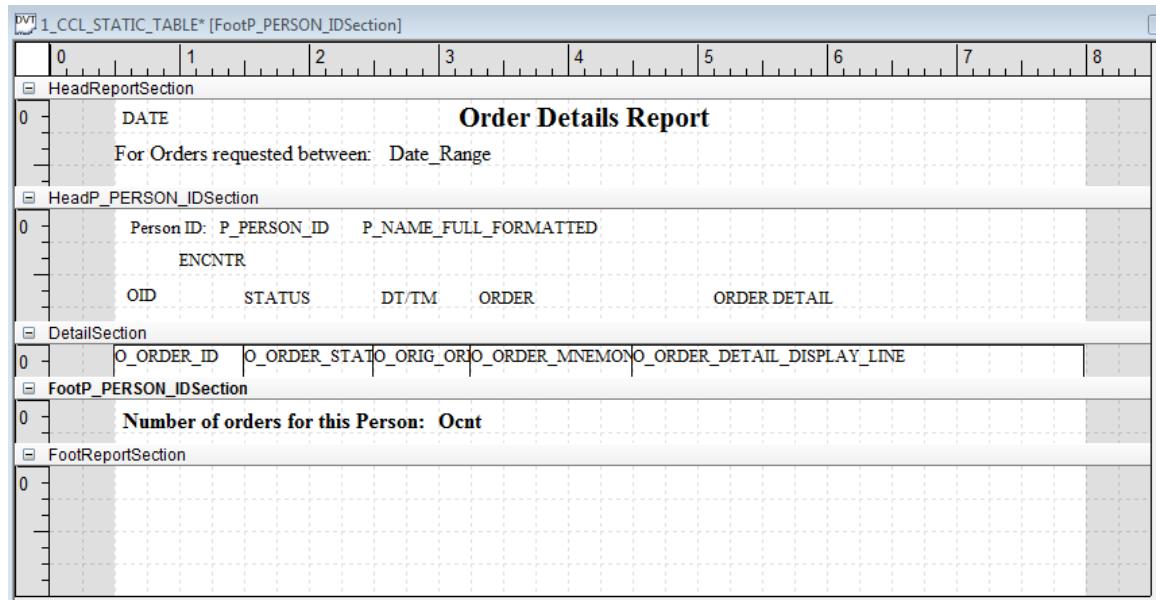


69. Click Code Segment in the Associated Layout Section and click the up Arrow button to move it to the top of the list. Moving the Code Segment to the top of the list causes the commands in the Code Segment to be executed before the FootP\_PERSON\_IDSection Layout Section is rendered.
70. In the Associated Layout Sections, double-click the Code Segment to open the Layout Source [Code Segment] dialog box and enter the following command in the source window:

```
Ocnt = count(o.order_id)
```
71. Click OK to close the Layout Source [Code Segment] dialog.
72. Using the Label tool, add the following label to the FootP\_PERSON\_IDSection:

**Number of Orders for this Person: .**
73. Change the Font Size to 12 and Font Bold to Yes.
74. Using the Text tool, add a field to the FootP\_PERSON\_IDSection to display the Ocnt variable you created above. In the Properties dialog box, modify the Name to **Ocnt** and the Source to **Format(Ocnt, "###")..**
75. Change the Font Size to 12 and the Font Bold to Yes.

76. Use the vertical resize to click and drag the FootReportSection title bar up to the bottom of the fields you just added. Your layout should be similar to the following:



77. From the Build menu, select Run “Your\_Layout\_Program” or press CTRL+F5 to execute your program.
78. Select Yes when prompted to save the layout program.
79. Enter a date range and click Execute. The following report is an example of what the output may look like. Your report should be similar in format showing persons with orders and a total count of orders for the person.

Order Details Report				
For Orders requested between: 01-MAY-2008 and 01-SEP-2008				
OID	STATUS	DT/TM	ORDER	ORDER DETAIL
58096257.00	Completed	07/29/08	ACT	Blood, 07/29/08 15:00:00, ST, ST - Stat, CERHDP, Collected Y/N, Venous Draw, 07/29/08 16:56:00, CENTRAL PROCESS, CERHDP, 07/29/08 15:00:00
56034432.00	Completed	05/27/08	AST-DW	Blood, Collected Y/N, Routine, CERHDP, 05/27/08 15:04:00, ROUTINE, Venous Draw, 05/27/08 15:04:00, CENTRAL PROCESS, CERHDP, Constant Indicator
55822289.00	Completed	05/12/08	Albumin level	Blood, 05/12/08 7:00:00, Routine, CERHDP, Collected Y/N, Venous Draw, 05/12/08 7:49:00, CENTRAL PROCESS, CERHDP, Print label Y/N, 05/12/08 7:00:00, Ankle, None, None
58227554.00	Ordered	08/01/08	ACT	Blood, 08/01/08 11:00:00, Routine, ROUTINE, CERHDP, Collected Y/N, Venous Draw, 08/01/08 11:50:00, CENTRAL PROCESS, CERHDP, 08/01/08 11:00:00
56046644.00	Ordered	05/27/08	AST-DW	Amniotic Fl, Collected Y/N, Routine, CERHDP, 05/27/08 11:00:00, ROUTINE, Body Fluid, 05/27/08 15:50:00, CENTRAL PROCESS, CERHDP, Constant Indicator
57794595.00	Ordered	07/16/08	Auto Differential	Blood, Collected Y/N, ST, CERHDP, 07/16/08 15:00:00, RT - Routine, Venous Draw, 07/16/08 17:17:00, CENTRAL PROCESS, CERHDP, Constant Indicator
57613589.00	Ordered	07/08/08	BUN	Blood, ST, ST - Stat, Collected, 07/08/08 14:00:00 CERHDP, 07/08/08 14:00:00, Venous Draw, CENTRAL PROCESS, PRINT DANG IT!, 07/08/08 14:18:00

Number of orders for this Person: 7

OID	STATUS	DT/TM	ORDER	ORDER DETAIL
56294158.00	Ordered	06/09/08	Albuterol 0.83mg/mL	See Rx Instructions, PO, 75 mL, 5, 5, 06/09/08 0:00:00, DAW, 12/09/09 23:59:59, Hard Stop, Constant Indicator

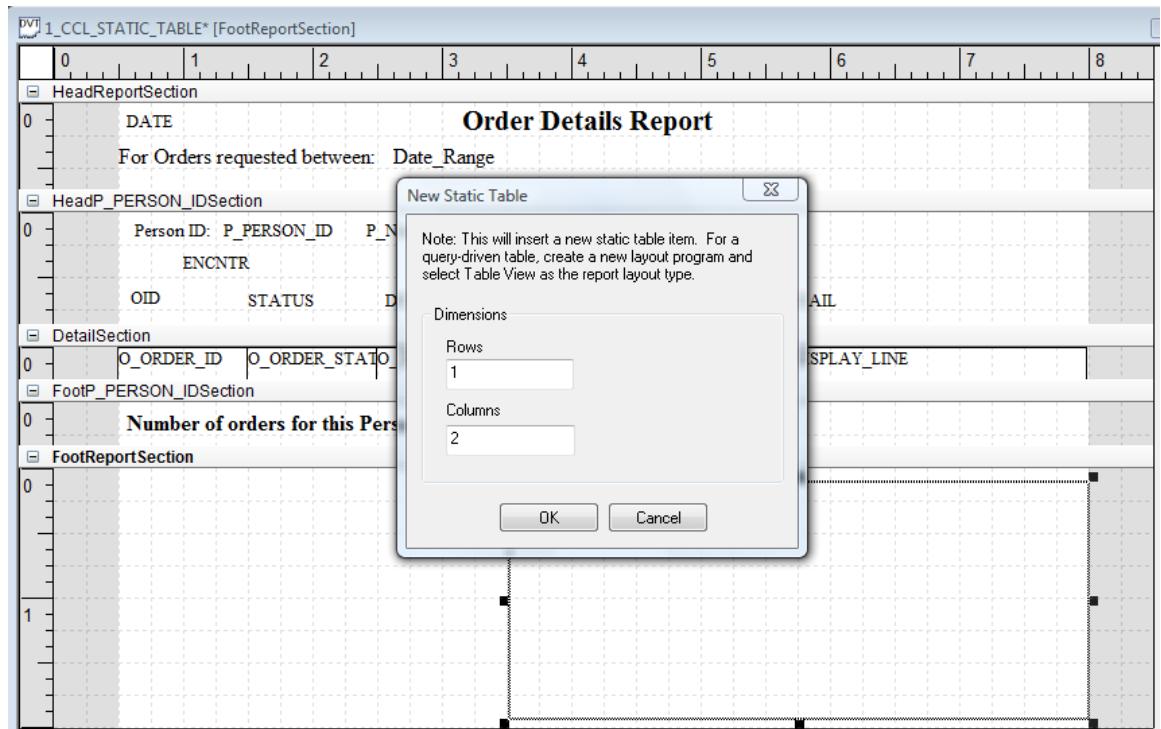
Number of orders for this Person: 1

80. Close the Output Viewer.

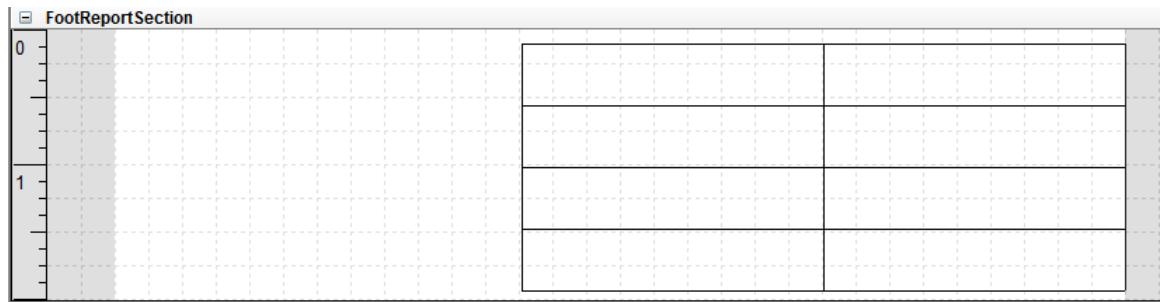
## Creating a Static Table that uses Static Text

You have created a Static Table that uses the query to populate the cells. Now, using a static table, create an area that has information for the office staff to fill out that is located at the end of the report.

1. Use the vertical resize to increase the size of the FootReportSection to approximately 2 inches.
2. Using the Static Table tool , add a table to the right hand side of the section that covers most of the section. The New Static Table dialog box is displayed.

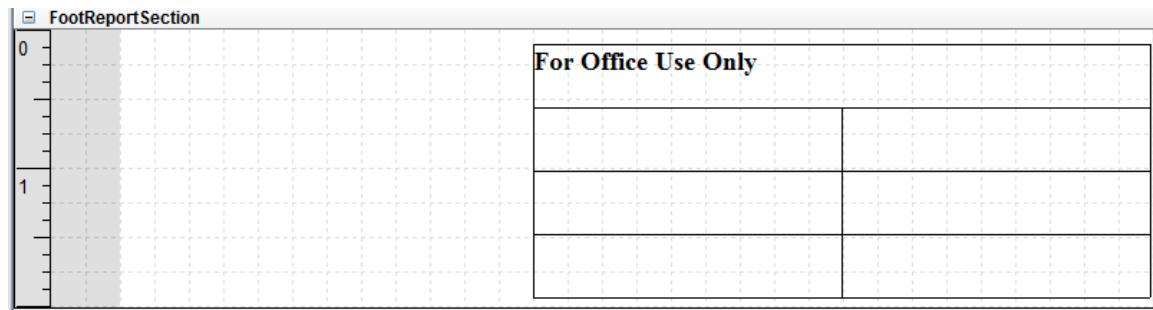


3. Enter 4 as the number of rows to be created in the Static Table. Leave 2 as the number of columns to be created in the table and click OK.



The table is created with 4 rows. The rows and columns are evenly-spaced within the initial size table.

4. Click in the first cell. Use the Properties dialog box to make the following modifications:
  - In the Source box, enter "**For Office Use Only**" (the quotation marks are required).
  - Change the Font size to 14 and Font Bold to Yes.
5. Right-click the cell on the right side of the first row. Select Remove Cell from the context menu. The remaining cell fills in the entire width of the first row as in the following example:



6. Click on the first cell of the second row. In the Source box of the Properties dialog window, enter “Received date:”.
7. Click on the first cell of the third row. In the Source box of the Properties dialog window, enter “Receiver’s initials:”.
8. Click on the first cell of the fourth row. In the Source box of the Properties dialog window, enter “File Number:”. Your table should look like the following:

For Office Use Only	
Received Date:	
Receiver's Initials:	
File Number:	

Currently rows 2 through 4 are divided into two cells of equal size. The first cell of each row is used to display the text and then the cell on the right of each row is purposely left blank so that it can be manually filled out once the report is printed. The cells to display the text do not need to be as large as the blank cell in order to allow the user enough room to write the necessary information. There are several options for changing the size of the cells. First if a single cell is selected and the pointer is moved over a vertical edge of that cell, the pointer changes to the horizontal . When the pointer changes to the horizontal resize, you can click and drag the vertical edge of the cell to change the size of the cell. If multiple or no cells are selected, the horizontal resize can be used to click and drag the vertical edge of all cells that share a vertical edge.

9. Drag your cursor over the vertical line that separates the the first and second cell on the second row until the horizontal resize shows. Then drag the vertical line to the left so that it is closer to the text written in the rows 2 through 4.

For Office Use Only	
Received date:	
Receiver's initials:	
File Number:	

10. Press CTRL+F5 to execute your layout program.
11. Select Yes when prompted to save the layout program.
12. When prompted, enter a date range and click Execute. The last page of your output should be similar to the following example:

56063389.00	Ordered	05/29/08	Calcium Chloride 100	7,000 mcg, PO, 892554, -1, 0, 05/29/08 1:04:00, 05/29/08 1:04:00, 0, 1, 0, 0, 2, 1, 1StaceC, 3, 1.194, BID
<b>Number of orders for this Person: 2</b>				
For Office Use Only				
Received date:				
Receiver's initials:				
File Number:				

## Executing Layout Programs

You have executed the layout program in DVDev using the Run “*Your\_Layout\_Program*” option on the Build menu or CTRL+F5. Most likely you will create layout programs that need to be executed by people who do not have access to DVDev. When Layout Builder is used to create a layout program, it generates a *Discern Explorer* program in the object library. This program can be executed from Explorer Menu (ExplorerMenu.exe) like any other *Discern Explorer* program by simply using the name of your layout program when adding a program item to the Explorer Menu.

# Moving Your Layout Program to Another Environment

Cerner recommends creating and testing all layout programs in a non-production environment. After the program has been created and tested, it can be moved into the production environment. Moving a layout program to a different environment requires you to export the layout program from a source environment into a target environment.

If you have a front-end file share that can be accessed from both environments, an easy way to move the layout program is to open it in DVDev and use the File > Export command to export the layout program to the front-end file share. The export creates a *program\_name.DVT* file. You then can close DVDev and reopen it in the target environment (the environment into which you want to move the program). Use the File > Import option to import the *program\_name.DVT* file from the common front-end file share. The import process uses the .DVT file to recreate the layout program. If the layout program has a prompt form associated with it, the prompt form is recreated when the .DVT file is imported.

If you do not have a front-end file share that can be accessed from both environments, but do have access to a different front-end file share from each environment, the process is basically the same. You need to export the layout program, and then copy the .DVT file to the front-end file share that can be accessed from the target environment before performing the import.

If you cannot access front-end file shares you can move the Layout Program to a different environment using the back-end end file structure. To use this method, select Transfer Objects from the Tools menu to open the Transfer Objects dialog box. Ensure that the Layout Programs category is selected under Layouts in the tree on the left side of the Transfer Objects dialog. Enter the name of your Layout Program in the Source Object: field. Use the Save to Backend... option on the Task menu to save the Layout Program to a back-end file with a .DVT extension. Copy the .DVT file to a directory in the target environment. Open DVDev in the target environment and select File > Open > Source to open the .DVT file. Opening the .DVT file opens Layout Builder and imports the layout. The import process prompts you to import the prompt form. After the import process completes, save the layout by clicking Save from the toolbar or selecting Save from the File menu. The .DPB file is a binary file, so FTP in binary mode must be used when copying the file.

# Appendix

## Layout Builder Sections and Subroutines

Two subroutines are created for each layout section created in Layout Builder. One subroutine is named using the section name as the subroutine name. The second subroutine is created using the section name with **ABS** appended to it as the subroutine name.

A third subroutine is created if HTML is selected as the output type using the section name with HTML appended to it as the subroutine name. The subroutine takes zero parameters because there is no height calculation involved for HTML. An HTML section will render immediately after the previous HTML section. There is no concept of absolute X and Y offsets.

The first subroutine that is named using the section name takes an integer parameter of **RPT\_RENDER** (value of 0) or **RPT\_CALCHEIGHT** (value of 1), which is used to designate whether the section should be rendered. This subroutine is created for ease of use when the margins and automatic y offset incrementation are needed. This automatic incrementation is held in the generated **\_YOffset** variable. If the **RPT\_CALCHEIGHT** is passed in, the calculated section height is returned without the section being rendered to the page and without the **\_YOffset** variable being incremented. When **RPT\_RENDER** is passed in, the calculated section height is returned, the section is rendered, and the **\_YOffset** variable is incremented.

The second subroutine is named using the section name with **ABS** appended. The first subroutine contains a call to execute the second subroutine. This is the absolute subroutine call and contains all of the logic making the calls to the Report API for the report section generation. The 3 parameters that this subroutine will take are the calculation flag (**RPT\_RENDER** or **RPT\_CALCHEIGHT**), as well as the X and Y offsets for the section as real numbers in terms of the measure of units selected for the report (inches or centimeters).

The X,Y offsets are relative to the 0,0 origin at the top left corner of the page. A section can be rendered at any location, but the developer should ensure that the section fits on the page. Any items that do not fit on the page are not printed or displayed.

The third subroutine that is named using the section name with HTML appended, takes zero parameters because there is no height calculation involved for HTML. An HTML section will render immediately after the previous HTML section. There is no concept of absolute X and Y offsets.

Layout Builder represents sections as the full width of the page, based on orientation, although the intended section may not use the full width of the section and may actually only apply to a column of data in the section that is repeatable across the width of the section. This does not pose any problems since the sections are virtual. It is just a drawback of representing sections as full page widths in Layout Builder.

Layout Builder allows the selection of a page size, orientation, type of report (Postscript, .PDF, Zebra Stripe (ZPL) 200dpi, or Intermec 3400 (IPL) 200 dpi), margins, and unit of measure (inches or centimeters).

Sections are displayed in the orientation selected; page width and height are based on a portrait report. Only left and right margins are represented in Layout Builder based on the orientation of the report because Layout Builder only uses these guides for item placement and visual representation.

The top and bottom margins are not represented in the builder since these margins do not directly apply to each section, but instead to the report in general. The Report API does use these margins in limited circumstances for generation of items that could grow either in width, height, or both, in which case the margins are the boundary to which the item can grow.

Layout Builder also generates other subroutines necessary for report generation, **InitializeReport**, **FinalizeReport**, **PageBreak**, **\_LoadImages**, **\_CreatePens**, and **\_CreateFonts**.

**InitializeReport** takes an integer dummy parameter reserved for future use which must currently be 0 or unexpected results can occur. **InitializeReport** sets the RPT properties, creates the report context, loads any images, creates any pens needed, creates any fonts used, starts the report, and begins the page. It does this by calling the necessary Layout Builder created subroutines beginning with an underscore ( '\_ ' ).

After the **InitializeReport** has been called, the sections created with Layout Builder can be called in the order they are to be rendered. The **\_YOffset** is incremented by the height of the section when it is rendered. By using the **\_YOffset** and adding the result from the section to be rendered using the **RPT\_CALCHEIGHT** as the parameter, you can compare against the appropriate value to determine page break.

To create a page break for Layout Builder sections, call the **PageBreak** subroutine with a 0 for the reserved parameter (0 must be used or unexpected results can occur). This subroutine calls the appropriate Report API routines to end the page and begin a new page.

When no more pages are to be generated and the report is ready to be finalized, call the **FinalizeReport**. This report passes in a string that contains the queue to print to or the file to generate. This subroutine ends the final page, ends the report, and writes the report to a temporary file. If the report is to be printed to a queue, the file is spooled and deleted.

## What You See Is What You Get (WYSIWYG):

Layout Builder attempts to provide a WYSIWYG display. However, the standard fonts that are available in a Windows system and the fonts that are available on a printer can be different. To achieve true WYSIWYG, the printer fonts and the windows display fonts must be the same. Most organizations do not purchase additional display fonts to match the fonts that are shipped with a printer. To help match printer fonts to display fonts, Layout Builder provides the Map Fonts option on the Edit menu. This option can be used to manually associate an existing display font to a True Type printer font. For example, the default font for a Zebra printer is most likely not available as a display font, but the Arial Black display font is very close to the Zebra's default font. When creating a layout for a Zebra printer you should select Map Fonts from the Edit menu and modify the Display font to Arial Black. This provides a very near WYSIWYG display; what you see on your screen when creating the layout is almost exactly what is printed by the Zebra printer.

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WYSIWYG does not apply for HTML. Layout Builder sometimes has to *massage* the items in order to make them render. For example, HTML cannot stack one text item on top of another. So, Layout Builder may need to *scoot* a time to create a valid arrangement.

# Document Revision History

Revision Number:	Revision Date:	Description:
001	July 16, 2008	Initial release of this <i>Cerner Millennium</i> Support Guide. This guide covers <i>Discern Layout Builder</i> in the 2007.18 code release of <i>Cerner Millennium</i> and therefore reflects the functionality changes that pertain to that release.
002	December 17, 2008	Added a new section <i>Adding a Static Table</i> .