

*Paris
Gartner400*

CODE Designer

Lab Instructions

THE CODE DESIGNER

Using an editor to create and maintain DDS source for your display and printer files can be a frustrating and difficult task. What would be great is a graphical design tool that let's you design your screens and reports visually and then generate the DDS source for you. Well that's exactly what CODE Designer does for you.

The CODE Designer interface was designed to help the novice DDS programmer create screens, reports and databases quickly and easily without worrying about the details of the DDS language. At the same time it allows the expert DDS programmer get access to all the features and power of the language. We'll now step through each part of the interface and update some DDS as well.

Before we begin the CODE designer, we need to understand the concept of a **group**. A group is simply a collection of one or more DDS records that make up a single screen or report. It is the set of records that is written by the application to the display or printer device at one time. Grouping records together allows you to work on one record while still seeing the related records in the background. The Workbook has a Design page tab for each group defined for quick access to each group of records. We will see this design page later.

Starting the CODE Designer

You can jump straight to this section without completing the [CODE Editor](#) section but you must have established a connection with the host as discussed in the [Connecting to OS/400](#) in Unit 2.

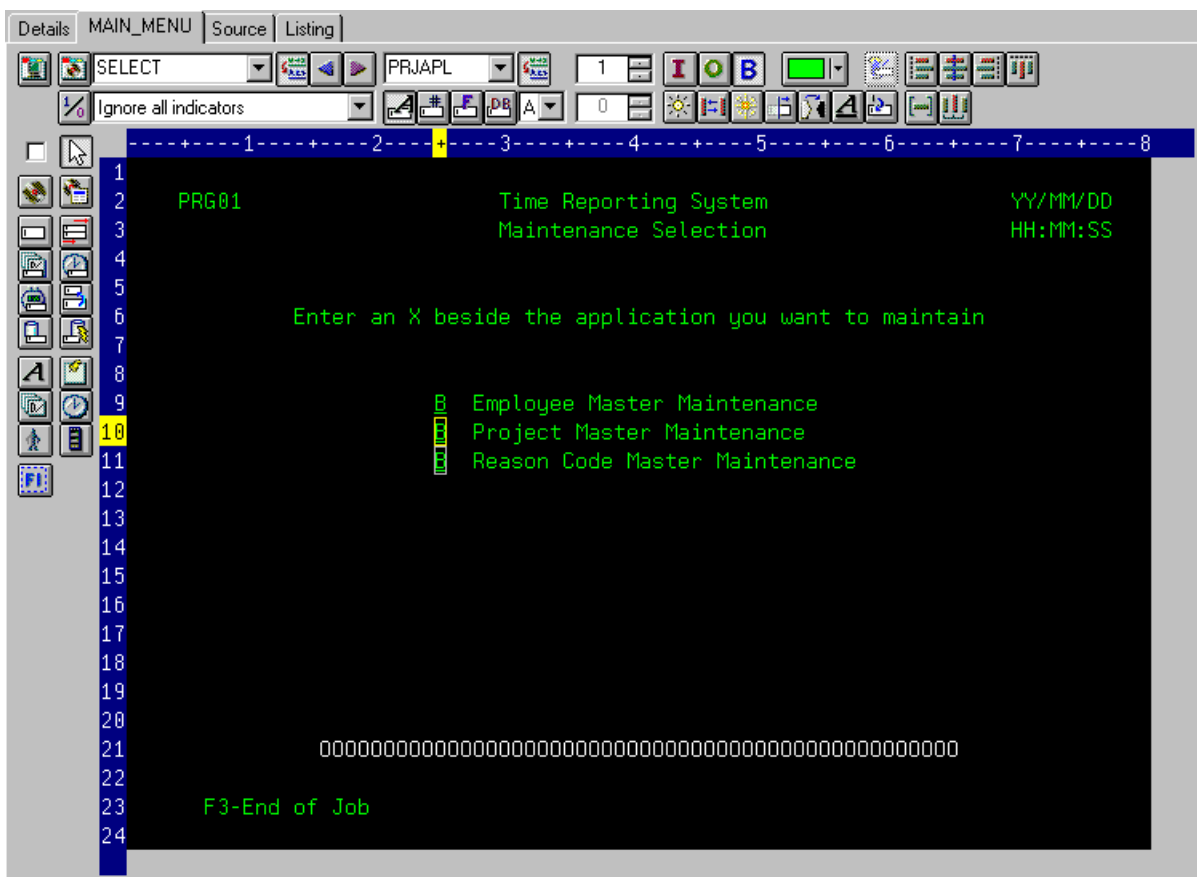
Let's launch the Designer and load a display file.

- From the **Start - Programs - IBM WebSphere Studio - Development Studio for iSeries - CODE** menu, select CODE Designer. The Designer appears with no DDS loaded.
- From the **File** menu, select **Open...** The Open dialog appears.
- Click the + beside <OS400> to show the library list.
- Click the + beside **CODELABxx** to show the library.
- Click on the source physical file **QDDSSRC** to show its contents on the right.

- ❑ Click on **MSTDSP DSPF** and then click on the **OK** push button. The source is loaded into the Designer.
- ❑ You may see a Group Properties window appear when the member is loaded into the Designer. This means that no Designer groups have been defined for this member yet. If you see the Group Properties window, create a group using the instructions that follow in the next 2 paragraphs. Otherwise, click on the **MAIN_MENU** group tab on the design screen and proceed to the next bullet.

We will create a group with one record format in it called **MAIN_MENU**. Change the group name by typing over the **SCREEN1** name given originally to name it **MAIN_MENU**.

Next, select (highlight) the **SELECT** record format from the “Available” list and Press the >> button to put that record into the “Selected” list for the group. You have just created the **MAIN_MENU** group and you should now see the screen format appearing in the main section on the top right of the Designer screen. Note that a tab associated with your **MAIN_MENU** group was also created. Close the Group Properties Window.

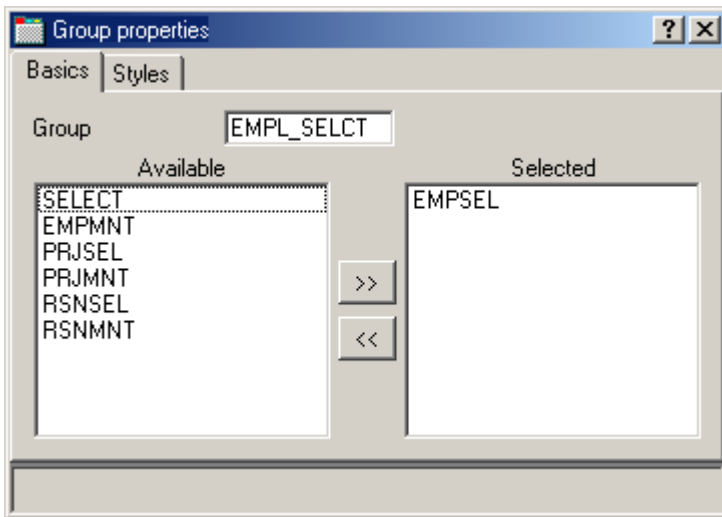


- ❑ Next we will take a look at some of the things we can do in the Design Page. **Select** (by clicking on it) the static text in the heading line “Maintenance Selection”. Note that the DDS line of code for this text appears in the bottom right window and the text field is highlighted with a box. Also notice that you can see many of the attributes of this static text field in the

top portion of the Design Page. For example, you can see its length (21) and its color (green). Click on the **Pulldown arrow** to the right of the green color indicator. Select a different color for this static text field and see what happens.

- ❑ **Double click** on your selected static text field to open its **Properties Notebook**. Note the current values for Row and Column positioning. Leaving the Properties Notebook open, drag the static text field with your mouse to a position approximately 1 line below and 8 or 10 spaces to the right of where it was originally. Note the Row and Column values change when you release the mouse, dropping the field in a new position. As you will see the DDS in the bottom right panel has also changed. Explore the contents of some of the other pages of the Properties Notebook, and the close it.
- ❑ We probably would prefer to have our text field centered again. **Right click** on the selected field and select **Align and Center Horizontally** from the pop up menu. That was a little easier than SDA wasn't it!
- ❑ Now select one of the 3 single character input capable fields (a **B** appears in the field to indicate both input and output just as it does in SDA). Notice that the name of the field appears in a box above the Design Window (near the middle). Select a different input capable field and observe that the field name changes. Note also that the appropriate DDS line of code always appears in the bottom pane.
- ❑ You can change the length of a field in many different ways. You can use the up/down arrows on the length box at the top of the design window (to the right of the field name). Try it and see what happens.
- ❑ You can also change the length by grabbing the edge of the selection box and dragging to make the box bigger (wait until your cursor becomes a 2-headed arrow before dragging). Before leaving this field, set its length back to 1.
- ❑ We will now add a new static text field to the record format. Find a nice empty spot on the Design Screen – perhaps between the entry fields and the message field (named EMESS) near the bottom of the screen. Simply type in whatever text you want to place in the field – do make sure though that you have at least 3 or 4 separate words in the text. Do not worry if you make some a typing mistake – you can backspace to correct them without interfering with the other fields on the screen! Try doing that with SDA and see what a mess you make!!
- ❑ Using your mouse, select the text you just entered. Notice that, unlike SDA, CODE designer created a single text field from all the words you keyed together! Pick up your new field and move it to any empty spot on the screen by dragging. Note that you can easily place it between other lines or fields, such as just below the heading lines. As you can see, it's quite easy to edit existing display screens using CODE designer and the Design Window.
- ❑ Remember that you **MUST** have the record format in a Designer Group before you can work with it in the Design Window. To get some extra practice in doing that, let's now create a second group for another record format using the steps below.

- ❑ Select the **MAIN_MENU** group from the list in the far left side pane of the Designer page. Right click on **MAIN_MENU** and select Insert Group... from the pop-up menu. A **Group properties** notebook appears and a blank Design page for the group **SCREEN1** will also appear.
- ❑ On the **Group properties** notebook, click on the record **EMPSEL** in the Available list box and click on the button. For simplicity this is the only record we will add for now. The Design page will have been updated to show us what the record **EMPSEL** looks like.
- ❑ Name the group by over typing **SCREEN1** with **EMPL_SELECT**. The resulting dialog should look like the image below.



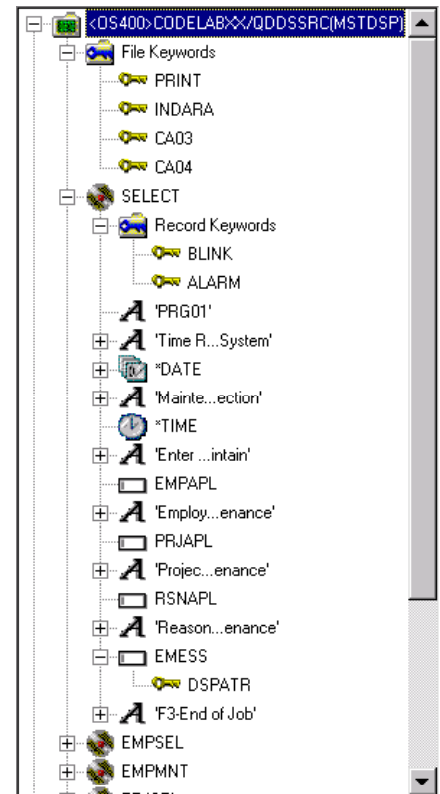
- ❑ Close the Group properties notebook by **clicking** on the **X** in the top right corner

The DDS Tree

- ❑ Let's concentrate now on the left side pane of our CODE screen. What you are looking at is basically a "Windows Explorer"-like view of the DDS. The DDS Tree view on the left-hand side of the Designer displays the DDS source in its file, record, field, and keyword hierarchy. It is a familiar and intuitive way to see the overall structure of the DDS source and to navigate through it quickly. Don't worry if you're not a DDS expert, we'll explain everything you need to know.

- ❑ Click on the + beside the folder <OS400>CODELABxx/QDDSSRC(MSTDSP).
- ❑ Click on the + beside the folder **File Keywords**.
- ❑ Click on the + beside the record **SELECT**.
- ❑ Click on the + beside the folder **Record Keywords**.
- ❑ Click on the + beside the field **EMESS**.
- ❑ The DDS Tree is now showing you a nice summary of the file-level keywords and of the record **SELECT**.

Notice that the Design Groups (**MAIN_MENU** and **EMPL_SELCT**) appear at the end of the DDS records.



The Details Page

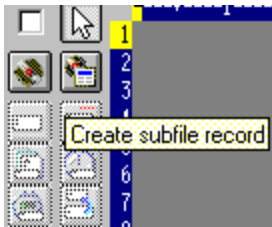
In the upper right-hand side of the Designer is the Workbook with several different tabbed pages. The top page (far left tab) is called Details and it is the other half of the "Windows Explorer"-like interface. It lists the contents of the currently selected item in the DDS Tree.

- ❑ Click on the Details tab.
- ❑ In the bottom right-hand side of the Designer is the Utility Notebook. The **Selected DDS** page in the notebook shows the actual DDS source for the currently selected item.


Creating New Screens

You may have noticed when running the application earlier that that application requires that you know the employee number ahead of time, instead of being able to browse what is in the database. What we really need is to add a subfile lookup capability. Normally the DDS for these is not easy to code. So much so in fact that most programmers simply clone another subfile, with the result that they rarely use all of the options available to them. Subfiles are much easier to code with CODE Designer. Let's try one.

- ❑ Before we create a new screen, we must first **create** another new **group**. You know how to do this (since you just did it in the previous steps.) Referring back to the earlier pages if necessary, create a new group. This time, however, do **NOT** select a record format from the Available list box. We will create a new record format for this group. Simply **Name** the Group **SUBFILE** and then close the Group Properties dialog. Note that the design page has a gray background whereas the groups we worked with before had a black background. That's because this group does not yet have a record format.
- ❑ You can create things on the design page by selecting the appropriate tool from the palette on the left-hand side and then click on the design page where you want it to be created. Right now, most things are disabled in the palette because there is no record in which to create fields. The only two tools available are Create standard record and Create subfile record. If you leave the mouse over a button for a second or two, flyover help will appear describing the indicated button.



- ❑ Click on the **Create subfile record** button and then click in the dark gray area. A subfile and a subfile control record pair will be created for you. The one you are seeing now is the subfile record. To see evidence of the subfile control record, use the drop down arrow to the right of the record format name (it's probably **RECORD1**). Before proceeding to the next step, make sure you are back to having the subfile record format (not the subfile control record) in the design page.

- ❑ Now click on the **Create named field** button  and then click in the design area somewhere on **row 8**. Six fields appear in a vertical column. This is because the subfile you created, defaulted to a **SFLPAGE** (visible list size) of six.

- ❑ Click on the top field and hold the mouse down and move it to row 8, column 5. Note the current row and column appear just above the field as you move it.

- ❑ Move the mouse over to the right edge of the field. It should turn into a








double-headed arrow as shown here. Hold down the mouse and move it to the left. The size of the field will be reduced. The current size will appear just above the field. When the size is 3, let go of the mouse. Very nice!

- The toolbar at the top of the design page is a very convenient place to monitor and manipulate the currently selected field. Rename the record from **RECORD1** to **EMPLSTSFL** and the field from **FIELD1** to **OPCODE** by simply over typing the text in the combo box.



- Change the color of the field by clicking on the  button and selecting pink (pink?!). Then change the usage of the field to input only by clicking on the  button.
- Position the cursor at row 8, column 9. Note that you can use the rulers on the top and side of the design screen to find the right spot. You can use the cursor keys or the mouse to move the cursor.
- If you are creating a long field with an exact length, the SDA syntax can be easier. Type: **+O(30)**. Then select the **+O(30)** field by clicking on it with your mouse. You should see a box around the field. Notice from Selected DDS page that you have created a text constant containing '+O(30)'. Not to worry – it won't stay that way for long.
- Hit the **Convert string to field**  button on the toolbar (this is supposed to look like a spool of thread in case you were wondering). Alternatively, you can press **F11** to convert the string into a character output field of length 30.
- Rename the new field to **ENAME** by overtyping in the toolbar. We are going to use this field to show the name of the employee.
- Position the cursor to **8, 41**. Now we will add a field for the employee's salary.
- It would be nice if we could just tell the Designer what we wanted the number to look like and then have Designer generate all the cryptic EDTCDEs to make it happen wouldn't it? Type **\$666,666.66** and then hit the **back arrow** to highlight the field.
- We are going to use **F11** this time to convert this field into an output numeric field with comma delimiters, two decimal positions, a currency symbol and no sign. Press **F11** and look at the Selected DDS page to see what was generated for you. Isn't that easier than remembering all those edit codes?

- ❑ Rename the field to **SALARY** and change its color to **yellow**, using the toolbar.
- ❑ Our subfile seems a little scrunched to the left. It would be nice to space it out evenly. To do



this simply **select** any one of the fields and hit **Space horizontally** on the far right side of the toolbar. Notice that the other buttons in the vicinity perform other typical alignment tasks (left, right, center and top).


- ❑ Just below the palette there are three spin buttons. The top one, **Subfile size**, specifies the total number of entries in the list that will be filled in by the application. The second one, **Subfile page size**, is how many entries appear on the screen. Set the Subfile size to 300 (by over typing) and the Subfile page size to 9. Notice that the design page is updated accordingly.

Switching between Multiple Records

- ❑ Now let's fix up the Subfile control record. The group we created contains 2 records. Verify







this by dropping down the record combo box in the toolbar.

- ❑ Change the current record by selecting **RECORD1CTL** from the combo box or by hitting the  or simply by pressing Alt+End. The fields in the subfile still appear so that column heading can be lined up, but they appear at half-intensity so that they can be distinguished from the fields of the current record. We think you'll agree that this ability to switch editing from one record to another is a lot simpler than the SDA approach!

- ❑ Rename the record to **EMPLSTCTL** by overtyping the name in the toolbar area.


Copy and Paste

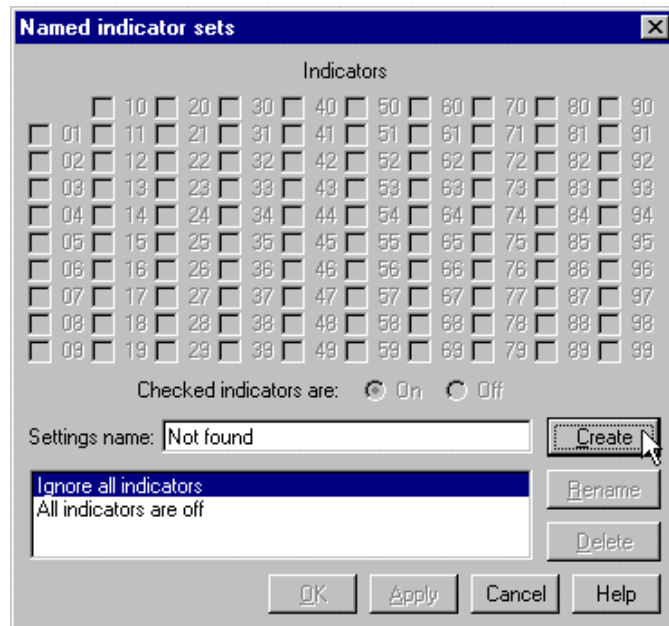
Let's provide a 'position to' entry in the subfile control header.

- ❑ Position the cursor at 4,9 and type: **Position to:**
- ❑ Next we need an employee name field. We could create a named field with the right  characteristics as we did in the subfile, or we could create a source reference using the  button in the palette. Alternatively we could reference the original database field using one of the   buttons. But there is an even simpler way. We can use copy and paste!
- ❑ In the DDS Tree expand the **EMPMNT** record by clicking on the + beside the record name.

- ❑ Click on the **ENAME** field and press **Ctrl+C**. (The right mouse pop-up menu or the Edit pulldown would also give us the Copy menu item.)
- ❑ Position the cursor to **4, 23** and press **Ctrl+V** to paste the field into the new layout. Can't get much simpler than that!
- ❑ Rename the field to **POS_TO**.

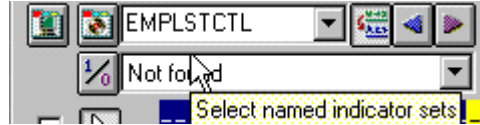
Working with Indicators

- ❑ Let's add some error handling for the 'position to employee name' field. If the employee name is not found in the database, the program will turn on indicator **60**. The screen should turn the field red, reverse image and position the cursor to it. Now wouldn't it be nice if we could work something higher level and easier to remember than some arbitrary number from 1 to 99.
- ❑ Click on the  button on the design page toolbar (or press F7). The Named indicator sets dialog appears.
- ❑ In the Settings name field, type: **Not Found** for the name and press the **Create** button.



- ❑ Click on the **checkbox** next to **60** and press **OK**. The 'Not found' indicator set is now in effect. The design area will be shown as if indicator 60 is on and all other indicators are off. The design page toolbar shows the name of the current indicator set in use in the combo box on the bottom left. The Designer will remember this indicator set for us so that we can re-use it at any time. We think that you will agree that this is a much easier way of applying indicators for test purposes than that used by SDA where you have to key the indicators over and over and

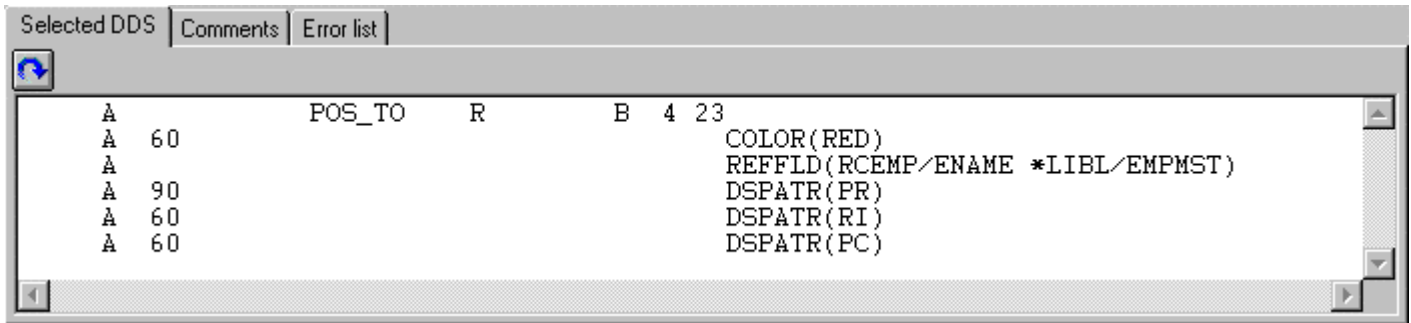
- ❑ Now select the **POS_TO** field.



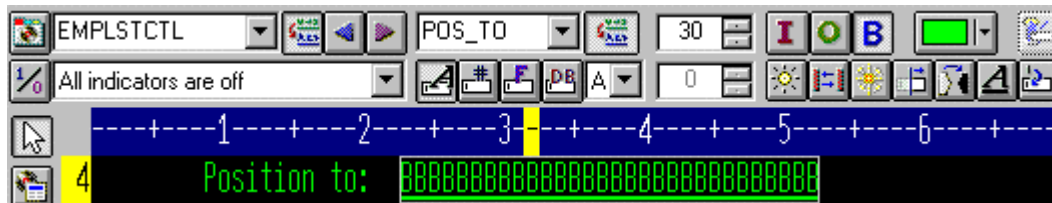
- ❑ On the toolbar, select the color **red** and the display attributes **reverse image** and **position cursor**. The set of toolbar buttons representing the current display attributes is found just below the color button). These buttons are toggles that are on (pushed) or off.

- ❑ Examine the DDS generated in the **Selected DDS** page.

- ❑ Notice that all the new keywords were created with a conditioning indicator of **60** applied. The DSPATR(PR) keyword was copied in when we pasted the field originally and so is not conditioned.



- ❑ Now let's try it out! From the Named indicator sets combo box, select **All indicators are off**. As you can see this stuff really works!



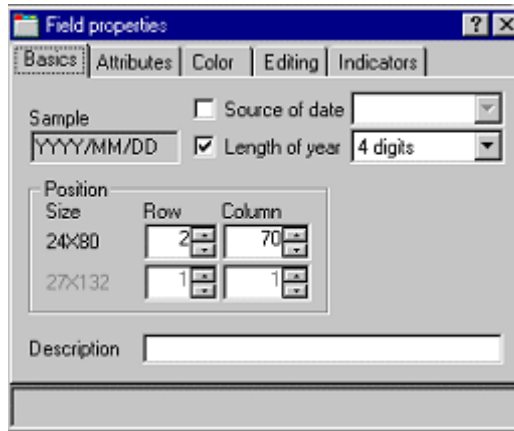
- ❑ From the Named indicator sets combo box, select your own set **Not found**. The field appears red and reverse imaged (or whatever other combination you selected).

The Properties Notebook

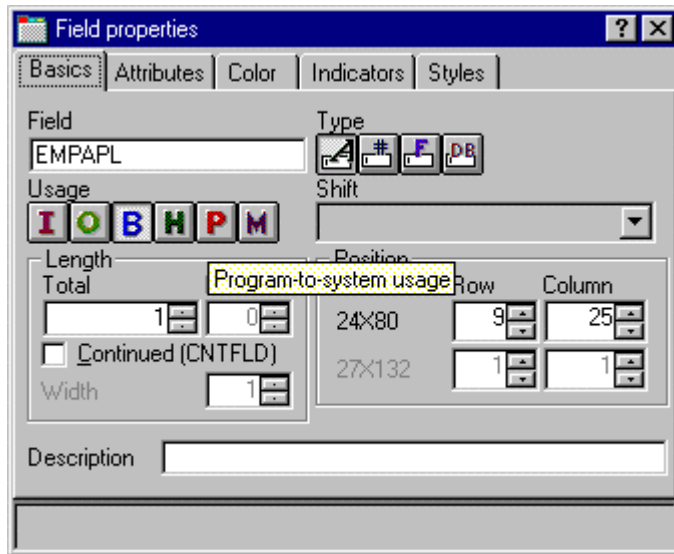
Second to the direct manipulation and the toolbar on the Design page, the easiest and quickest ways of getting access to the properties of a field, record, or entire file is a **Properties notebook**.

There are a number of ways in which you can get to a **Properties notebook**.

- ❑ From the Selected menu pull-down select **Properties**. Notice that **F4** is identified as the keyboard shortcut (F4 = Prompt – makes sense in a way).
- ❑ Now click on another field. Notice that the properties dialog changes to reflect the new field. This is useful when you need to change the properties on a number of fields.
- ❑ **Close** the properties notebook by closing it (clicking on the 'X' in the upper right of the dialog window).
- ❑ Another method of displaying the properties notebook is to **double-click** on anything in the DDS Tree, the Details Page, or the Design Page. Try those options now to see how it works.
- ❑ In the DDS Tree, click on the record **SELECT** and press **F4** to see the Record properties. Notice how, as you select different items, the Properties notebook will continuously update itself to show you the properties of the current selection.
- ❑ Now click on the ***DATE** field in the SELECT record. (You may have to move the properties notebook out of the way.) This field has a different set of pages describing its properties.
- ❑ Let's say we want to change the year from 2 to 4 digits. Click on the **Length of year** checkbox.
- ❑ Select the 4 digits option from the combo box. Notice how the sample is updated on the properties notebook.
- ❑ To test the Design page, click on the **MAIN_MENU** tab in the workbook and look at the upper right corner of the screen. The date should now have 4 digits.



- Next click on the **EMPAPL** field in the SELECT record. On the Field Properties notebook click on the **Basics** tab. On this page, you can change the field's name, usage, length, type,

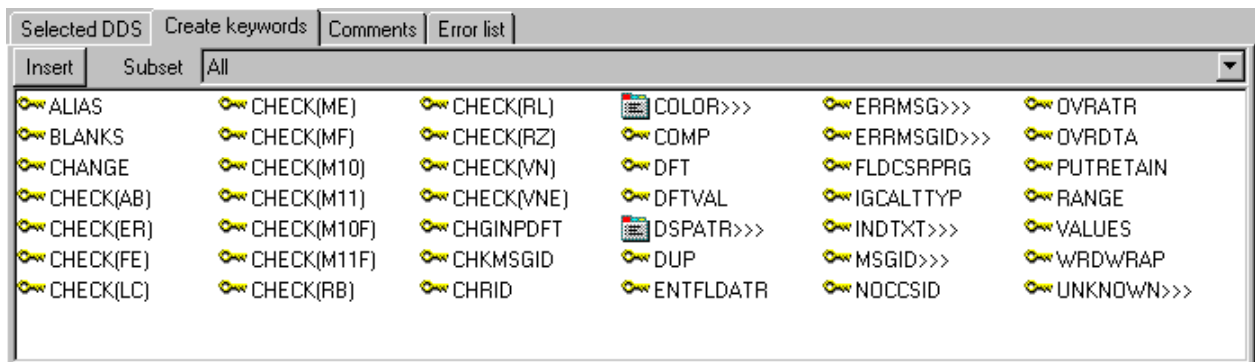


and screen position. The other pages give you quick access to other properties for this field.



Adding New Keywords

Hopefully by now you can see where CODE Designer helps you to manage the visual aspects of your displays and reports. But what if you need access to the full power of DDS?

- Click on the **EMPAPL** field in the **DDS Tree**.
- Press F5 or select **Insert keywords** from the pop-up menu. You are taken to the Details page




for the EMPAPL field and the Create keywords tab is selected in the Utilities notebook. This page shows you the subset of keywords that are allowed for the selected file, record or field and it takes into account the field's type, usage, shift and what record it is in. It is very powerful to know exactly what your options are. This information cannot be quickly ascertained from the Reference manual.

- With the EMPAPL properties notebook at the Basics page. Click on the  button to change the field to numeric type. Notice that the list of keywords in the Create keywords page has changed.
- Click on the  button to change the field back to alphanumeric. Notice that the list of keywords in the Create keywords page has changed.
- Click on the **ALIAS** keyword and press **F1**. The DDS Reference help for the **ALIAS** keyword appears. It is important to mention that the CODE Designer has lots of on-line help.
- Feel free to press **F1** anywhere you want to see help for an item, icon or notebook. You will get help relevant to what you are currently trying to do. From the Help menu you can get quick access to the DDS Language Reference as well as several other useful sources of information.
- Minimize the help window.
- Double click on the **INDTXT** keyword. (You may have to scroll to the right to find it). The keyword is created with default values which can be changed at your leisure
- Double click on the **INDTXT** keyword again. The keyword will be created with the same default values thereby creating a conflict. Not to worry – this is deliberate – we want to use it to show you how to resolve errors later on.

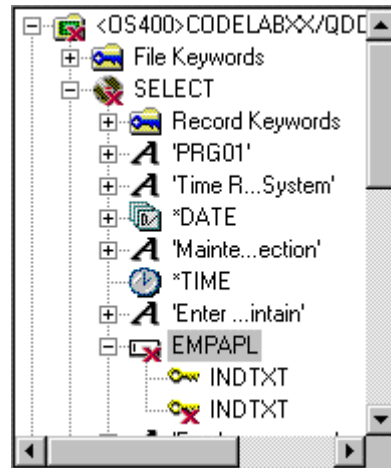
Verifying Your Source

We have just added a new record and some new fields to our DDS source. Everything that the CODE Designer adds to your DDS source is certain to have the correct syntax. Now we need to make sure that there are no semantic errors. We just introduced one in the last section by creating two INDTXT keywords describing the same indicator.

- ❑ From the Tools menu, select **Verify file** (or click on the  button on the main toolbar).

The DDS source is checked using the same verifier that the CODE Editor uses. A message appears on the status line at the bottom of the designer stating that the **verify completed with errors**.

- ❑ In the DDS Tree, there is a trail of **red x's** leading to the culprit. The file icon has a red x, as does the SELECT record, the EMPAPL field and finally the second INDTXT keyword.




- ❑ Click on the **MAIN_MENU** tab in the workbook. The EMPAPL field is highlighted in red.

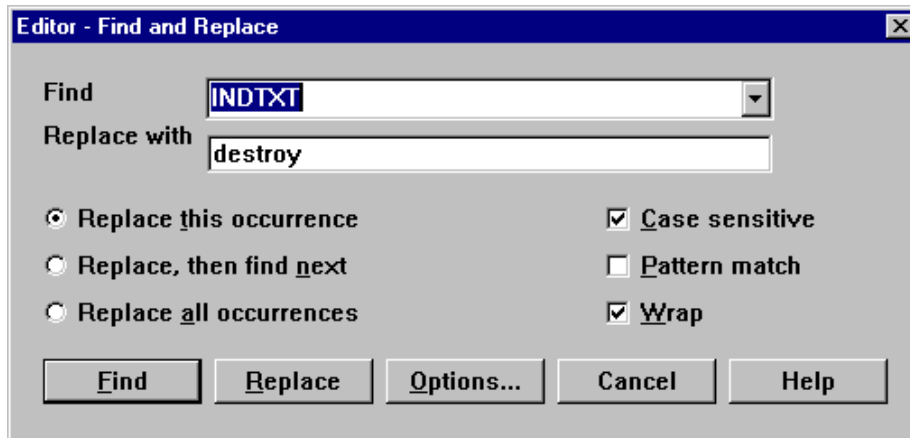
- ❑ Click on the **Listing** tab in the workbook. This page shows you the listing generated by the most recent program verify. A warning message is buried somewhere in the listing but it's not easy to find.

- ❑ If there are problems, they will show up in the **Error list page** in the Utility notebook. It behaves exactly like the Error list in the CODE Editor. Click on the Error list tab.

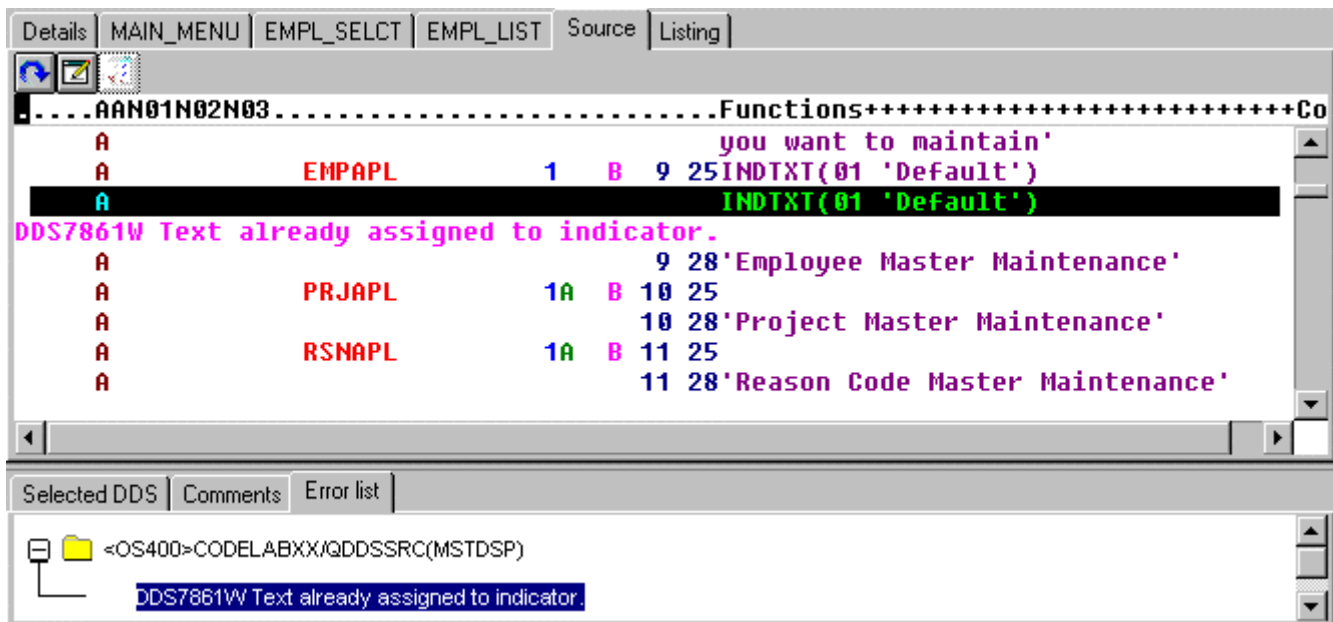
- ❑ **Double-click** on the warning DDS7861 in the Error list. (Hitting F1 would get detailed help on the message). The Source page appears and the cursor is placed exactly where the error is in the source. The Source page is a tokenized read-only view of the current state of the DDS source. Read-only? Wouldn't it be nice if you could just zap the error right here? Some things are just plain faster in the editor and many others are faster in the visual environment. It would be great to switch between the two modes at the push of a button

Switching between Design mode and Edit mode

- Click on the  button or select the **File**→ **Edit DDS Source** menu item. You now have access to the full power of the editor.
- Explore the Edit and View pull downs.
- Press Ctrl-F to bring up the Find/Replace dialog
- Type in INDTXT and hit the Find button.




- Press Ctrl-N to find the next occurrence
- Delete the second INDTXT line using Ctrl-Backspace or by any other method you like.



Compiling Your Source

Now we will compile the source on OS/400 just as we did in the CODE Editor.

- From the File menu, select **Save** to save your source to the host.
- From the Tools menu select **Compile** and then select **No prompt** (or click the  button on the main toolbar). A message will tell you when the compile is complete. Click on the OK push button in the message dialog.
- If you run the PAYROLL program, you will see the 4 digit year change you made to the opening screen of the program.

Closing CODE Designer

- From the **File** menu, select **Exit**.