CHAPTER 5: ARRAY FIELDS, FIELD OPTIONS, AND CALCULATED FIELDS

Training Objectives

Actively participating during this chapter helps you learn:

- The different components of the Calculated Field Definition window
- How to create and use calculated and conditional expressions
- How to use concatenated fields
- How to work with array fields
- Various field options

Introduction

This chapter focuses on special fields and options available in Report Writer to accomplish more complicated calculations that might be necessary on certain reports. An array field is a single field in a table that actually corresponds to several pieces of data, or elements, each from a certain period or category. These fields offer additional options when placed on reports.

Field Options allow you to modify how a field is printed. For example, placing the **Account Number** field in a report or page footer on reports and changing the Field Option to Count, would print the number of account numbers that appear on the report instead of printing an Account Number from a table. Field Options provide extra functionality without a significant amount of additional work.

Calculated Fields can be created to store user-defined information and print it on reports. These fields can add existing fields together, or use constants in an arithmetic expression to calculate a value. This value can be placed on a report like any other field after it is created.

One type of a Calculated Field is a Conditional expression. These expressions perform what is commonly referred to as If-Then-Else functionality to Report Writer. Conditional expressions require a True and False Case entry along with the expression.

For additional information on these topics other than what is provided in this chapter of the training manual, search on the key words in the online help available from the **Help** menu in the Report Writer application.

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Array Fields

This section explains how to place array fields and to enter the necessary information to do this on a report. Array fields store the same information from several periods, such as sales from each month in the year or several different pieces of data of the same type, such as the names of your account segments. This section describes the steps necessary to use array fields.

An array field that appears as a single field in a table actually corresponds to several pieces of data, or elements, each from a certain period or category. You can use array fields on reports in much the same way other fields are used. However, to place a single field onto a report, enter the field's array index. The array index is a number that designates which specific element within an array field is printed.

For example, an array field containing information about monthly fields on a report should typically be placed on your report 12 times. Each of the 12 fields displays sales information from one month of the fiscal year. To place each field on the report, first specify which month's sales are displayed in that field by entering a number within the array index. The array index for the monthly sales array field is 12. The field for which you enter an index of 7 would print sales information from the seventh month of your fiscal year.

The monthly sales array field is shown in the following illustration as it would appear in a report layout on the left and as it would appear on a printed report on the right.

Monthly Sales [1]	$19,567.00	
Monthly Sales [2]	$21,456.00	
Monthly Sales [3]	$28,566.00	
Monthly Sales [4]	$22,198.00	Each field contains a separate sales figure, one for each month of the year.
Monthly Sales [5]	$18,445.00	
Monthly Sales [6]	$17,339.00	
Monthly Sales [7]	$17,899.00	
Monthly Sales [8]	$21,688.00	
Monthly Sales [9]	$24,601.00	
Monthly Sales [10]	$26,770.00	
Monthly Sales [11]	$32,844.00	
Monthly Sales [12]	$37,550.00	

Each field of the array is treated as a separate field on the report layout. A field can be deleted from the report layout like any other report field by selecting it and pressing the delete key. Fields can also be moved or sized like any other field in the layout window.

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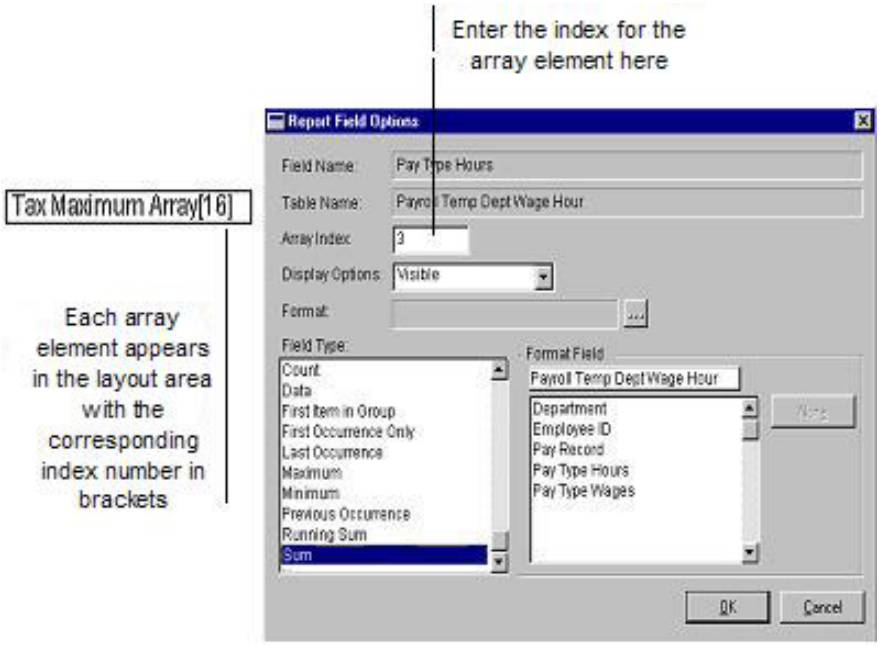
Dragging an Array Field to the Report Layout Area

When planning a report you may not know if a field is an array field. After dragging a field to the layout window, the Report Fields Options window automatically opens if it is an array field.

HINT: *Automatically place all of the fields in the array on the report by holding down the CTRL key when dragging the field to the layout area. Each field's index is displayed next to the name of the field, as shown in the previous illustration. If you decide to use this method, skip to the section entitled "Position the Array Fields."*



Entering an Index for each Field in the Array

To add the first element of an array to a report layout, enter the number one in the **Array Index** field, and then click **OK** to close the window. Drag the same array field from the field list into the layout area again. Select the next Array Index to add to repeat the process until all of the desired fields are on the report. If you do not know the field's array index, select the **Fields** button on the Toolbar. In the Fields window, highlight the appropriate field and select **Open** to view field information. The maximum array index value is displayed in the **Array Size** field of the Field Definition window that appears. (If the array index is 0, the field is not an array field.)

HINT: *You do not have to add every element in the array to the report. If, for instance, you want to print only the monthly sales for one month of your current fiscal year, drag the* ***Monthly Sales*** *field to the report, enter the corresponding array index in the Report Field Options window, and complete the report as usual.*

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If you close or cancel the Report Field Options window without entering a valid index, the index 1 is automatically entered, and the corresponding element appears in the report layout.

Positioning the Array Fields

Arrange the elements on the report, and label each or position them so that it is clear what data is displayed in each. Complete the report as usual. Remember to save changes when closing the layout window and to set access to the report for the appropriate users.

If you placed the array field on your layout using the CTRL key, all of the fields for the array field are placed on the layout window. If you only want to use certain fields, delete the fields that are not needed.

Field Options

This section describes the options that can be applied to fields on reports. Using field options, you can modify a field's type. Field types allow the altering of how data stored in a field is printed.

Instead of simply finding the data in a field and printing it, you can modify the field type to accomplish a number of things, including the following:

- Print the number of times a field appears on a report.
- Print the total of a field's values at the point where the field is placed in the report.
- Reprint the most recently printed value of a field on the following page.
- Print the highest, lowest, or average value of a field.
- Print the sum within a group or on a report.
- Print the number of times a field is printed in a group.

Positioning the Field on a Report

Place the field whose options you need to modify on the report layout. Place a field on a report as many times as needed. Typically, fields with modified field types should be placed in the report body, in additional footer sections or report footers. Values cannot be calculated correctly unless fields are placed in those sections, with the exception of the First Occurrence Only field type, which can be placed in headers.

When placing a field in a report footer or additional footer it is automatically assigned a Last Occurrence field type. A field printing the last occurrence simply repeats the most recently printed value of that field. You may want to change the field's type. When placing calculated fields in footers, change the field's type to data to ensure that the expression you created is calculated correctly.

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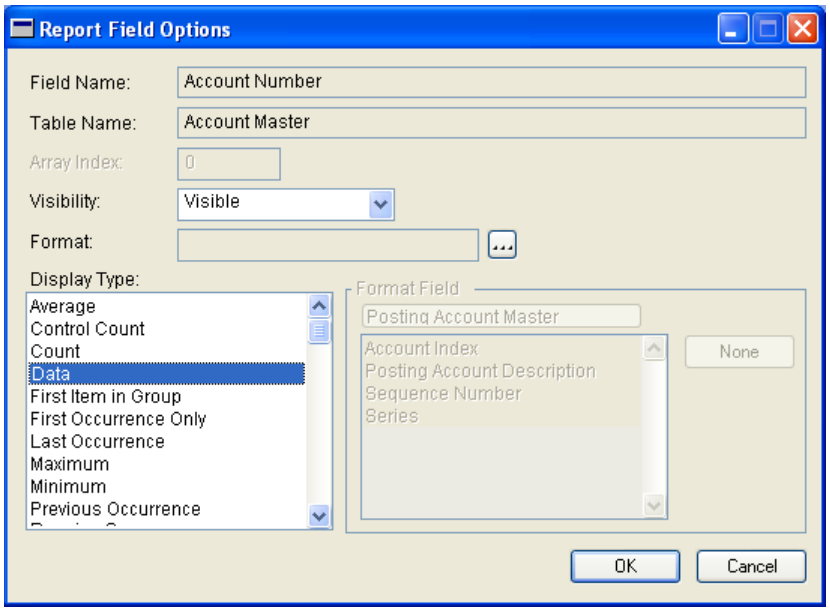
Each of the different field types are defined in a table on the following pages. Refer to this table for more information on the different field types and what each can help you accomplish on a report.

Opening the Report Field Options Window

Be sure that the field whose field options are being modified is still selected. Then, select **Report Field Options** from the Tools menu to open the Report Fields window, shown in the following illustration. (You can also double-click on the field to open the window.)

The field name and table name are displayed for the selected field at the top of the window. These fields on the window are for informational purposes only and cannot be changed by the user. The **Array Index** field is only available if the field selected is an array.



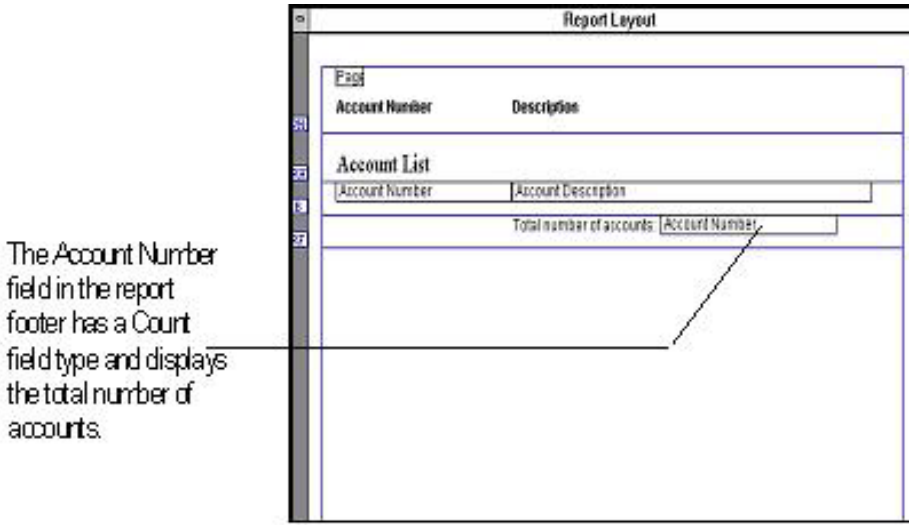
Setting the Field Type

The default field type for all fields placed in the body of the report is **Data**. With a **Data** field type, the field's data is printed exactly as it is stored in your tables. Selecting a different field type changes how the field's data is evaluated – instead of printing the data, information is printed about that field's data.

For example, to print a report listing some of your accounts; create a field that counts the total number of accounts printed. To do this, place the **Account** field on the report again in the report footer, and change its field type to Control Count.

The default field type for fields placed in footers is Last Occurrence, which displays the most recent occurrence of data for that field in the **Last Occurrence** field. You can change the field type for fields placed in footers to any type except **Data**.

The following illustration shows a simple report that contains fields with modified field types.



To have a field that prints the total balance of the accounts, place the field containing account balances on the report again, in the report footer, and change its field type to Sum. Placing the field in the report footer means the balance of the accounts on the entire report are added together.

Field Types

Average	This prints the average value of the data printed in a group or on a report.
Control Count	This prints the number of times the additional footer immediately above the footer containing the **Control Count** field is printed on the report. The **Control Count** field type can be used only when printing information in groups using additional footers. The Control Count type should be used instead of the **Count** field type to count categories, if you print a report with groups.
Count	This prints the number of times a field is printed in a group or on a report.
Data	This prints data without modifications, as it is stored in the table. All fields in the body of the report whose field types have not been modified have Data field types.
First Item In Group	This prints the first value printed in a group or on a report.

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First Occurrence Only	This prints a value the first time it occurs, instead of each time it occurs. Use the First Occurrence field type to organize data in groups without the use of additional headers and footers.
Last Occurrence	This prints the last value of the field that was printed in a group or on a report. It can be thought of as the current occurrence. All fields placed in footers are automatically assigned a Last Occurrence field type. If you place a calculated field into a footer section, you need to change its field type to **Data** or another appropriate field type, or the field does not print correctly.
Maximum	Prints the greatest value of the field printed in a group or report.
Minimum	Prints the smallest value of the field printed in a group or report.
Previous Occurrence	This prints the value of the field printed immediately before the last occurrence in a group or on a report.
Running Sum	This prints the total of the field's values at the point where the field is placed within the entire report.
Sum	This field prints the sum within a group or on a report.

HINT: *The* ***Control Count*** *field prints the number of unique values the field has generated, whereas the* ***Count*** *field prints the number of times the field printed. See the example below for further clarification about the* ***Count*** *field.*

Vendor ID	Doc #
Aaron Fitz Electrical	1234
Aaron Fitz Electrical	2365
Aaron Fitz Electrical	6793
Adam Park Resort	3562
Blue Yonder Airlines	5464
Bob's Deli	2934

If you have a count and control count on the **Vendor ID** field referred to above, count = 6, control count = 3. Not all field types can be used in all sections of a report. Refer to the online help for a summary of what field types can be used in each section of a report.

Additional Field Options

Select to make a field visible (the default selection), invisible, or hidden when it does not contain data.

Visible

The field is always displayed on the report, even if blank for a given record. This is the default selection. If a visible field is blank but has a format applied to it, the formatting is displayed on the report without any data. For example, a **ZIP Code** field could be formatted to include a dash between the fifth and sixth characters. If this field is included on a report and is visible, and a given record has no ZIP Code data, a dash appears in the **ZIP Code** field for that record on the report.

Invisible

The field is never shown on a report. Commonly, fields are selected as invisible when their values are needed for use in calculated fields, but not for display on the report. For example, you may want to display a field on the report showing the difference between the highest and lowest values of specific field.

To accomplish this, add the field to a footer in the report layout twice. Change the field type of one instance to Minimum, and the other to Maximum. Then, create a calculated field that subtracts the minimum value from the maximum value. Since only the calculated field needs to be displayed on the report, set the visibility of both the minimum and maximum value fields to invisible.

Hide When Empty

If a record does not contain an entry for this field, it is not included on the report. For example, if a customer record does not include a telephone number, and the **Phone number** field is selected as hide when empty, then for that customer record, the empty phone number field and any related formatting is not included on the report.

HINT: *Selecting hide when empty prevents formatting characters from appearing on a report when the field contains no data. You also can select the Skip Blank Transactions option in the Report Definition window to skip records that contain incomplete data.*

Format Field

When your report layout contains a string, currency or variable currency field that gets its formatting based on a format field, use the fields in this group to identify the format field, so that Report Writer can retrieve the format and print the record the same way it was saved. Do not apply a specific format to a report field and use the Report Field Options window to specify a format field for the same report field; the format results will be unpredictable.

The format field must be an integer field. It is common to use a drop-down list for this purpose. To select a format field, click the visual switch until calculated fields or the appropriate table name is displayed. Then select the field name from the list. To select a different field, click **None** to deselect your original choice.

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Calculated Fields

This section explains the process of using calculated fields in a report. Calculated fields allow you to manipulate report data, adding value to a report by producing information not available in the data tables.

There are two ways to create calculated fields:

- **Using conditional expressions** – Allows you to print one value or another, depending on the result of a Boolean (true or false) expression.
- **Using calculated expressions** – Allows you to print the result of an expression.

Conditional Expressions

Conditional expressions are powerful tools used to print a particular word, calculation, or other result in the calculated field you create. It can be used when two different conditions are possible on a report, and you want to print a different result in the field depending upon which condition occurs.

For example, you may want to print a customer's balance on a report if the amount has been due for less than 30 days, but leave the balance off the report if the customer is in default, since that information is more sensitive. The condition is whether the customer's balance has been due for less than 30 days; and if the condition is true – that is, if the condition exists for a given customer – you want the customer's balance to be printed.

Calculated Expressions

Calculated expressions allow printing the result of any calculation in the calculated field. Use calculated expressions to create fields that print simple functions or complex mathematical calculations on a report. As with conditional expressions, you can even incorporate other calculated fields into the expression.

Writing an Expression

Before entering conditions or true and false cases, write out the expressions completely and determine which of the fields, operators, constants and functions you will be using.

Be sure that both the true and false cases use the same result type. For example, you cannot enter an integer field or expression in one field and a currency field or expression in the other. However, several functions are available to convert the value of a field from one storage type to another. The CUR_STR function converts a currency storage type to a string storage type; other functions that convert storage types are STR_CUR, STR_LNG, INT_STR and STR_DAT.

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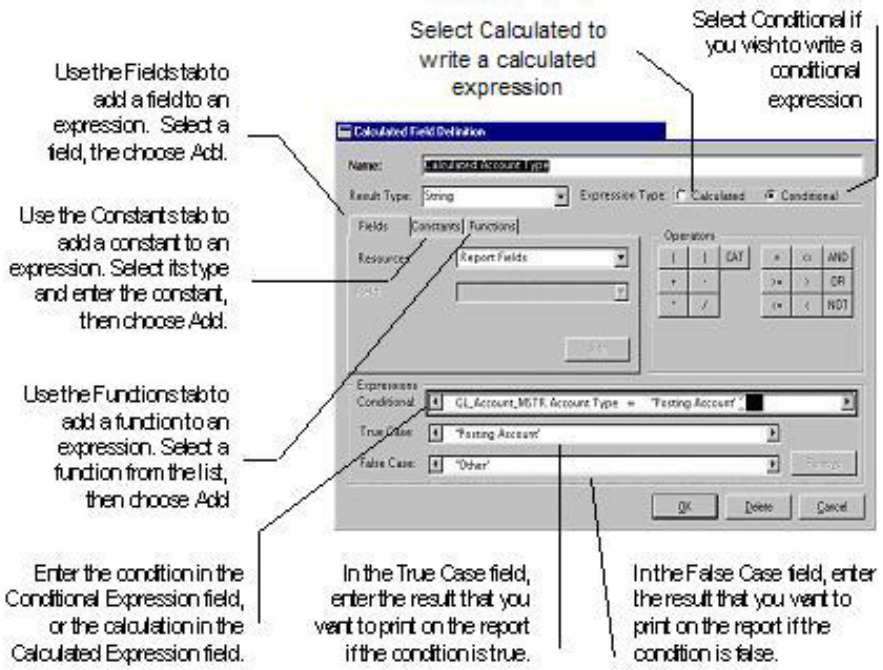
Overview of the Calculated Field Definition Window

From the list of tables in the Report Layout window Toolbox, select Calculated Fields. The current calculated fields for the report are displayed in the fields list. Select New to create a new calculated field, or highlight an existing calculated field and select Open. The Calculated Field Definition window opens.

The following illustration identifies key parts of the Calculated Field Definition window and how each is used.



Naming the Calculated Field and Determining the Expression Type

Enter a name for the expression in the **Name** field. It is best to use a name that easily identifies the expression, so when it is placed on the report layout, you do not have to return to the definition window to determine what the expression is being used for. To create a calculated expression, select Calculated as the Expression Type. To create a conditional expression, select Conditional as the Expression Type.

HINT: *If the expression type for an existing calculated field is changed, an alert message appears indicating that the action will destroy the current expression. If an expression is displayed in the window and you click* ***Continue*** *when the alert message appears, the expression is removed, even if it was saved previously; and you need to redefine the expression.*

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Selecting a Result Type

Select a result type for the expression from the drop-down list. The result type is the storage type that determines the way the information printed in the calculated field is stored. The storage types available are: integer, string, currency and date. These storage types are similar to those offered for constants.

Control Type	Used For	Example
Integer	Numbers	Any number that is not a monetary value, such as the number of line items on an invoice.
Currency or Variable Currency	Monetary units	Any monetary value, such as account balances.
String	Text	Passwords, names, phone numbers.
Date	Dates	The date a user logged into the application.

HINT: *If you are using the CAT operator, the result type is String, even though you may be using fields with other storage types in the expression. For more information about the storage types with which these result types correspond, refer to the Field Descriptions online.*

HINT: *For conditional expressions, the result type must apply to both the true case and false case; you cannot enter an integer field or expression in one field and a dollar field or expression in the other.*

Defining an Expression

Select each element to be included in the expression from the appropriate tab (Fields, Constants, or Functions). Click **Add** to place the selected element in the currently-highlighted position within the expression. Add the appropriate operators to the expression as needed. The **Conditional Expression** field is displayed in the window if you select Conditional; otherwise, the **Calculated Expression** field is displayed.

Defining Conditional Values

If this calculated field is based on a conditional expression, define the True Case and False Case values. One of these values is printed in the calculated field on the report, depending on whether the expression defined is true or false. If the calculated field is based on a conditional expression, both the True Case and False Case values must have the same storage type as the result type.

HINT: *You must place values in both the **True Case** and **False Case** fields when you write a conditional expression. If you do not want anything to be printed if a condition is not true, enter 0 or a space in the **False Case** field, and select the same constant type specified for the storage type of the **True Case** field value.*

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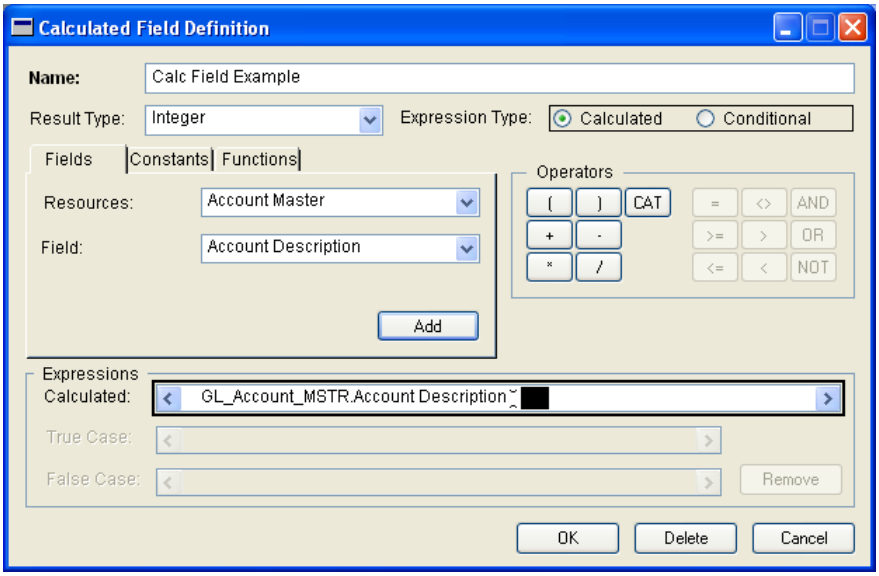
Fields, Constants and Functions

When defining an expression for a calculated field, the expression cannot be typed in directly. Instead, the expression must be built by adding the elements to the expression from the Fields, Constants, or Functions tabs and the Operators.

Fields Tab

Five or more lists of fields are displayed in the Resources list in the Fields tab: Report Fields, Calculated Fields, Legends and Globals as well as the fields in each report table. Use fields from any of those categories in expressions.



To add a field to an expression, select the name of the appropriate table to display the fields in that table. Then, use the Field drop-down list to select the field to include in the expression. Select **Add** to add the field to the expression.

Report Fields are fields to which you have applied field types other than Data. Fields with modified field types are displayed with the name of the report section they are in, such as H1 for the first additional header and the name of the field type, such as MAX for Maximum and FREQ for Count.

The Calculated Fields list allows the use of other calculated fields when writing expressions. For example, you could create a conditional expression that evaluates whether an account's balance is less than or equal to $2,000. If the condition is true, the value in the **Balance** field can be printed in the calculated field. If the balance is greater than $2,000, the calculated field can be left blank, or it can display the value of another field.

HINT: *If you change a calculated field's type to something other than data, it will not be listed in the report field list for use in another calculated field.*

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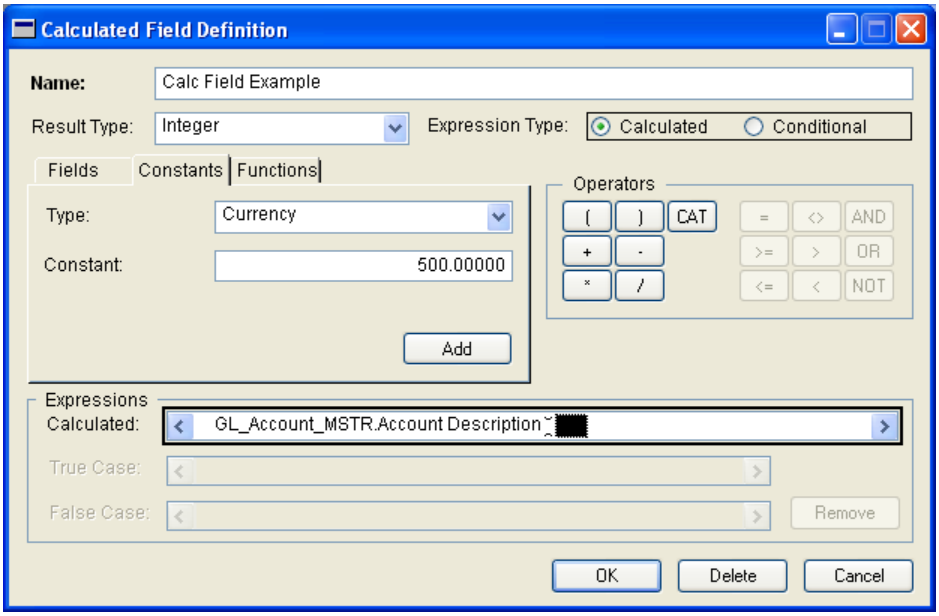
The RW Legends list displays all legend fields placed in the layout; these are not used frequently in Report Writer. Please refer to the appropriate section in the Report Writer printable manual for more information about how legends are used in original Microsoft Dynamics GP reports. The Globals list displays the same global fields shown in the report layout.

HINT: *To use a field in the expression that is not displayed in any of the lists, use the online field descriptions to find the table it is stored in. Then use Report Writer's linking capability to link the table to the report, if possible.*

Constants Tab

Constants are values you set. Typically, they are used in the **True Case** and **False Case** fields or as a value against which expression fields are measured. For example, you might want to add $500 to each customer's credit limit and print the result. Enter a constant for the value you are adding, 500.00000.



The Constants tab contains two fields: the **Type** drop-down list and the **Constant** field. The **Type** drop-down list allows you to select one of the following constant types: integer, string, currency, date, or time. These constant types are storage types, and are five of the basic ways information is stored in Microsoft Dynamics GP tables.

To enter a constant in an expression, select a constant type and use the **Constant** field to enter the constant. Select **Add** to add the constant to the expression. Typically, an operator is entered prior to a constant. For example, if you want to add $500 to customer credit limits, enter the credit limit table field and the operator for addition (+) into the expression calculation. Then, enter the currency constant of 500.

Functions Tab

System-defined functions are predetermined operations included with Report Writer. To add a function to an expression, select the function from the Functions list and select **Add**.

Some of the functions can be used to change the format of a field. The UCASE function, for example, prints text fields in all uppercase characters, regardless of how they were typed when entered. Other functions can be used to convert a field's storage type, allowing greater flexibility in writing expressions.

HINT: *Many of the system-defined functions convert a field's control type. For example, the CUR_STR function converts a currency control type field to a string control type field. The conversion does not affect the way the field is stored in the table; it only affects how its data is evaluated in the calculated or conditional expression.*

Depending on the product used with Report Writer, you may have access to user-defined functions provided with that product. Refer to the documentation provided with the product or the appendix on Functions for more information about these functions.

Operators

The operator buttons are used to join the other elements of the expression together. To add an operator to an expression, select the appropriate symbol. Some of the operators cannot be used when writing the true and false cases for conditional expressions, or when writing calculated expressions. These buttons are unavailable when clicking the **True Case** or **False Case** field or whenever the Conditional expression type is selected.

Removing and Inserting Items in Expressions

To remove an item from any part of an expression, highlight it and select **Remove**. To add an item to the beginning or middle of any expression, click in the appropriate location in the expression and add the item.

Saving the Expression and Positioning the Field

Click **OK** to save the expression and close the window. The name of the field appears in the Calculated Fields list in the Toolbox. Drag it into the report layout area and position it as you would any other field. Add the appropriate label, if necessary, and use drawing options to customize it.

HINT: *If you place the field in a footer, it is automatically assigned a Last Occurrence field type. To change the field type, use the Field Options window. We recommend assigning a field type of Data to the* ***Calculated*** *field rather than leaving it at Last Occurrence; otherwise, it does not print correctly.*

Save changes when closing the layout window; if you do not, the calculated field's expression is saved, but its position on the report, and any other customizing done for it is not.

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Creating Calculated Expressions

Writing the Expression

The **Calculated Expression** field displays the calculation that determines what is printed in the calculated field. Examples of calculated expressions are listed in the following table.

Goal	Calculated Expression
Determine the percentage that each customer's balance has increased from the previous month to the current month.	(Current Balance – Previous Balance) / Previous Balance * 100
Determine the average number of users in each user class by dividing the total number of classes by the total number of users.	User Class (Count) / User ID (Count) The Field Options section provides information on changing field types.

Before entering a calculated expression, write it out completely and decide which of the fields, operators, constants, and functions must be used to express the calculation. For more information about operators and functions, refer to the Report Writer printable manual or to the online documentation for Report Writer.

HINT: *If the calculated expression you are building has an integer value divided by another integer value, the resulting value is always an integer. This occurs even if the result type of the calculated field is set to currency.*

For example, if the calculated expression you are using is equivalent to 5 / 2, the result of your calculation is 2.00 instead of 2.50 even if the result type of your calculated field has been selected as currency. In order for the result to truly calculate to the correct currency value, you need to avoid directly dividing an integer by another integer.

*For example, you could use the following expression: 5 * 1.00000 / 2, to come up with the result of 2.50. Because the integer is first multiplied by a currency value before it is divided by an integer, the result calculates as expected.*

Expression Elements – Specific information for Calculated Expressions

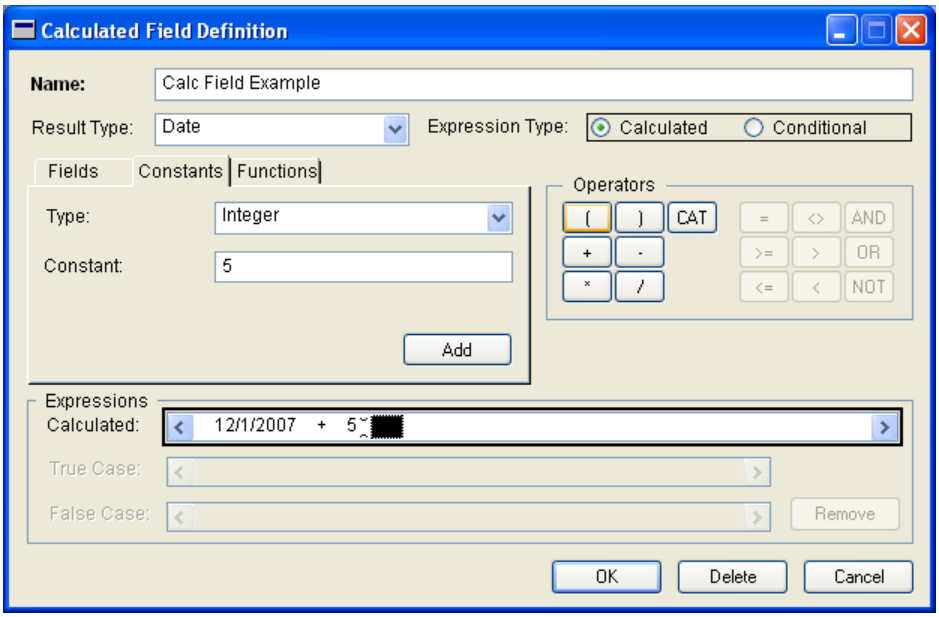
Dates

Fields containing dates and constants with Date control types can be used in two ways in calculated expressions:

- Adding a date and a number which describes a specified number of days
- Subtracting a date from a date

The following examples illustrate each type of expression and a sample expression using each.

Adding a date and an integer (conditional and calculated)
Expression: Date + Integer (can be constant or field value)
Result: Date
Example: 12/01/07 + 5
Example result: 12/06/07



You can also create two expressions of this type and use comparison operators such as **Greater Than** or **Less Than** to compare them.

Subtracting a date from a date (conditional and calculated)
Expression: Date – Date (can be constant or field value)
Result: Integer
Example: 12/06/07 – 12/01/07
Example result: 5 (days)

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The result type must be Integer.

You can also create a conditional expression of this type and use comparison operators such as **Greater Than** or **Less Than** to compare it to a field or constant with an integer control type.

For more information on calculated expressions, consult the online help available from the Help menu in Report Writer.

Creating Conditional Expressions

Writing the Condition

Click on the **Conditional Expression** field to make all entries you want to appear in that field. Enter the first half of the conditional expression, the condition here. The condition determines whether the true case or the false case is printed in the calculated field. True and false cases, entered in the next step, are the results that print in the field if the condition is true (present) or false (not present).

Sample conditional expressions are listed in the following table.

Goal	Condition	True Case	False Case
Print a list of employee salaries, estimating take-home pay.	Salary < $20,000	Balance * .7 (dollar field multiplied by integer constant)	Balance * .65 (dollar field multiplied by integer constant)
Print a list of customers, and if their monthly purchases total more than the average of all the customers' purchases, print the words "Higher than average." If they're lower, print the words "Lower than average."	Monthly Purchases >= Monthly Purchases (Average)* *(See the "Field Options" section for additional information on field types.)	"Higher than average" (string constant)	"Lower than average" (string constant)

To make an entry in the **Conditional Expression**, **True Case**, or **False Case** fields, click in the field to specify where the entries should be placed. For example, if you have just finished writing the false case and now want to make modifications to the condition, click in the **Condition** field, or your next entries will continue to appear in the **False Case** field.

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Do not make any entries directly in the fields by typing in them. All entries are made by selecting the appropriate item, such as a field or an operator (plus or minus sign), and then by using the appropriate button to enter it in the expression fields.

Before entering conditions or true and false cases, write out the expression completely, and determine which of the fields, operators such as plus and minus signs, constants, and functions are used.

Writing True and False Cases

After writing the condition, write the true and false cases. True and false cases indicate the result printed in the calculated field depending upon whether the condition is met or not.

To write the true case, click in the **True Case** field, select the appropriate items, and enter them in the field. To write the false case, click in the **False Case** field, select the appropriate items, and enter them in the field.

You must always make an entry in both the **True Case** and **False Case** fields when writing conditional expressions. If you do not want anything to be printed if a condition is not true, enter 0 or a space in the **False Case** field, and select the same constant type as the control type of the entry for the **True Case** field.

HINT: *The result type selected must apply to both the true case and false case; you cannot enter an integer field or expression for the true case and a dollar field or expression for the false case.*

Expression Elements – Specific information for Conditional Expressions

Dates

Fields and constants with Date control types can be used in three ways in conditional expressions:

- Adding a date and number which describes a specified number of days
- Subtracting one date from another
- Comparing two dates

All dates are displayed according to the operating systems settings. Adding and subtracting dates was illustrated earlier in the Calculated Fields section.

Comparing two dates (conditional only)
Expression: Date < Date (can be constant or field value)
Result: True or False
Example: 12/01/07 < 12/06/07
Example result: True

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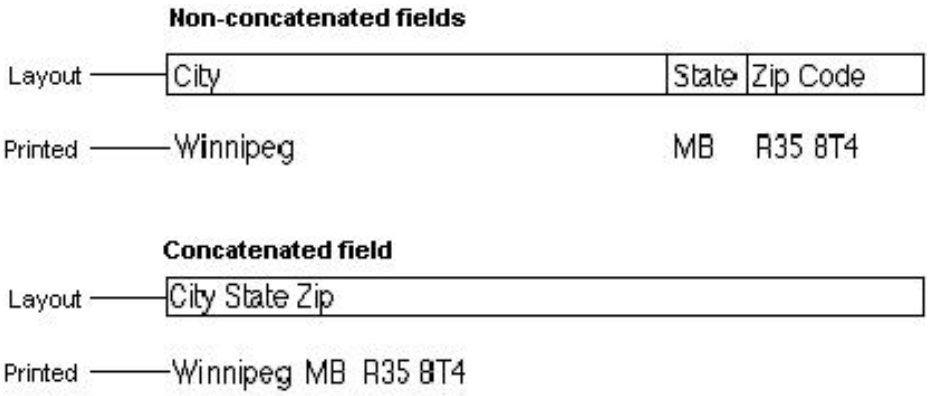
Most Conditional Expressions perform If Then-Else functionality. For example, if customers are assessed a $2.00 service charge if there balance is greater than $100.00 and you want to display this on a report prior to entering the service charge documents, enter Customer Balance > $100.00 in the Expression field. In the True Case field enter Customer Balance + $2.00. In the False Case enter Customer Balance.

Using Concatenated Fields

The CAT operator allows you to create a calculated field made up of one or more other fields. This operator combines, or concatenates, the fields so that they are printed together, with as many spaces as desired between each field within the calculated field.

For example, to print addresses on mailing labels, place the **name**, **address**, **city**, **state**, and **postal code** fields on the report. However, the **city** field would always require the same amount of space on the report, even if the data contained within it required only a few characters.

By concatenating – linking together in a calculated field – the **city**, **state**, and **postal code** fields, you can have the information printed in a way that is easier to read.



Complete the following steps to create a concatenated report field:

1. Create a calculated field. Make sure that Conditional is not selected.
2. Select the result type. When using the CAT operator, the result type is String, even though you may be using fields with other storage types in the expression.
3. Write the expression.
4. The **Calculated Expression** field displays the calculation that determines what is printed in the calculated field.

HINT: *Before entering the calculated expression, write it out completely and decide which of the fields, operators, constants, and functions are used in the calculation.*

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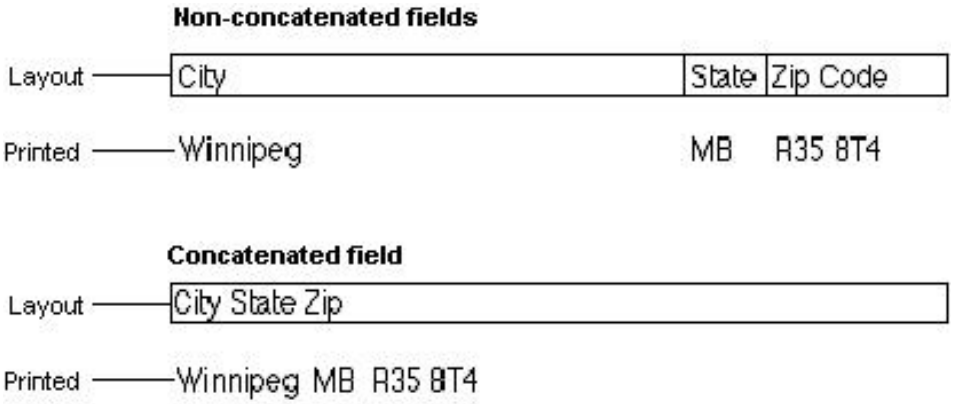
HINT: *Addresses that contain too many spaces between the* ***city****,* ***state****, and* ***postal code*** *fields are difficult to sort automatically, so they typically are delivered more slowly. It is a good idea to use this procedure to combine any fields that are printed on envelopes or displayed through envelope windows.*

Removing Extra Spaces

When writing expressions to concatenate fields for mailing addresses, use the STRIP function to remove the extra spaces in each field. Otherwise, the data looks the same as it would if you did not concatenate the fields. Also, you must use the STRIP function with each individual field – not the group of fields.



These examples show how the CAT operator (indicated by the pound – # – sign) and the STRIP function should be used together:

Correct: STRIP (City) # STRIP (State) # (Zip Code)
Incorrect: STRIP (City # State # Zip Code)

Converting Data to Strings

To concatenate fields that have dollar, integer, or long integer storage types, you must use the appropriate function (DLR_STR, INT_STR or LNG_STR) to convert the field's data to a string storage type. Then use the STRIP function to remove extra spaces, if necessary.

Enter each part of the expression by selecting the appropriate item, such as a field or function, and then by using the appropriate button to enter it in the **Calculated Expression** field.

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Saving the Expression and Positioning the Field

Click **OK** to save the expression and close the window. The name of the field appears in the calculated fields list at the left. Drag it into the report layout area, and position it as with any other field. Add the appropriate label, if necessary, and use drawing options to customize it.

HINT: *If you place a field in the footer section of a report, use the Field Options window to change its field type to Data, since all fields placed in footers are assigned a Last Occurrence field type automatically.*

Lab 5.1 – Array Fields

Company: Fabrikam, Inc.

Scenario: You have been asked to create a report to give an overview of your Customers aging. The **Aging Period Amounts** field is stored in an array. This exercise guides you through the creation of a simple report that includes adding the **Aging Period Amount** field to the report for all seven aging periods.

Challenge Yourself!

1. Determine the main table for your report. This is the table that contains the **Aging Period Amounts** field. Use the Field Descriptions window.
2. Create a new text report using the following information in the Report Definition window:

Report Name	Array Lesson
Using Key	RM_Customer_MSTR_SUM_Key1
Format Options	Text Report
Text Report Options	17 Characters/Inch

3. Complete the layout of the report by referring to the following screen output for guidance. Your report should look similar to this output when it is printed.

***HINT**: Make the body of the report large enough to accommodate all seven aging periods, and use the ctrl key to add all of the **Aging Period Amounts** fields at once.*

```
                    Customer Summary Overview

Customer Number:  AARONFIT0001

Aging Period 1:                 $3,434.09
Aging Period 2:                     $0.00
Aging Period 3:                     $0.00
Aging Period 4:                     $0.00
Aging Period 5:                     $0.00
Aging Period 6:                     $0.00
Aging Period 7:                19,899.04

Customer Number:  ADAMPARK0001

Aging Period 1:                 $2,696.15
Aging Period 2:                     $0.00
Aging Period 3:                     $0.00
Aging Period 4:                     $0.00
Aging Period 5:                     $0.00
Aging Period 6:                     $0.00
Aging Period 7:                17,170.36
```


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Lab 5.1 – Array Fields

Company: Fabrikam, Inc.

Scenario: You have been asked to create a report to give an overview of your Customers aging. The **Aging Period Amounts** field is stored in an array. This exercise guides you through the creation of a simple report that includes adding the **Aging Period Amount** field to the report for all seven aging periods.

Need a Little Help?

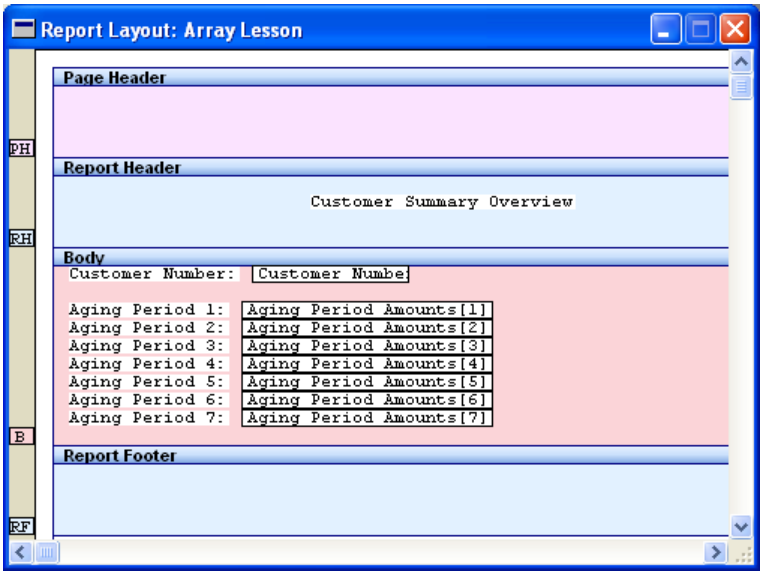
1. Launch Report Writer.
2. Create a new report using the following information in the Report Definition window:

Report Name	Array Lesson
Series	Sales
Main Table	Customer Master Summary
Using Key	RM_Customer_MSTR_SUM_Key1
Maximum Records	0
Format Options	Text Report
Text Report Options	17 Characters/Inch
Printing Options	First Page Header
Printing Options	Last Page Footer

3. Open the report layout window. Complete the layout of the report by referring to the following illustration and steps for guidance.
4. Add the report title to the report header.
5. Make the body of the report larger to accommodate more fields.
6. Place the **Customer Number** field and add an appropriate label into the body section of the report.
7. The body section also includes the aging period amounts for each customer. Add the array field called **Aging Period Amounts**. Because Customers can have up to seven aging periods, and it is not known exactly how many have been assigned, add all seven to the report layout. They will be arranged in one column within the body of the report. They can be added individually or all at one time.

***HINT**: Hold down the CTRL key while clicking and dragging the **Aging Period Amounts** field from the Toolbox. All of the seven amounts are added to the report layout when you use this method. The body of the report layout should be large enough to accommodate the fields if it was sized correctly in Step 5.*

8. Add text labels for each aging period.



9. Save your changes to the Report Layout, and Print the report to screen. The screen output should appear similar to the following:

```
                    Customer Summary Overview

Customer Number:  AARONFIT0001

Aging Period 1:                  $3,434.09
Aging Period 2:                      $0.00
Aging Period 3:                      $0.00
Aging Period 4:                      $0.00
Aging Period 5:                      $0.00
Aging Period 6:                      $0.00
Aging Period 7:                 $19,899.04

Customer Number:  ADAMPARK0001

Aging Period 1:                  $2,696.15
Aging Period 2:                      $0.00
Aging Period 3:                      $0.00
Aging Period 4:                      $0.00
Aging Period 5:                      $0.00
Aging Period 6:                      $0.00
Aging Period 7:                 $17,170.36
```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Lab 5.2 – Field Options

Company: Fabrikam, Inc.

Scenario: To better handle incoming phone calls and ultimately provide better customer service, it has been decided that you need a report that displays all of your customers and the salesperson that has been assigned to each customer. For added reference, make sure the report counts the number of customers that each salesperson has been assigned. Also, add a field that counts the total number of salespeople listed on the report.

Challenge Yourself!

1. Create a new graphical report using the following information:

Report Name	Salesperson – Field Options
Main Table	RM Salesperson Master

2. Add the RM Customer Master table to be able to put the Customer ID on the report.
3. Ensure only the Report Header, Body, and Report Footer sections will be part of the report.
4. Create an additional header called Salesperson ID that prints each time a new salesperson's information is printed.
5. Repeat the process to create an additional footer.
6. Layout the report using the finished report as a guide. Position and size the fields as shown in the illustration.

***HINT**: The field type for **Customer Number** in the footer should be Count.*

7. The last page of the report should include the total number of sales people on the report.

***HINT**: The field type for **Salesperson ID** in the footer should be Control Count.*

8. Print the report sending the output to the screen. The screen output should look similar to the screen shot found at the end of the Need a Little Help lab.

Lab 5.2 – Field Options

Company: Fabrikam, Inc.

Scenario: To better handle incoming phone calls and ultimately provide better customer service, it has been decided that you need a report that displays all of your customers and the salesperson that has been assigned to each customer. For added reference, make sure the report counts the number of customers that each salesperson has been assigned. Also, add a field that counts the total number of salespeople listed on the report.

Need a Little Help?

1. Launch Report Writer.
2. Create a new graphical report using the following information in the Report Definition window.

Report Name	Salesperson - Field Options
Series	Sales
Main Table	RM Salesperson Master
Using Key	RM_Salesperson_MSTR_Key1
Printing Options	First Page Header, Last Page Footer

3. To include all fields you want on the report, the RM Customer Master table needs to be linked to the report. Add the table using the Report Table Relationships window.
4. Open the Report Layout window.
5. Using the Report Section Options window, ensure the Report Header, Body, and Report Footer sections are part of the report.
6. Ensure the Page Header and Page Footer selections are not part of the report.
7. Create an additional header that will print each time a new salesperson's information is printed. In the Header Options window, make the following selections, and click **OK** to close the window.

Header Name	Salesperson ID
Print When Field Changes:	
Report Table	RM Salesperson Master
Field	Salesperson ID

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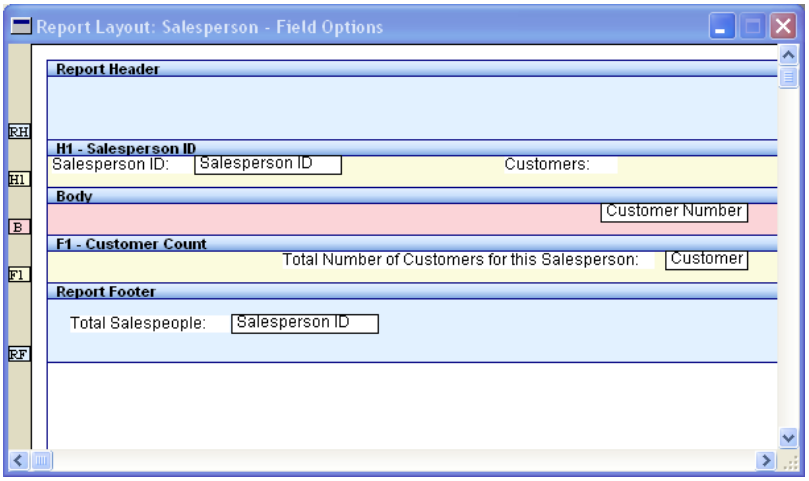
8. Repeat the process to create an additional footer. In the Footer Options window, make the following selections.

Footer Name	Customer Count
Print When Field Changes:	
Report Table	RM Salesperson Master
Field	Salesperson ID

9. Layout the report using the steps given. Position and size the fields as shown in the illustration.

10. The modifications you make to the report should resemble the following illustration when it is complete.



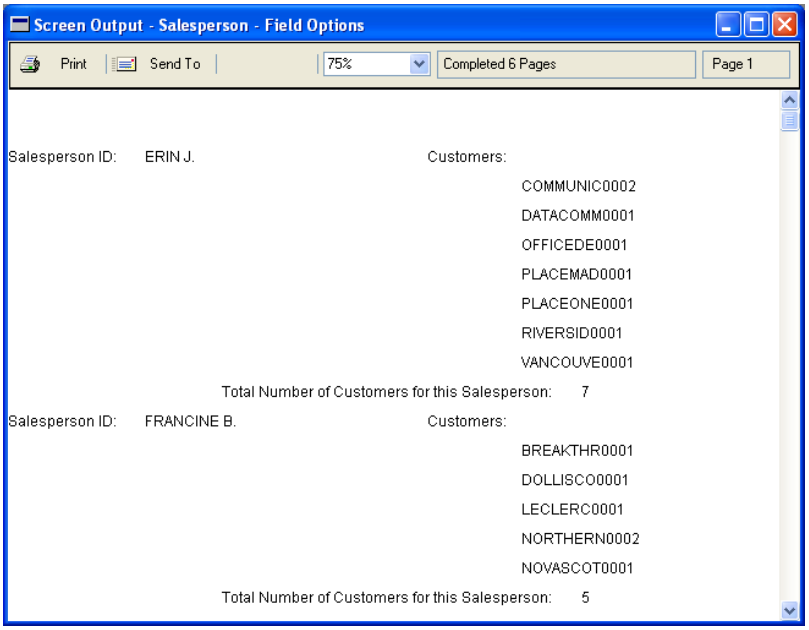
11. Add the **Salesperson ID** field to the additional header section and the report footer from the RM Salesperson Master table.

12. Add the **Customer Number** field from the RM Customer Master table to the body of the report and again to the additional footer.

13. Use the text tool to create labels for the fields you have added.

1st Salesperson ID field	**Salesperson ID:**
2nd Salesperson ID field:	**Total Salespeople:**
1st Customer Number field:	**Customers:**
2nd Customer Number field:	**Total Number of Customers for this Salesperson:**

14. Select the **Customer Number** field you placed in the additional footer. Using the Report Field Options window, change the field type to Count.
15. Select the **Salesperson ID** field you placed in the report footer. Use the Report Field Options window to change the field type to Control Count.
16. Save the changes to the report.
17. Print the report sending the output to the screen. The screen output should look similar to the following:



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Lab 5.3 – Calculated Fields

Company: Fabrikam, Inc.

Background Information: The concatenate (CAT) operator joins two elements of an expression together, and the STRIP function removes trailing blank spaces from string fields.

Scenario: Your experience has shown you that some tables in Microsoft Dynamics GP store the **City**, **State**, and **Zip Code** fields as separate fields. Today you are going to create a report that lists all the locations for your company. To make the report look a little neater, create a calculated field that concatenates, or joins, the **City**, **State**, and **ZIP Code** fields. Use the CAT operator and the STRIP function to create the field.

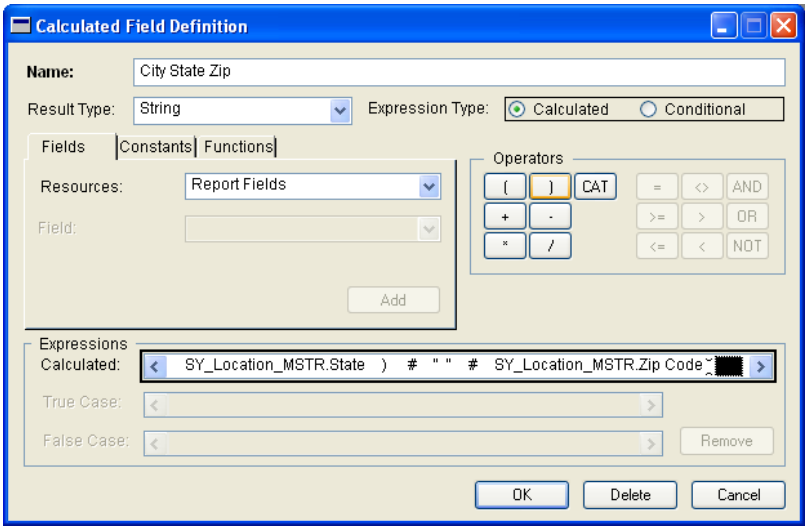
Challenge Yourself!

1. Create a text new report called Concatenated Fields Exercise, using the following information.

   Main Table Company Location Master

2. Create a new Calculated Field called City State Zip. The result type should be String. Refer to the illustration shown later in this exercise.
   - Use the STRIP function to remove extra space from the **City** and **State** fields.
   - Add two spaces between the **City**, **State**, and **Zip** fields.
   - Use CAT operator between all fields, constants and functions.

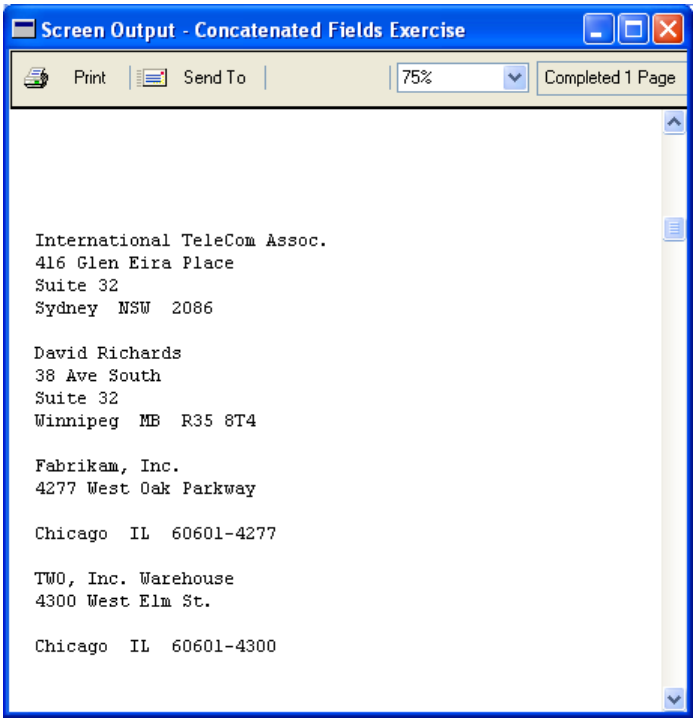
3. When you have written the expression, the window should look like the following window illustration.



4. Add the fields indicated by the illustration of the report shown later in this exercise for guidance.

***HINT**: Place the **City**, **State** and **Zip Code** fields onto the layout even though a calculated field was already created to represent those fields. The individual fields are added to the layout so that they can be used later in the exercise to resize the calculated field once you have resized the new calculated field.*

5. Print the report to screen. The output window should look similar to the following illustration:



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Lab 5.3 – Calculated Fields

Company: Fabrikam, Inc.

Background Information: The concatenate (CAT) operator joins two elements of an expression together, and the STRIP function removes trailing blank spaces from string fields.

Scenario: Your experience has shown you that some tables in Microsoft Dynamics GP store the **City**, **State**, and **Zip Code** fields as separate fields. Today you are going to create a report that lists all the locations for your company. To make the report look a little neater, create a calculated field that concatenates, or joins, the **City**, **State**, and **ZIP Code** fields. Use the CAT operator and the STRIP function to create the field.

Need a Little Help?

1. Launch Report Writer.
2. Create a new report using the following information in the Report Definition window.

Name	Concatenated Fields Exercise
Series	Company
Main Table	Company Location Master
Using Key	SY_Location_MSTR_Key1
Format Options	Text Report

3. Open the Report Layout window.
4. Create a new **Calculated Field** using the Calculated Field Definition window and the following information. Refer to the illustration shown later in this exercise for guidance.

Name	City State ZIP
Result Type	String
Expression Type	Calculated
Functions Tab	
Type	System-defined
Function	STRIP

5. Click the **Add** button.

Fields Tab	
Resources	Company Location Master
Field	City

6. Click the **Add** button.
7. In the **Calculated Expression** field, click to the right of the closing parenthesis.

Operators	CAT
Constants	Tab
Type	String
..Constant	Press the spacebar twice

8. Click the **Add** button.

Operators	CAT
Functions	Tab
Type	System-defined
..Function	STRIP

9. Click the **Add** button.

Fields Tab	
Resources	Company Location Master
Field	State

10. Click the **Add** button.
11. In the **Calculated Expression** field, click to the right of the closing parenthesis.

Operators	CAT
Constants	Tab
Type	String
..Constant	Press the spacebar twice

12. Click the **Add** button.

Operators	CAT
Fields Tab:	
Resources	Company Location Master
Field	Zip Code

13. Click the **Add** button.

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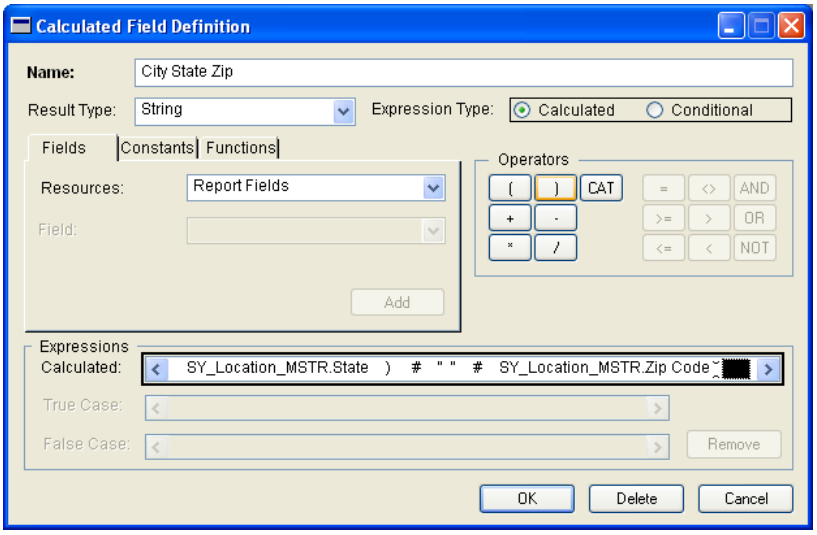
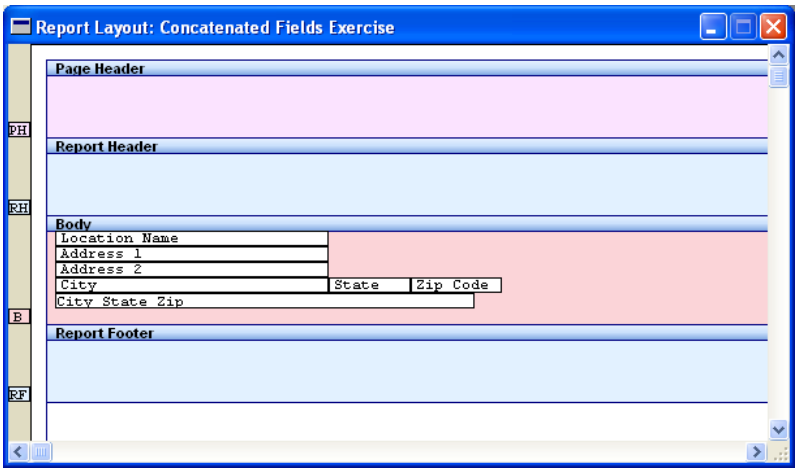
14. The window should look like the window illustration. Once you have verified that the information is entered correctly, click **OK** to save the expression and close the window.



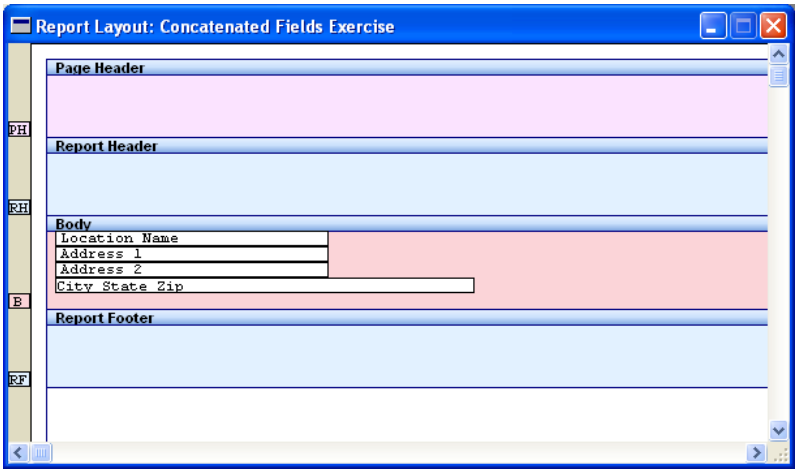
15. Add the fields indicated by the illustration of the report shown later in this exercise. (Size the fields according to the illustration.)

NOTE: *The City, State, and Zip Code are added to the layout even though a calculated field was already created to represent those fields. The individual fields are added to the layout so that they can be used later in the exercise to resize the calculated field.*

16. Place the new calculated field in the body of the report under the **City**, **State**, and **Zip Code** fields that were added previously. Resize the field as indicated so that if the maximum length for each of the fields is needed, the information is still printed properly.

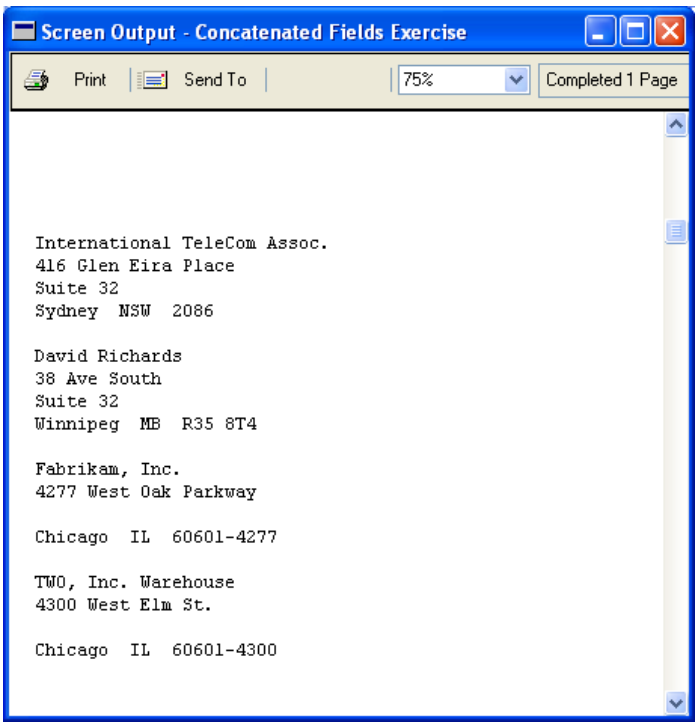


17. Remove the individual **City**, **State**, and **Zip Code** fields. Reposition the calculated field as **City State ZIP** field as indicated. Refer to the following illustration for guidance.



18. Close the Report Layout window, and save the changes. Click **OK** in the Report Definition window to save the report.

19. In the Report Writer window, highlight the report for the Concatenated Fields Lesson in the list of Modified Reports and click **Print**. Select to send the output to the screen. The screen output window should look like the illustration:



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Conclusion

Array Fields, Field Options and Calculated Fields

Some key points to remember from this chapter include:

- Array fields store multiple pieces of information such as monthly sales in a single displayed field
- Array field elements can be placed simultaneously on a report by holding the CTRL key when dragging the fields onto a report
- Field Options allow you to modify a field's type
- Calculated Fields allow you to create user-defined fields based on an expression entered
- Two types of Calculated Fields expressions exist; Conditional and Calculated
- Conditional expressions require both a True and False Case
- The Concatenate operator allows you to combine a group of fields for better reporting presentation

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Quick Interaction: Lessons Learned

Take a moment to write down three Key Points you have learned from this chapter:

1.

2.

3.

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