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Microsoft Excel 2010

Pivot Tables

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INTRODUCTION

These notes describe the essential features of Excel's Pivot Tables.

Pivot Tables provide a fast efficient and powerful way to summarize data in a tabular data source without the need for normal cell formulas.

The Data Source may be an Excel Structured Table or cell range containing tabular data that conforms to certain design rules.

Pivot Tables have a number of areas where the unwary user can be caught out, but with experience you can create a useful Pivot Table in minutes. Using formulas to create the same summary can take hours or days.

The convenience of Pivot Tables makes them one of the most useful features in Excel.

CONVENTIONS

The following are the conventions used in this manual.

Home		Press the named key.
Ctrl A		Press and hold the first named key while you press the second.
Ctrl A		Press and release the first named key before pressing the second.
🖱		Point the mouse at a specified screen feature.
🖱 🖱	**Click**	Press and release the left or right mouse button.
🖱🖱 🖱🖱	**Double Click**	Click the left or right mouse button twice - quickly.
🖱→🖱 🖱→🖱	**Drag**	Click and hold the left of right mouse button while you move the mouse.
Ctrl 🖱		Press and hold the named key while you click the mouse button.
Filename.ext		Reference to a named file stored on disk.
Text Entry		Typed text entry.
Ribbon		Select the specified Ribbon or option from a displayed quick menu.
Option		Select the specified option from a displayed dialog box or task pane etc.
Highlight		Highlight for important notes and comments.

TABLE DESIGN RULES

Before you create any Pivot Tables it is important to create a design which works with Excel's features to provide greatest reliability and flexibility when the workbook is used. This is of particular importance when you use tables to store data.

Since Excel 2007 (when Tables with Structured Cell References were introduced) the rules have changed.

- If your workbook is going to be used in Excel 2007 or later you should take advantage of the new **Structured Table** feature that provides better formatting options and access to Structured Cell References.

    These **Structured Tables** dictate the use of new design rules.

- If your workbook is going to be used in Excel 2003 or earlier your tables must adhere to traditional design rules that avoid the use of features introduced in Excel 2007.

    Opening and Saving a workbook containing one or more **Structured Tables**, in an older version of Excel, will remove the **Structured Table** definitions and all their benefits. The result will be a workbook that will not function properly in any version of Excel.

In other words: create designs that work in all versions of Excel that will be used to Open and Save the workbook.

STRUCTURED TABLES

Structured Tables change the way a number of Microsoft Excel's commands work. This means that a **Table** designed to work in Excel 2003 is not always suitable for conversion to a **Structured Table** in Excel 2010 - without some modification.
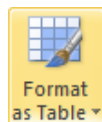
> Microsoft Excel 2003's tables will still work the way they used to do - as long as they are not converted to **Structured Tables**.
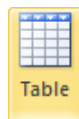
Converting a Range to a Structured Table

A **Structured Table** is created when you convert a range of cells to a **Structured Table** using either of the illustrated Ribbon Tools.

Ribbon: **Home**
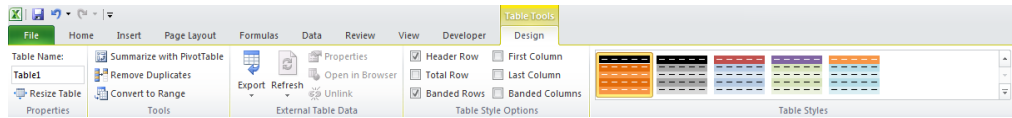

                Insert

You can easily tell if a range has been converted to a **Structured Table**.

Excel will display the illustrated Ribbon when you select any cell within a **Structured Table**.

Structured Table tools are described separately.

Required Design Attributes

1. **Structured Table**s may start anywhere in the worksheet.

2. The first row and only the first row must be used for column headings (the Header Row).

    a. Table headings and Section headings are **not** part of the **Structured Table** and should not be included in any range that is converted to a **Structured Table**.

    b. Column headings may use Wrapped Text to create multiple lines of text within the heading row.

    c. If your cell range does not include a Header Row, Microsoft Excel will insert its own generic headings.

3. Column Headings may be text or numbers.

    a. Formulas will be replaced with static entries based on their results.

4. Every other row in the **Structured Table** is considered to be a data row.

5. One entry (record) per row.

    a. You may not split an entry over two rows.

    b. You may use wrapped text to place multiple lines of text in the row.

    c. You may include blank rows in a **Structured Table**.

6. Column Totals are **NOT** required - they are created using the **Structured Table** commands. If your spreadsheet has column totals - delete them!

    a. In fact there should not be any entries in the spreadsheet below the **Structured Table**.

        It is common to append data rows to the end of **Structured Table**s rather than insert new rows so there should be nothing in the way!

7. You may use calculated fields within the table that perform simple calculations within the row.

    a. For example: Differences between values, VAT calculations etc.

    b. If you intend to use Structured Cell References (recommended) in your formulas you must build these formulas after converting the cell range into a **Structured Table**.

8. The data entered into any column should be consistent throughout.

9. Do not merge cells within the **Structured Table**.

Desirable Design Attributes

1. Use the Freeze Panes feature to keep your Column Headings and the Columns which identify entries visible on the screen when you navigate large tables.

> **TIP**
> Before you sort any data - consider if you need to re-establish the original order afterwards.
>
> If so, you may need to include a record number field in your design.

2. Design a table structure that provides unambiguous headings that show the users clearly where each item of data should go.

    a. Never allow the user to have a choice of columns for an item of data.

    For example.   Use Address columns such as:

    House, Road, Town, County, Postcode

    Do not use:

    Address1, Address2, Address3 etc.

    b. Use separate columns for each item of data - do not design a column structure that requires two items of data in a single cell.

    For example.   Use Name columns such as:

    Title, First Name, Surname

    Do not use:

    Name

TRADITIONAL TABLES

In order for formulas containing normal cell references to work well and react correctly when users edit the spreadsheet by inserting & deleting rows or columns, or sorting the records in the table it is important that your design complies with the following rules.

If you design all your spreadsheets to comply with these rules Excel will help you. If you break any of the rules Excel will give you and the people who use your spreadsheet problems that never go away!

Most spreadsheets involve a table which is used to collect data which can then be manipulated and charted etc. It is the design of these tables which is often critical to the success of your design.

Required Design Attributes

1. Tables may start anywhere in the worksheet.

2. The first row and only the first row may be used for column headings (Field Names).

   a. Table headings and section headings are not part of the table and should be separated from the column headings by at least one completely blank row.

   b. Column headings may use Wrapped Text to create multiple lines of text within the heading row.

3. Column Headings must be text, otherwise Excel may treat the headings row as a data row. Numbers can be entered as text using:

   a. Prefix the entry with a ʼ (apostrophe).

   b. Or pre-format the cells with the Number format of Text (which is not meant to be a contradiction in terms!)

4. Every other row in the table is considered to be a data row.

5. One entry per row.

   a. You may not split an entry over two rows.

   b. You may use wrapped text to place multiple lines of text in the row.

6. The table boundaries are automatically identified by Excel when it finds the edge of the spreadsheet or at the first completely blank row or column.

7. Column and Row Totals are not part of the table so must be separated from it by at least one blank row or column.

8. You may use calculated fields within the table that perform simple calculations within the row.
   e.g. Differences between values, VAT calculations etc.

9. The data entered into any column should be consistent throughout.

10. Do not merge cells within the table.

Desirable Design Attributes

1. Use the Freeze Panes feature to keep your Column Headings and the Columns which identify entries visible on the screen when you navigate large tables.

> **TIP**
>
> Before you sort any data - consider if you need to re-establish the original order afterwards.
>
> If so, you may need to include a record number field in your design.

2. Design a table structure that provides unambiguous headings that show the users clearly where each item of data should go.

   a. Never allow the user to have a choice of columns for an item of data.

      For example.   Use Address columns such as:

      House, Road, Town, County, Postcode

      Do not use:

      Address1, Address2, Address3 etc.

   b. Use separate columns for each item of data - do not design a column structure that requires two items of data in a single cell.

      For example.   Use Name columns such as:

      Title, First Name, Surname

      Do not use:

      Name

EXAMPLE TABLES

Structured Tables

Notice the use of Structured Cell References in the formulas.

D5	fx =[@ACTUAL]-[@TARGET]			
	A	B	C	D	E
1	SALES PERFORMANCES				
2					
3	SALESPERSON	TARGET	ACTUAL	DIFFERENCE	PERCENTAGE
4	Anne Other	£20,000	£21,345	£1,345	106.7%
5	Tom Cat	£21,000	£20,876	-£124	99.4%
6	Bee Sting	£25,000	£25,098	£98	100.4%
7	Kay Lee	£20,000	£24,964	£4,964	124.8%
8	Ali Cat	£18,000	£10,987	-£7,013	61.0%
9	Ed Case	£12,000	£13,056	£1,056	108.8%
10	Jay Walk	£30,000	£29,543	-£457	98.5%
11	Dee Van	£20,000	£23,410	£3,410	117.1%
12	Total	£166,000	£169,279	£3,279	102.0%
13					
14	Average	£20,750	£21,160	£410	102%
15	Best	£30,000	£29,543	£4,964	125%
16	Worst	£12,000	£10,987	-£7,013	61%

Structured Table definition uses the range **A3:E12**

Traditional Tables

Notice the use of traditional co-ordinates in the equivalent formulas.

D5	fx =C5-B5			
	A	B	C	D	E
1	SALES PERFORMANCES				
2					
3	SALESPERSON	TARGET	ACTUAL	DIFFERENCE	PERCENTAGE
4	Anne Other	£20,000	£21,345	£1,345	106.7%
5	Tom Cat	£21,000	£20,876	-£124	99.4%
6	Bee Sting	£25,000	£25,098	£98	100.4%
7	Kay Lee	£20,000	£24,964	£4,964	124.8%
8	Ali Cat	£18,000	£10,987	-£7,013	61.0%
9	Ed Case	£12,000	£13,056	£1,056	108.8%
10	Jay Walk	£30,000	£29,543	-£457	98.5%
11	Dee Van	£20,000	£23,410	£3,410	117.1%
12					
13	TOTALS	£166,000	£169,279	£3,279	102.0%
14					
15	Average	£20,750	£21,160	£410	102.1%
16	Best	£30,000	£29,543	£4,964	124.8%
17	Worst	£12,000	£10,987	-£7,013	61.0%

Notice   How both tables break one of the design rules –
                    The names should be split into two columns!

Structured Tables	**Traditional Tables**
Notice the use of Structured Cell References in the formulas.	Notice the use of traditional co-ordinates in the equivalent formulas.

	B9		f_x =SUBTOTAL(109,[2013])

	A	B	C	D	E	F	G
1	DESCRIPTION	2013	2014	2015	2016	2017	TOTALS
2	Computers	10,000	10,500	10,750	10,200	10,350	51,800
3	Printers	7,000	8,000	9,550	11,000	13,000	48,550
4	Software	14,000	16,000	15,500	17,000	17,000	79,500
5	Disc Drives	5,000	5,000	5,550	6,000	5,900	27,450
6	CD Roms	1,000	1,200	4,000	6,000	8,000	20,200
7	Consumables	8,000	8,000	8,400	8,700	9,000	42,100
8	Other	3,000	3,000	3,000	3,000	3,000	15,000
9	Total	48,000	51,700	56,750	61,900	66,250	284,600

	B10		f_x =SUM(B2:B9)

	A	B	C	D	E	F	G	H
1	DESCRIPTION	2013	2014	2015	2016	2017		TOTALS
2	Computers	10,000	10,500	10,750	10,200	10,350		51,800
3	Printers	7,000	8,000	9,550	11,000	13,000		48,550
4	Software	14,000	16,000	15,500	17,000	17,000		79,500
5	Disc Drives	5,000	5,000	5,550	6,000	5,900		27,450
6	CD Roms	1,000	1,200	4,000	6,000	8,000		20,200
7	Consumables	8,000	8,000	8,400	8,700	9,000		42,100
8	Other	3,000	3,000	3,000	3,000	3,000		15,000
9								
10	TOTAL	48,000	51,700	56,750	61,900	66,250		284,600

Structured Table definition uses the range **A1:G9**	
In this **Structured Table** the Year headings have been entered as numbers.	In this table the Year headings have been entered as text.

	A	B	C	D	E	F	G	H	I	J
1	Rec No.	Title	First Name	Surname	Gender	Date of Birth	Address	Town	Post Code	Home Phone
2	1	Mr	Daniel	Smith	m	29-Oct-80	3 High St	March	PE15 1SF	525021
3	2	Ms	Yvonne	Jones	f	09-May-75	25 March Road	Wisbech	PE13 4RT	195458
4	3	Mr	Christopher	Madsen	m	09-Apr-69	5 Strollers Way	Whittlesey	PE7 6YT	228682
5	4	Mr	Ian	Price	m	14-Aug-54	56 Coopers Close	Chatteris	PE19 7UT	781458
6	5	Ms	Emma	Macey	f	11-May-69	1 The Avenue	Manea	PE15 7RT	279717
7	6	Miss	Mandy	Johnson	f	17-Aug-77	89 London Road	Wimblington	PE15 1AM	788074
8	7	Mr	Glen	Golding	m	07-Apr-71	15 Lime Tree Avenue	Parson Drove	PE13 8UJ	858939
9	8	Dr	Lesley	Spencer	f	17-Dec-59	4 Fen Cottages	Elm	PE14 4WD	538462
10	9	Mr	Steven	Andrews	m	17-Mar-55	33 Gretton Road	March	PE15 8IJ	401541
11	10	Mrs	Sharon	Andrews	f	18 Dec 44	45 Hamilton Road	March	PE15 3FD	660368

	A	B	C	D	E	F	G	H	I	J
1	Rec No.	Title	First Name	Surname	Gender	Date of Birth	Address	Town	Post Code	Home Phone
2	1	Mr	Daniel	Smith	m	29-Oct-80	3 High St	March	PE15 1SF	525021
3	2	Ms	Yvonne	Jones	f	09-May-75	25 March Road	Wisbech	PE13 4RT	195458
4	3	Mr	Christopher	Madsen	m	09-Apr-69	5 Strollers Way	Whittlesey	PE7 6YT	228682
5	4	Mr	Ian	Price	m	14-Aug-54	56 Coopers Close	Chatteris	PE19 7UT	781458
6	5	Ms	Emma	Macey	f	11-May-69	1 The Avenue	Manea	PE15 7RT	279717
7	6	Miss	Mandy	Johnson	f	17-Aug-77	89 London Road	Wimblington	PE15 1AM	788074
8	7	Mr	Glen	Golding	m	07-Apr-71	15 Lime Tree Avenue	Parson Drove	PE13 8UJ	858939
9	8	Dr	Lesley	Spencer	f	17-Dec-59	4 Fen Cottages	Elm	PE14 4WD	538462
10	9	Mr	Steven	Andrews	m	17-Mar-55	33 Gretton Road	March	PE15 8IJ	401541
11	10	Mrs	Sharon	Andrews	f	18 Dec 44	45 Hamilton Road	March	PE15 3FD	660368

Notice   Again the Address column should be split into two columns – House & Road.

CREATING A PIVOT TABLE

Pivot Tables: Are an advanced tool provided by Excel that summarizes the data in a table.

Provide flexible layouts.

Require no formulas - which makes them quick and easy to produce.

Have a few traps that are easy to fall into - these notes will tell you how to avoid these.

Are normally created on new worksheets inserted into the current workbook.

For each Pivot Table you may optionally create one or more linked Pivot Charts which will graph the data in the Pivot Chart. Editing the design of a Pivot Table will affect the associated Pivot Chart(s) - and vice versa.

See also: **Pivot Charts**

CREATE PIVOT TABLE DIALOG BOX

Select any cell in a **Structured Table** or in the header row of traditional data table then use:
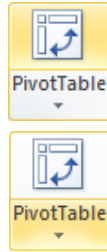
Ribbon:	**Insert**		Click on the Icon to create a Pivot Table without a Pivot Chart - this can be added later.
			Click on the drop down list to choose between Pivot Table and Pivot Chart.
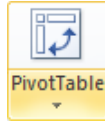
Excel will prompt you to confirm data source which the Pivot Table will be linked to:

Structured Table

Select a table or range   Excel will enter the name of the **Structured Table** at the cursor position provided you selected a cell within it before displaying this dialog box.

If not, you will have to type the name.
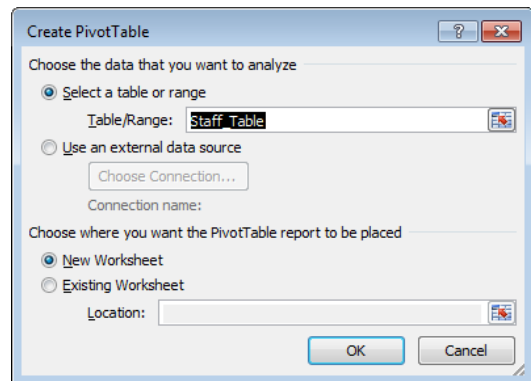
Use an external data source   Beyond the scope of these notes.

New Worksheet   I strongly advise you to place each Pivot Table on a separate Worksheet.

Existing Worksheet   Allows you to select cell on a suitable worksheet which will act as the top left corner of the new Pivot Table.

Beware: Pivot Tables will overwrite any cell data that gets in the way.

Pivot Tables often change size when they are recalculated and again they will overwrite any cell data that gets in the way.
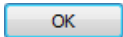
OK   Creates a new Blank Pivot Table, linked to the **Structured Table**.

See later.

Traditional Table

Select a table or range	Excel will enter the range containing the Traditional Table at the cursor position provided you selected a cell in a header row before displaying this dialog box. If not, you will have to select or enter the required range.
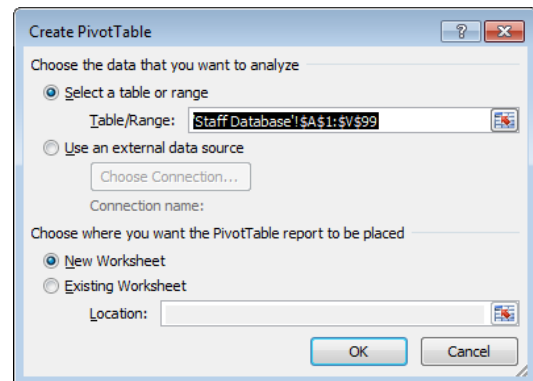
The remaining options of this dialog box are used in exactly the same way as when using a **Structured Table**. See previous page.

Important Tip:	If you want the resulting Pivot Table to recognise new rows as they are added to the end of the table you should:

1. Extend the range by one row.

Press: ⇧   ↓   To achieve this.
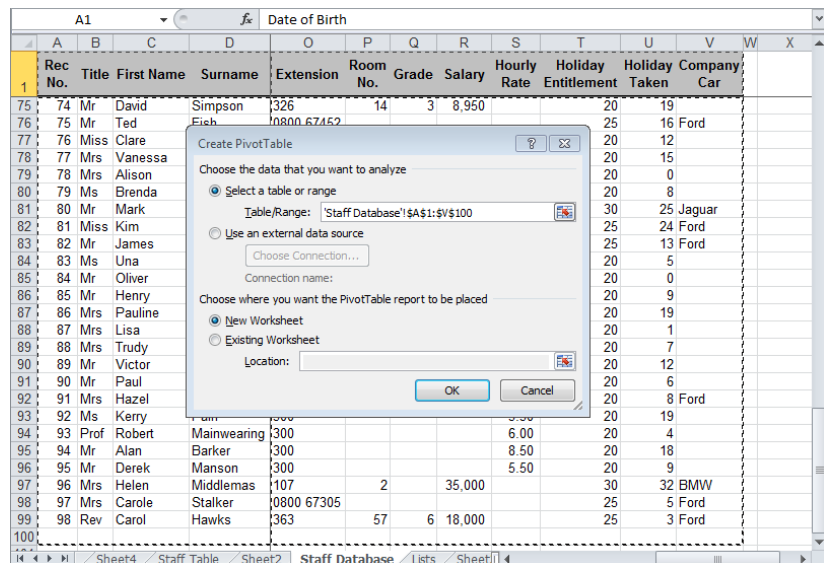
2. Do not use this extra blank row for data.

3. Insert new rows **before** this blank row.

    This will stretch the range seen by the Pivot Table.

4. **Protect** this blank row from accidental use.

    Data Validation can be used for this.

5. You can also include an extra blank column if you need to add new columns to the table while it is being used.

6. None of this is needed if you use **Structured Tables**!

RESULT - BLANK PIVOT TABLE

Whichever type of data source you use, Excel will create a new blank Pivot Table - preferably on a new worksheet.

You may use the Pivot Table Field List, to build the content of the Pivot Table.
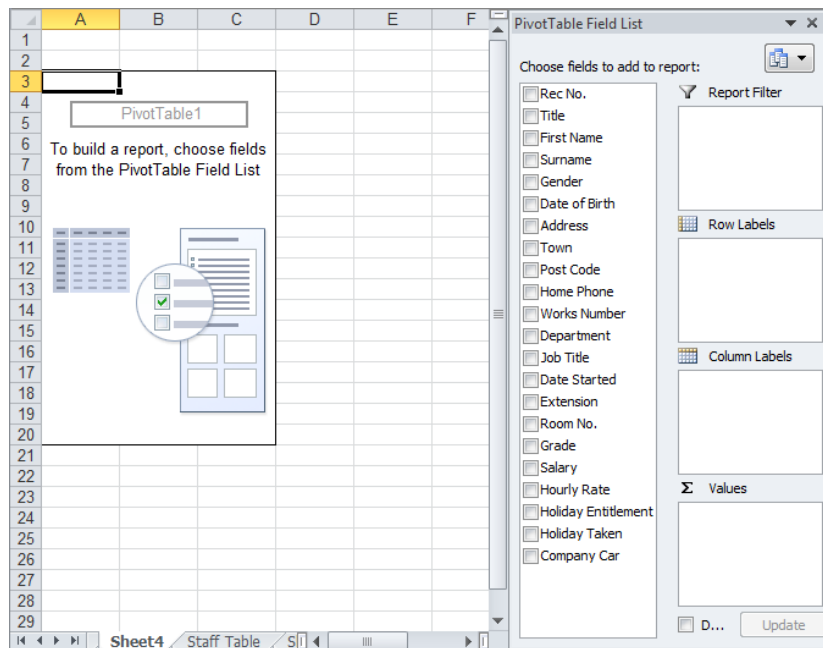
EDITING PIVOT TABLE CONTENTS

Once you have created a blank Pivot Table, it is necessary to add a selection of fields from the data source into its design. This done using the Pivot Table Field List - see above.

You may add and remove fields at any time without causing any damage to the original data source.

This makes Pivot Tables the perfect play tool that you can explore without having any affects other than on the Pivot Table itself.

PIVOT TABLE TOOLS

Whenever you select a cell within a Pivot Table, Microsoft Excel displays two additional Ribbons that allow you to change the options and appearance of the Pivot Table.

Options
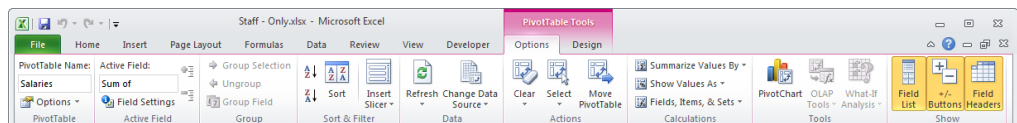
Design
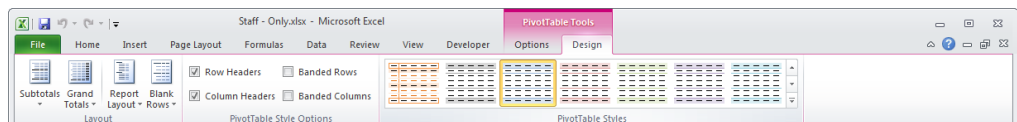
These tools are described in the following sections of these notes.

PIVOT TABLE FIELD LIST

Provides access to the list of field names in the linked data source, so that you may add them to the Pivot Table Layout.

The field list is automatically displayed for new Pivot Tables but since it takes up a lot of screen space it is normal to remove it from the screen when not in use.

Quick Menu: Inside the Pivot Table.

                                Select from: **Show Field List**

                                                    Hide Field List

Options   On/off toggle for the display of the Pivot Table Field List.
Ribbon

The field list can be displayed in one of four different layouts.

Tool: [icon]   Select from:

Fields section and Areas Section Stacked

This is the default option.
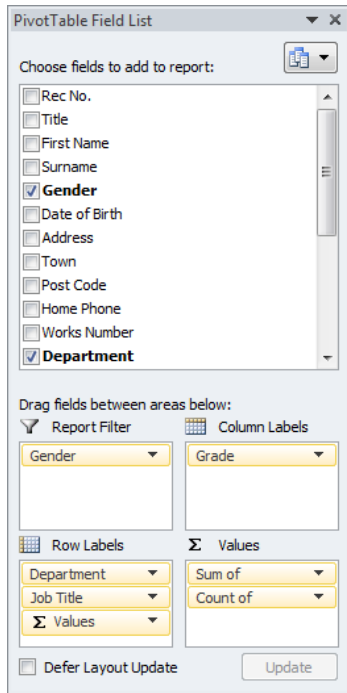
Fields section and Areas Section Side-by-Side
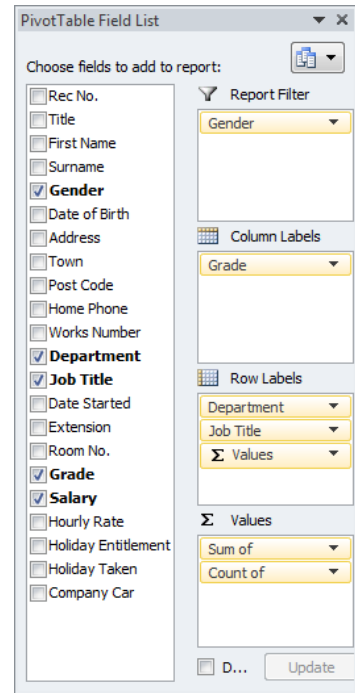
Fields Section Only
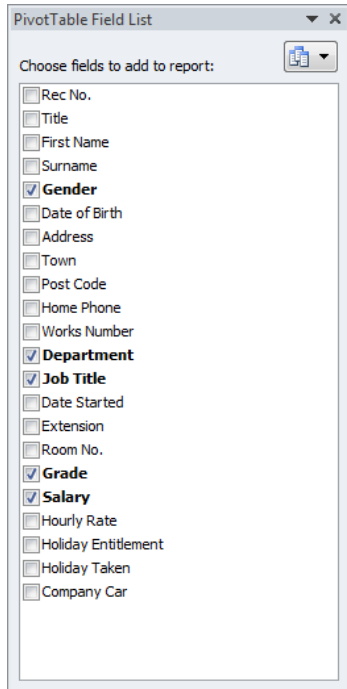
Areas Section Only (2 by 2)
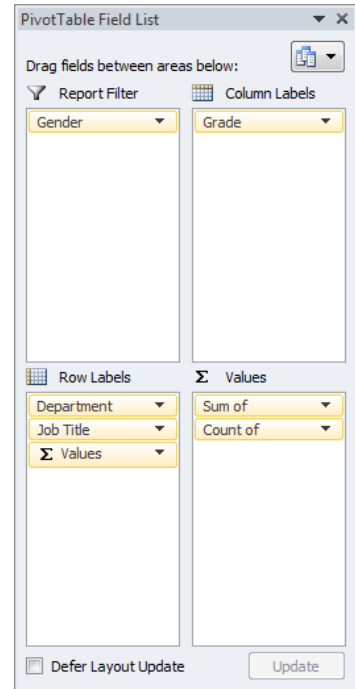
<div align="right">
**Areas Section
Only (1 by 4)**
</div>
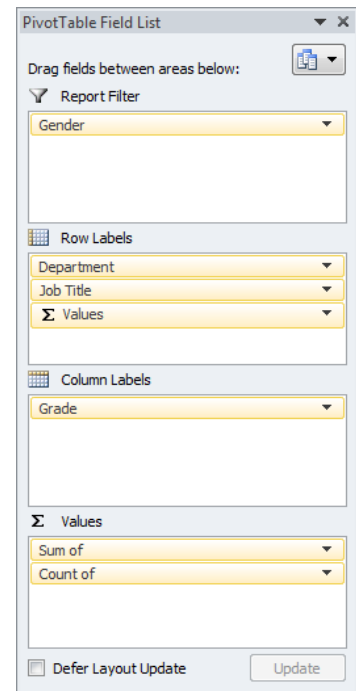
ADDING FIELDS TO THE PIVOT TABLE

The Pivot Table design is split up into 4 regions - which are displayed in the Pivot Table Field List.

To add a field to the Pivot Table simply:

Select the required field in the Pivot table Field List, then:

Either: Mouse: Drag the field into one of the regions in the Pivot Table Field List.

Or: Mouse: Right click on a field name and select the region to add it to from the displayed quick menu.
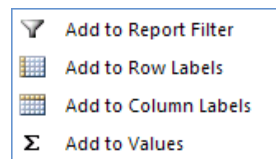
Pivot Table Regions

Row Labels

When a field is added to the row labels region, the Pivot Table will display each unique field entry as Row Headings down the left hand side of the table.

You may add more than one field, to sub-divide main headings into sub-headings. Sub-headings are not displayed when the main headings have been 'collapsed' to hide details - see page 38.

Row Labels are optional.

Column Labels

As above, but creates the Column Headings across the top of the Pivot Table.

Column Labels are optional

Report Filter

These allow you to filter the records that are summarised in the Pivot Table.

See page 31.

Report Filters are optional.

Values

This section is used to perform the calculations that provide the statistics displayed in the Pivot Table.

See below.

There are no cell formulas in a Pivot Table.

At least one Value field is required.

Note: The Row and Column Grand Totals (and Subtotals) are added automatically by Microsoft Excel.

MOVING FIELDS

You may move fields between the Pivot Table Areas using:

Mouse: Click on the field to display a Quick Menu of options.

                Select: **Move to ….**

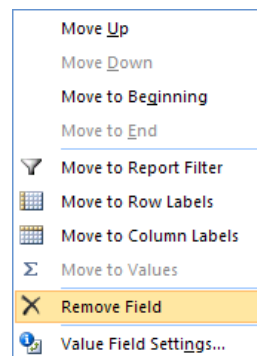   Drag the field to a different Area.
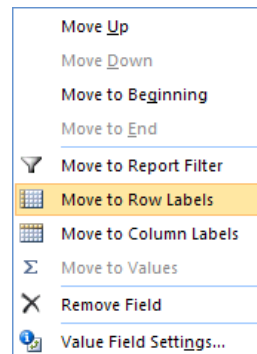
DELETING FIELDS

Fields may be removed from any of the Pivot Table Areas using:

Mouse: Click on the field to display a Quick Menu of options.

                Select: **Remove Field**

                Drag the field away from the Area.

VALUE FIELDS - CALCULATIONS

When a new Field is added to the Values Area, it is automatically set to counting entries in the field.

For example: Count of Salary

                Counts the number of salary paid staff in the Staff table.

Value Fields can be changed to calculate a range of other statistics.

If more than one statistic is required the same field can be added to the Values Area more than once. Each can then be customized to calculate the required statistic.
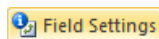
In the Pivot Table Field List:

Mouse: 🖱   Click on the required Value Field.

Select: **Value Field Settings**

	Move Up
	Move Down
	Move to Beginning
	Move to End
▽	Move to Report Filter
▦	Move to Row Labels
▦	Move to Column Labels
Σ	Move to Values
✕	Remove Field
🔢	Value Field Settings...
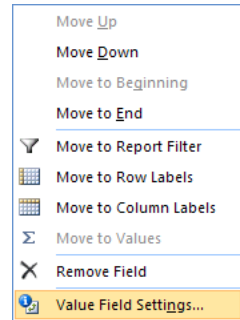
In the Pivot Table:

Mouse: 🖱   Right click on the required Value Field Label.

Select: **Value Field Settings**
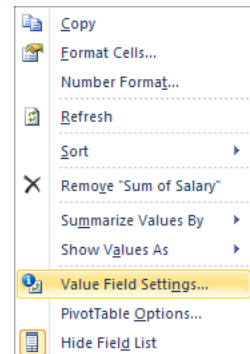
📋	Copy
🖌	Format Cells...
	Number Format...
🔄	Refresh
	Sort ▶
✕	Remove "Sum of Salary"
	Summarize Values By ▶
	Show Values As ▶
🔢	Value Field Settings...
	PivotTable Options...
📋	Hide Field List

Ribbon: 🔢 Field Settings   Displays the appropriate Field Settings dialog box for the active cell within a Pivot Table.

Custom Name Displays the name of the selected Value field. Type a new entry to rename the field (does not affect the data source).

Note   The GetPivotData() function uses these labels to identify data in the Pivot Table - changing the name will affect formulas using this function.

Macros referring to the Pivot Table must also be updated.

Microsoft Excel 2010 Pivot Tables.docm
22 March 2013
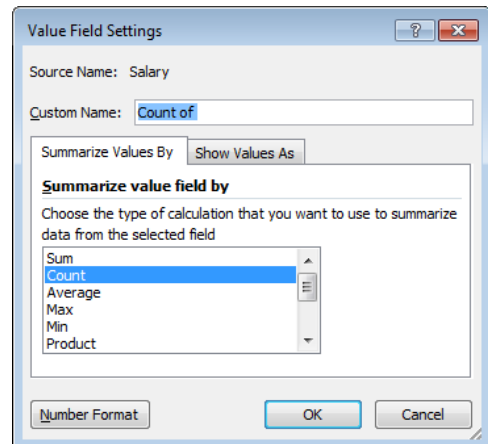
Select Tab: **Summarize Values By**

Summarize value field by

Select the summary function you require for the data field.
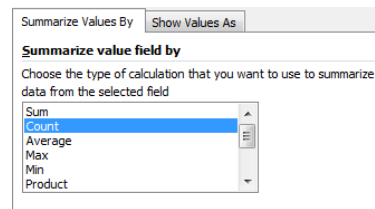
Select from:	**Sum**	Sum all values
	Count	Counts all entries
	Average	Arithmetic mean
	Max	Maximum
	Min	Minimum
	Product	Multiply all values together
	Count Numbers	Counts numeric values only - including Dates and Times
	StdDev	Standard Deviation
	StDevP	Population Standard Deviation
	Var	Variance
	VarP	Population Variance

Notes: If you do not know what some of these are - you do not need them!

The observant will notice that this is the same list that is available in the SUBTOTAL function.

For a text field it makes little sense to use Sum or Average, but you may Count, Maximize or Minimize etc. entries in any type of field.
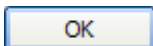
OK   Confirms the choices made, and updates the Pivot Table with any changes made.
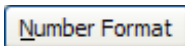
Number Format   Displays a further dialog box allowing you to format the numbers in the Value Field.

The options are the same as those for formatting numbers in a normal range of cells.
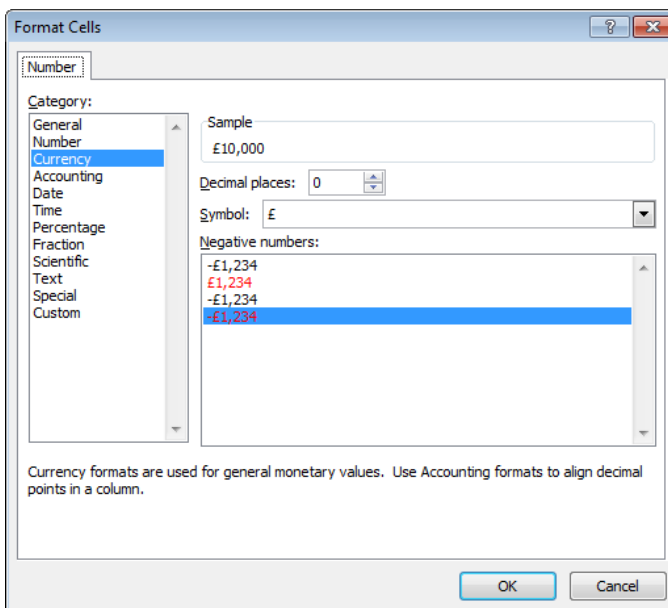
Select Tab: **Show Values As**

This tab extends the dialog box, to offer more advanced options for further summary types - including ones which allow you to give comparisons between data values.

Most users will not need these options!

Show values as
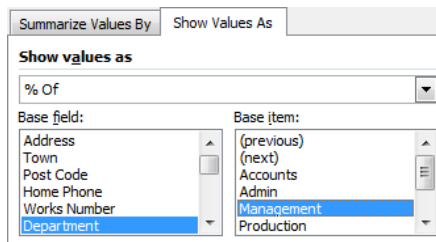
No Calculation	Gives a normal summary as defined by the previous options.
Others	The other entries provide alternative summaries, such as in the illustration.
	Depending on your choice you may need to select a Base field and a Base item.
	The illustrated example will calculate each departments salary bill as a percentage of the Management salary bill!
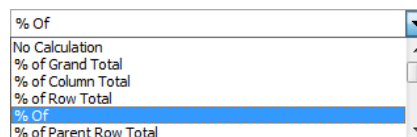
LABEL FIELDS

Row Labels and Column Labels can be customized in the same way.

In the Pivot Table Field List:

Mouse: Click on the required Label Field.

                                Select: **Field Settings**
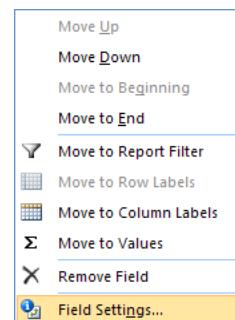
In the Pivot Table

Mouse: Right click on the required Value Field Label.

                                Select: **Field Settings**
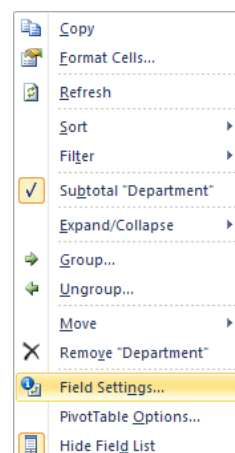
Ribbon: Field Settings   Displays the appropriate Field Settings dialog box for the active cell within a Pivot Table.

Field Settings

Custom Name Displays the name of the selected field. Type a new entry to rename the field. (Source database not affected).

> **Note**   The GetPivotData() function uses these names to identify data in the Pivot Table - changing the name will affect formulas using this function.
>
> Macros referring to the Pivot Table must also be updated.
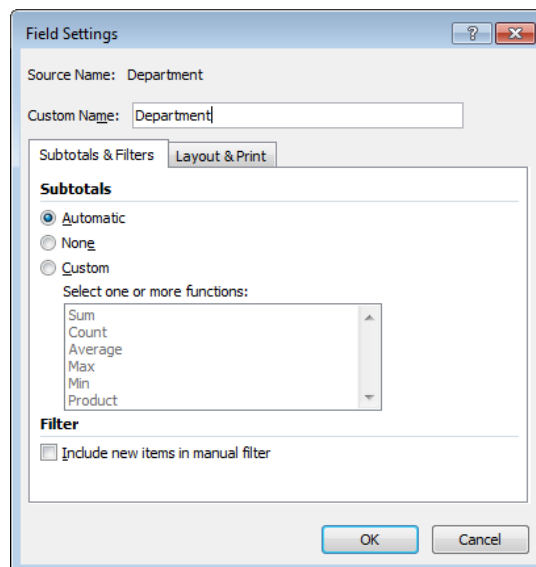
Select Tab   **Subtotals and Filters**

Subtotals   If you add two or more fields into the Row or Column Field panels, you create main headings and subheadings.

In effect, each main heading will identify a sub-group.

The sub-totals option allows you to generate group statistics as well as Grand Total statistics.

Automatic   When selected, Excel creates Sub-Totals for the main headings only - using the same summary function as used in the data field.

When using manually grouped fields, Excel will display sub-totals for groups hidden using the Outline features. See later.

Custom   When selected, Excel allows you to select one or more Sub-Total functions from the displayed List.

None   When selected, all Sub-Totals for this field will be removed.

Note: Subtotals are hidden when Main headings are collapsed.

You may expand or collapse main headings using:

Mouse: ⊞   Displayed next to any heading which is collapsed.

Click to expand.

Ribbon: 🟩

⊟   Displayed next to any heading which is collapsed.
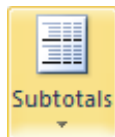
Click to collapse.

Ribbon: 🟥

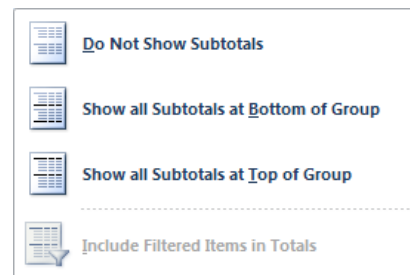Using these Ribbon Tools when the column heading for the Labels is selected will expand or collapse all headings.

You may also control the display of subtotals using:

Design   Select an option   Do Not Show Subtotals
Ribbon: form the displayed
                 menu.   Show all Subtotals at Bottom of Group

Subtotals   Show all Subtotals at Top of Group

Include Filtered Items in Totals

Select Tab   **Layout and Print**

These options subtly change the layout of the Pivot Table - on screen and when printed.

Explore!

Subtotals & Filters	Layout & Print

Layout
◯ Show item labels in outline form
 ☐ Display labels from the next field in the same column (compact form)
 ☐ Display subtotals at the top of each group
◉ Show item labels in tabular form

☐ Repeat item labels
☐ Insert blank line after each item label
☐ Show items with no data

Print
☐ Insert page break after each item
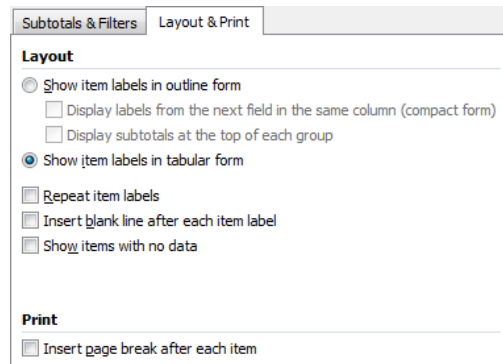
REPORT FILTER FIELDS

Row Labels and Column Labels can be customized in the same way.

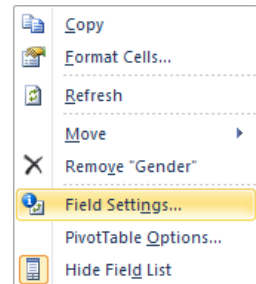**In the Pivot Table Field List:**

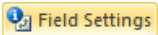Mouse: 🖱   Click on the required Label Field.

   Select: **Field Settings**
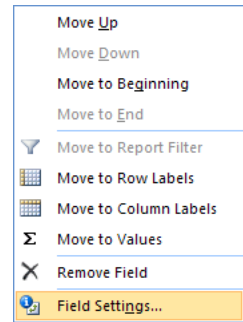
In the Pivot Table

Mouse: 🖱   Right click on the required Value Field Label.

          Select: **Field Settings**

Ribbon: 🔧 Field Settings   Displays the appropriate Field Settings dialog box for the active cell within a Pivot Table.

These fields have identical settings to those offered for Row and Column Labels, described above.

These descriptions are not repeated here.
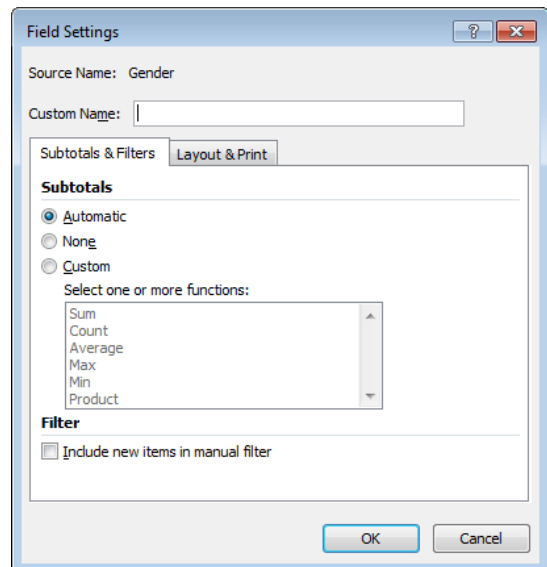
PIVOT TABLE OPTIONS

These options affect the overall content, appearance and workings of the Pivot Table.

Ribbon:

Quick Menu: **Pivot Table Options**

Inside the Pivot Table.

These notes do not describe all the options in this dialog box - just those that may be of greatest interest.

Name   Enter/edit a descriptive name for the Pivot Table - the default name is not very useful if you have numerous Pivot Tables.
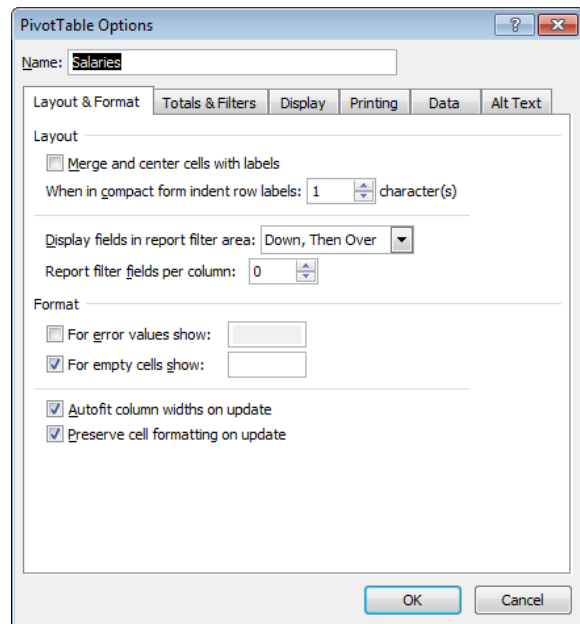
The names cannot be used in worksheet formulas but are used in VBA Modules.

The name can also be edited directly in the Ribbon.
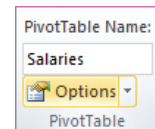
Select Tab: **Layout and Format**

Layout

Merge and center cells with labels

When selected, labels for rows and columns which contain a subgroup have their cells merged into a single cell.

This has the effect of centring the label horizontally and vertically across the subgroups.

Format

For error values, show

When not selected, errors will be shown in the cells whenever they occur - commonly division by zero errors for averages when there is no data to average in a section.

Enable this feature to replace the errors with either blank cells, or any value/message you place in the space provided.

For empty cells, show

Similar to the above. When disabled, sections with no data display zeros. When selected, these cells can be left blank or display any value you enter in the space provided.
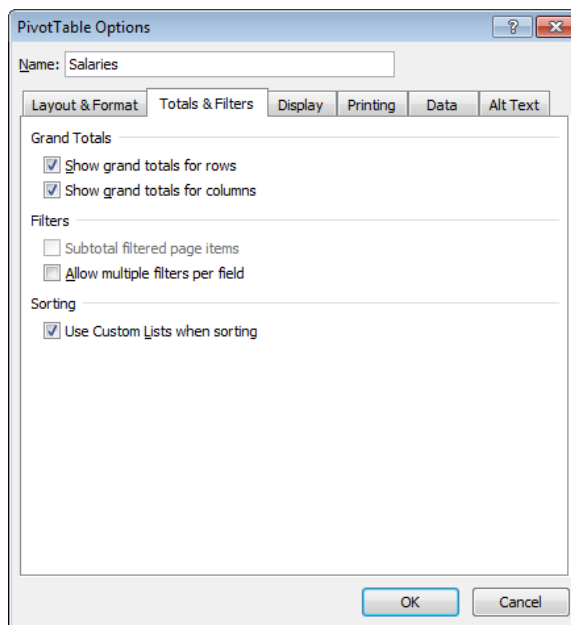
Preserve formatting

When selected, Excel is prevented from replacing any formats you have applied to the Pivot Table when you change the Pivot Table.

Select Tab: **Totals & Filters**

Grand Totals

These options have already been described.

See page 39.

Select Tab: **Display**

This tab allows you to display or hide some of the Pivot Table features.

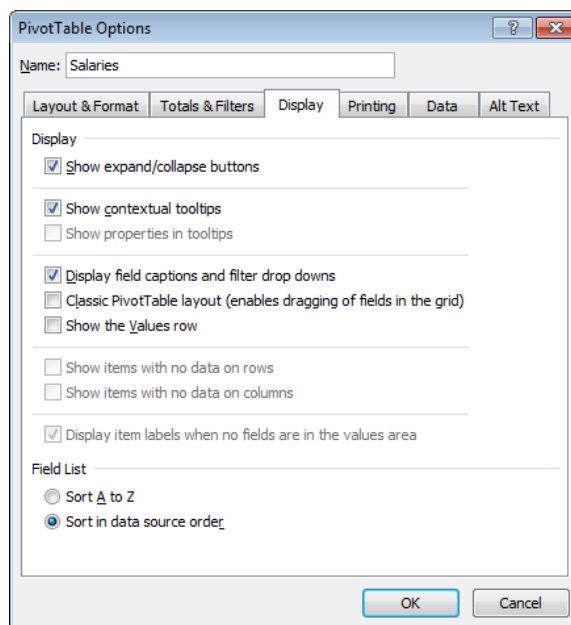Since they are simple on/off tools they are safe to explore.

Display

Classic PivotTable layout

This option is normally deselected.

You may wish to select it.

When selected, you are allowed more control over the layout of the Pivot Table using mouse Drag and Drop Methods to edit the layout.

The Pivot Table will behave in the same way as Pivot Tables in Excel 2003 and earlier. This includes the Pivot Table regions showing Blue Borders.

For Example

In this view you can move Fields between regions:

Mouse:

Drag the border of the **Values** Label cell to the Column Labels.

	Grade	▼ Values			
		1		2	
Department ▼	Sum of Salary	Count of Salary	Sum of Salary	Count of Salary	S
Accounts					
Admin	4000	1	10000	2	
Management					
Production					
Purchasing					
R & D					
Sales					
(blank)					
Grand Total	4000	1	10000	2	

On releasing the mouse you get a much better layout.

Department ▼	Values	Grade ▼ 1	2	3	4	5	6	7	(blank)	Grand Total
Accounts	Sum of Salary			8950	97000	13500	18000		50000	187450
	Count of Salary			1	8	1	1		2	13
Admin	Sum of Salary	4000	10000	35800	36000		18000			103800
	Count of Salary	1	2	4	3		1			11
Management	Sum of Salary								240000	240000
	Count of Salary								6	6
Production	Sum of Salary									
	Count of Salary									
Purchasing	Sum of Salary			8950	36000		18000			62950
	Count of Salary			1	3		1			5
R & D	Sum of Salary						90000	18000		108000
	Count of Salary						5	1		6
Sales	Sum of Salary								35000	35000
	Count of Salary								1	1
(blank)	Sum of Salary									
	Count of Salary									
Total Sum of Salary		4000	10000	53700	169000	13500	144000	18000	325000	737200
Total Count of Salary		1	2	6	14	1	8	1	9	42

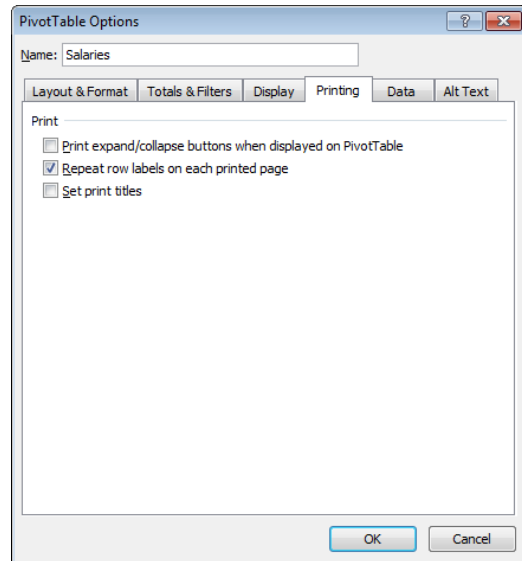Select Tab: **Printing**

Print

Repeat row labels on each printed page

Prints the outermost row field entries on each printed page.

Set Print Titles

Select this option to ensure that all the labels are repeated on each printed page.

Very useful in large Pivot Tables.

PivotTable Options

Name: Salaries

| Layout & Format | Totals & Filters | Display | Printing | Data | Alt Text |

Print
- ☐ Print expand/collapse buttons when displayed on PivotTable
- ☑ Repeat row labels on each printed page
- ☐ Set print titles

OK   Cancel

Select Tab: **Data**

PivotTable Data

Save source data with file

      When the Pivot Table is linked to an external data source, this option can be used to save the data in the workbook file so that you will not need to refresh the Pivot Table when you use it.

Enable show details

      When enabled, you may double click on a Pivot Table value, to insert a sheet with an extract of the database containing the records which are used to calculate the value.

Refresh data when opening the file

      When enabled, Excel will automatically update the Pivot Table when the workbook is opened. Otherwise you will have to perform a manual refresh.
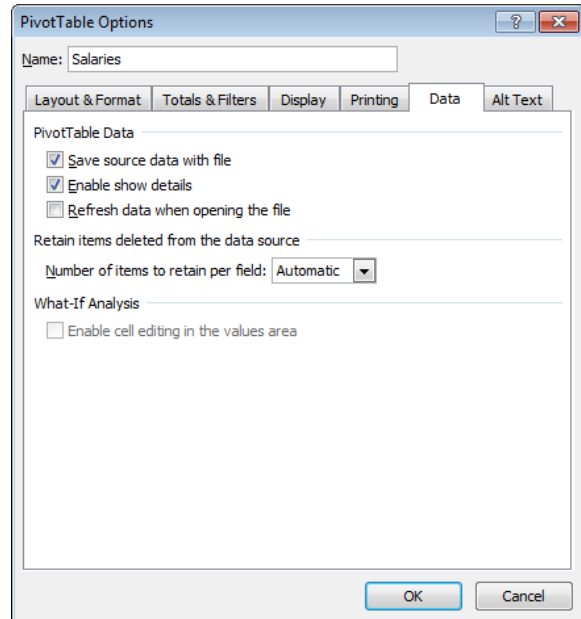
USING A PIVOT TABLE

REFRESHING A PIVOT TABLE

Pivot Tables do not recalculate automatically when the data source is edited.

You must refresh them manually as and when required.

Options Ribbon		Refresh all links to data sources. Keyboard: Alt F5

		Displays a quick menu:
		Refresh Update this data source only. There may be more than one Pivot Table linked to a single data source. **Refresh All** Update all data sources. Keyboard: Alt F5
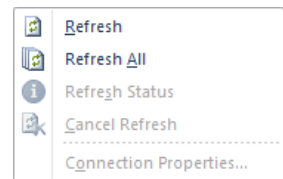
Notes   Refreshing a Pivot Table does not actually re-calculate it, instead it updates the Pivot Cache - the copy of the database used by the Pivot Table for its calculations.

Refreshing the Pivot Table, updates all Pivot Tables that share the same Pivot Cache.

You may change the Pivot Table Options to automatically refresh data from external databases at regular intervals, and/or refresh the Pivot Table when the workbook is first opened.

FILTERING PIVOT TABLE DATA

Filtering the table that the Pivot Table is linked to normally has no effect on the Pivot Table - the exception being when you use filters in Microsoft Query to filter an external database.

Pivot Tables have their own methods for applying filters.

Report Filter Fields

The Report Filter fields allow you to select the records that are summaraized in the Pivot Table.

Mouse:

	A	B
1	Gender	(All) ▼

Indicates the current filter setting, and displays a list of Field entries to select from.

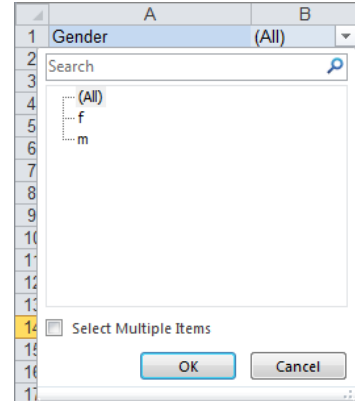The list can be used in one of two ways:

Single Selection

Deselect: **Select Multiple Items**

Mouse: 🖱   Click on the required
                              entry in the list.

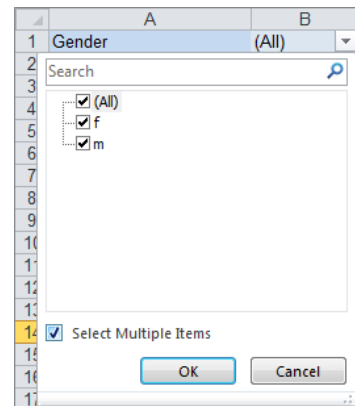The Pivot Table will display results for the selected item
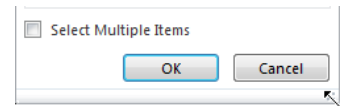only.

Multiple Selections

Select: **Select Multiple Items**

Mouse: 🖱   Select/deselect individual
                              items in the list.

The Pivot Table will display results for all selected items.

Notes   You can control the size of the Drop Down List by dragging
                   the mouse in its bottom right corner.

                   The Pivot Table options dialog box can be used to allow
                   the Pivot Table to perform calculations which include data that you have hidden.

Row & Column Labels Fields

Excel allows you to apply two types of filter to the Row and Column Label fields in the Pivot Table.

Filter by Selection

Mouse: Department ▼   Displays a drop down list where you may select which items to show or hide
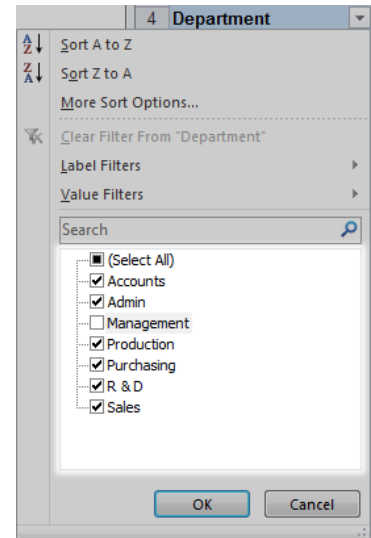
Predefined Filters

Excel also allows you to select from a series of predefined filters.

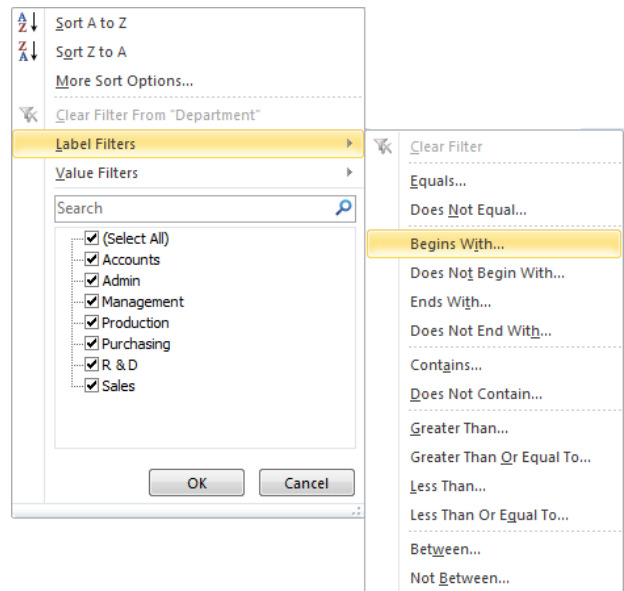Mouse: Department ▼

Select: **Label Filters**

These are intended for use with fields containing text based data.
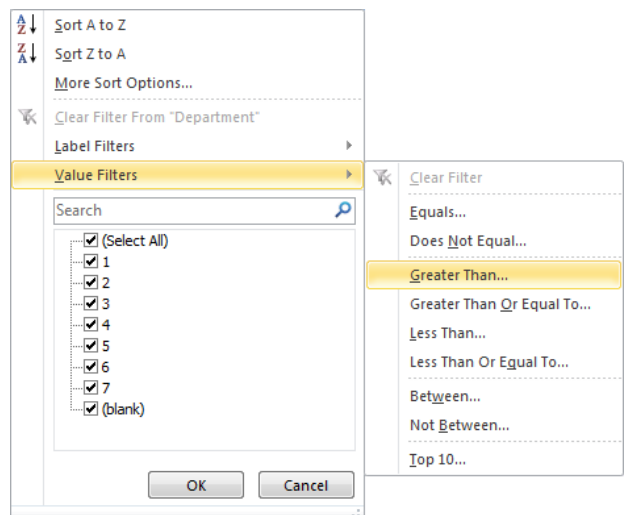
It provides a series of filters to select from.

These are very similar to those used by Excel's AutoFilter feature.

Each option displays a dialog box where you may enter a suitable value to compare field entries with.
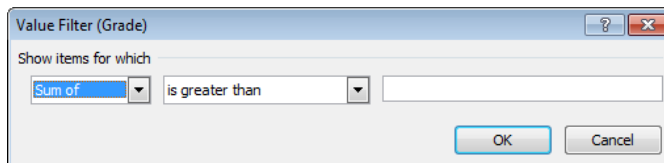
Value Filters

Similar to the above, but with options intended for use with the numeric data contained within the Values region of the Pivot Table.
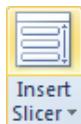
Each option will display a dialog box where you may enter or select the Value Field on which you are setting a filter and the value(s) with which to compare the values.
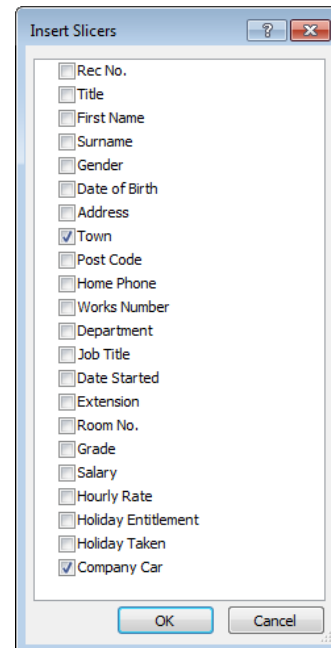
Slicing a Pivot Table

Slicers provide a quick and convenient method for applying simple filters to a Pivot Table.

Options
Ribbon

Displays a dialog box listing fields from the Data Source that can be used as Slicers

Select/deselect as you wish.

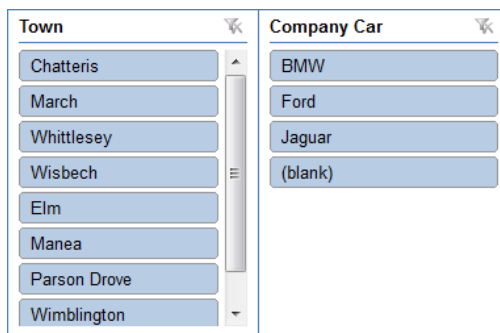Each Slicer is displayed in its own mini window.

Mouse:

Select/deselect item at mouse pointer.

Add/remove item at mouse pointer from selection.

The Pivot Table is filtered to show results for matching records only.
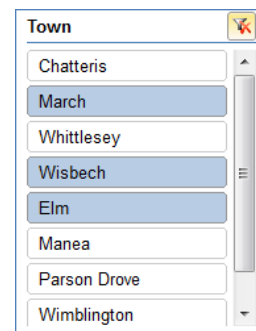
Symbol:

Indicates a filter has been set using the Slicer. Click the symbol to remove the Slicer's filter.
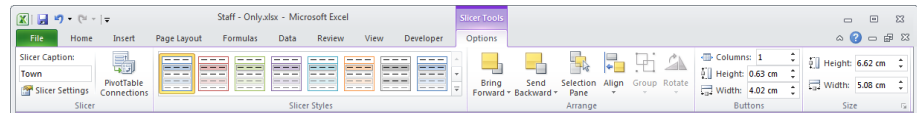
Deleting a Slicer

You may remove any selected Slicer from the screen using:

Keyboard:

Slicer Options

Slicers have their own Ribbon tools which are displayed when a Slicer is selected.
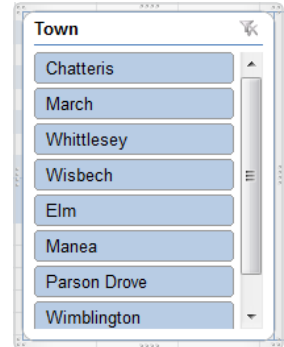
Select a Slicer using:

Mouse: On the Field name displayed at the top of the Slicer.

Extracting Data Source Records

As well as filtering the records visible to the Pivot Table, the Pivot Table can be used as a filter on the original Data Source.

Pivot Tables allow you to create new worksheets with copies of the original records extracted from the data source.

Mouse: On any Value displayed in the Pivot Table.

Excel will extract the records that are used to calculate the Value.

This is a very powerful feature.

There is a case for using a Pivot Table purely as a filter that can copy selected records to a new worksheet.

This duplicate data should be treated as TEMPORARY, and ought to be deleted when finished with.

Beware: If you e-mail someone a copy of a Pivot Table, they can use this feature to extract all the raw data - including sensitive/confidential data!

SORTING A PIVOT TABLE

Sort Tools

The Sort tools are available from the Drop Down Menus that are displayed by the Row and Column Labels Fields - see page 32.

The same options are available from the **Data** Ribbon and the Pivot Table **Options** Ribbon.

The following descriptions refer to the use of the Ribbon.

Sorting Whole Pivot Table	To Sort the whole Pivot Table select a cell containing a Field Name - e.g. Row or Column Label.

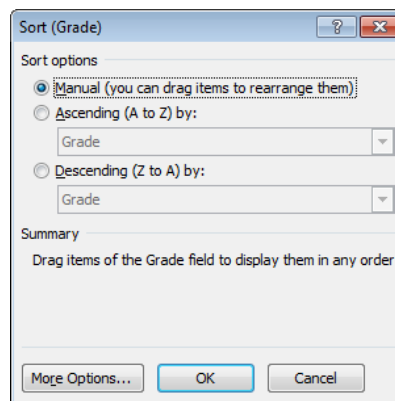| **Sorting Subgroups**	To sort within Subgroups, select an item within a subgroup.
	To sort Subgroups, select a cell within a subgroup Summary

Ribbon:		Sort into Ascending order.
		Sort into Descending order.

Sort Options

Ribbon:		Displays a dialog box offering more Sort Options.

Manual	Selecting this option removes any Sorts applied to the Pivot Table.

The remaining options allow you to sort the Pivot Table into Ascending or Descending order based on the item you select.
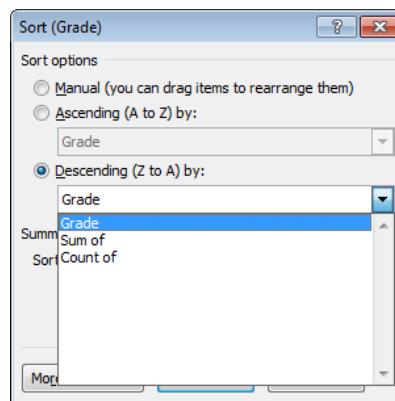
Manual Sort

As well as the sort tools you can revert to reordering items manually using drag and drop methods.

Mouse:

Point the mouse at the black border around a cell containing a Row or Column Label, before dragging it with the mouse to a different position.

The illustration shows the **(blank)** column being moved.

GROUPING FIELDS

Automatic Groups

Pivot Tables automatically create groups whenever you add a second or subsequent field to the Row or Column Field panels of the Pivot Table.

The illustration shows Job Titles grouped by Department.

Some of the groups have the detail hidden leaving just the Group Summary visible.

See later for details on how this is achieved.

Department	Job Title	Values
⊞ Accounts		Sum of
		Count of
⊞ Admin		Sum of
		Count of
⊟ Management	Director	Sum of
		Count of
	MD	Sum of
		Count of
Management Sum of		
Management Count of		
⊞ Production		Sum of
		Count of
⊟ Purchasing	Clerk	Sum of
		Count of
	Leader	Sum of
		Count of
Purchasing Sum of		
Purchasing Count of		
⊞ R & D		Sum of
		Count of
⊞ Sales		Sum of
		Count of
Total Sum of		
Total Count of		

Manual Groups

Excel allows you to manually group two or more row/column fields. When grouped, Excel will calculate Group Summaries and allow you to show and hide the group details.

Level ▾	Grade ▾				
⊟ Junior			⊞ Senior	⊟ (blank)	Grand Total
1	2	3		(blank)	
		£8,950	£128,500	£50,000	£187,450
		1	10	2	13
£4,000	£10,000	£35,800	£54,000		£103,800
1	2	4	4		11
				£175,000	£175,000
				5	5
				£65,000	£65,000
				1	1
				£240,000	£240,000
				6	6
		£8,950	£36,000		£44,950
		1	3		4
			£18,000		£18,000
			1		1
		£8,950	£54,000		£62,950
		1	4		5
			£108,000		£108,000
			6		6
			£35,000		£35,000
			1		1
£4,000	£10,000	£53,700	£344,500	£325,000	£737,200
1	2	6	24	9	42

The concept is very similar to grouping and outlining rows and columns in normal worksheets. (This is also possible in a Pivot Table - if you select the required worksheet rows and columns).

Once grouped, Excel provides a generic Group Name - you may edit this as for any normal cell to a more descriptive name.

The illustration shows, the Staff Grades grouped into Junior and Senior Grades.

Note   Group headings share the same Field Settings dialog box as normal Row and Column Labels fields.

Creating a Group

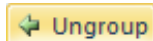To create a group, select two or more row/column labels, then use:
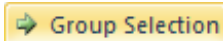
Options   ➡ Group Selection
Ribbon

Quick Menu: 🖱   **Group**

Removing a Grouping

To create a group, select two or more row/column labels, then use:

Options   ⬅ Ungroup
Ribbon

Quick Menu: 🖱   **Ungroup**

Show/Hide Group Details

Subtotals are hidden when Main headings are collapsed.

You may expand or collapse main headings using:

Mouse: 🖱 🖱   On any Group Label to switch between the two settings.

⊞   Displayed next to any heading which is collapsed.

Click to expand.

Ribbon: ▣

Displayed next to any heading which is collapsed.

Click to collapse.

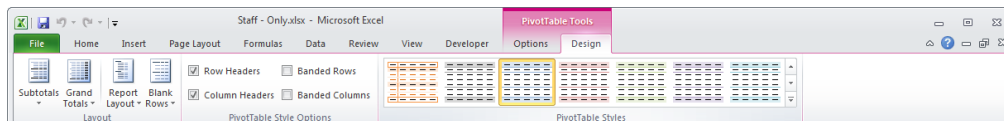⊟   Ribbon: ▣

Using these Ribbon Tools when the column heading for the Labels is selected will expand or collapse all headings.

FORMATTING A PIVOT TABLE

Excel's Pivot Table Design Ribbon provides some easy to use tools for making your Pivot Table attractive to look at.

Design

PIVOT TABLE STYLES

Select a style from the displayed panel.

Or:

Mouse:		Expand the panel to show more choices.

The Styles can be amended using the following Ribbon tools:

Row Headers When selected, all Styles will apply a different colour to highlight the Row Labels in the Pivot Table.

Column Headers
As above, but affects the Column Labels in the Pivot table..

Banded Rows When selected, alternate rows are displayed in different colours.
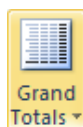
Banded Columns
As above, but affects the columns in the Pivot Table.

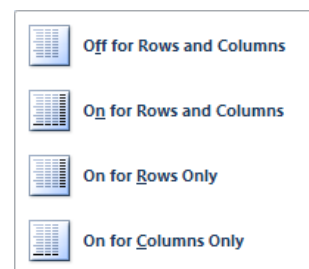**Note**: The Pivot Styles Panel will change to illustrate the effect of these options.
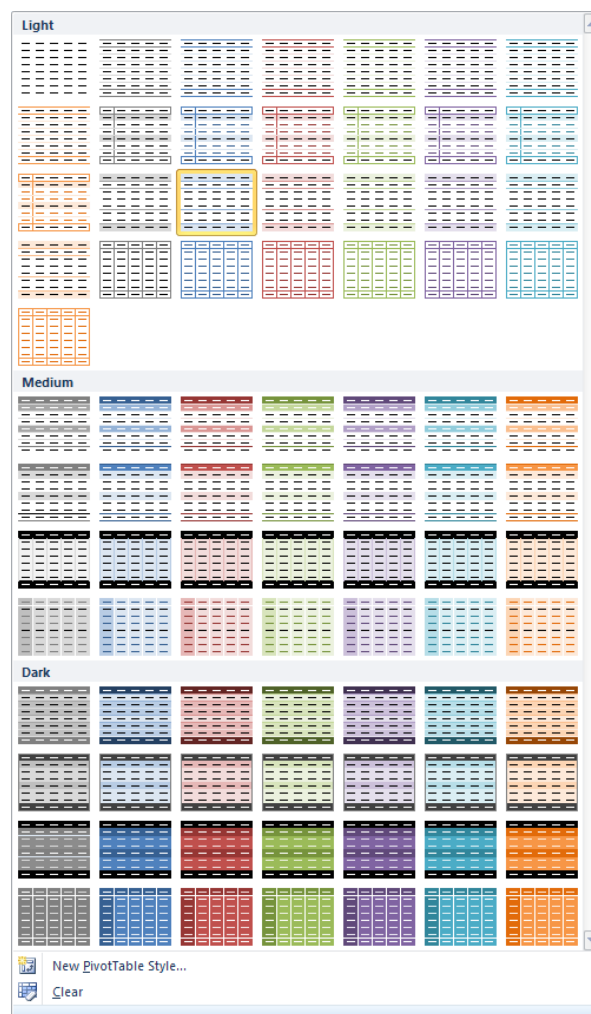
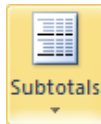## LAYOUT TOOLS

Ribbon:		This tool allows you to control which if any Grand Totals are displayed in the Pivot Table Displays a list of options to select from.	

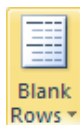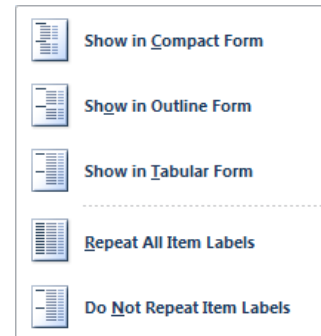|		
Subtotals	Similar to the above for Subtotals. Subtotals are only available when the Pivot Table contains Groups (See earlier).	Do Not Show Subtotals Show all Subtotals at Bottom of Group Show all Subtotals at Top of Group Include Filtered Items in Totals
Report Layout	This option changes the layout of the Pivot Table on the screen, but does not change the information included in the Pivot Table.	Show in Compact Form Show in Outline Form Show in Tabular Form Repeat All Item Labels Do Not Repeat Item Labels
Blank Rows	Allows you to control the use of blank rows to separate items in the Pivot Table. Blank rows can significantly increase this size of the Pivot Table.	Insert Blank Line after Each Item Remove Blank Line after Each Item
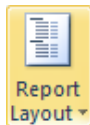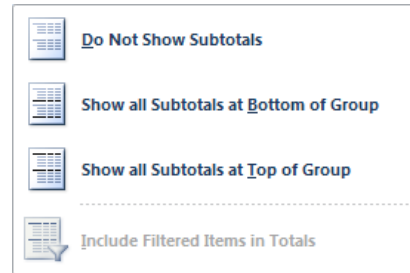
PIVOT CHARTS

Pivot Charts are very similar to normal Charts.

They are linked to Pivot Tables, graphing the data they contain.

The difference here is that the Pivot Chart incorporates the ability to manage the Pivot Table fields as well as perform normal charting commands and formats etc.
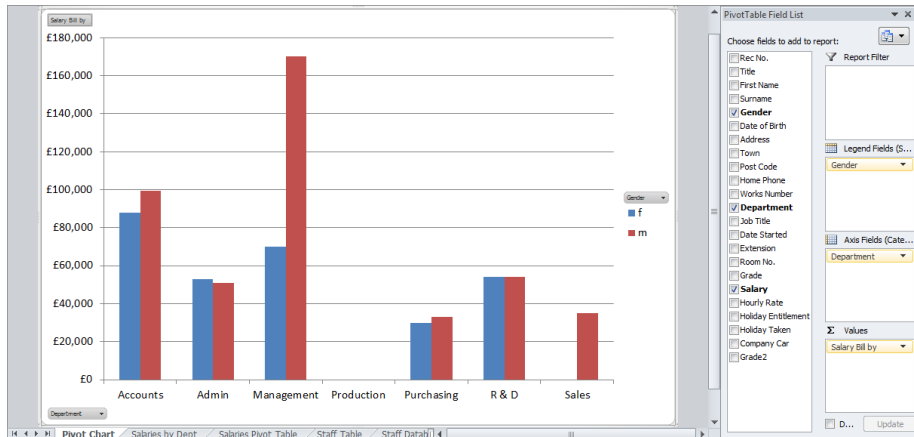
Notes:

Some complex Pivot Tables are not suited to having a linked Pivot Chart.

You may choose to create a Pivot Table because you want the Chart more than the table of values.

The illustrated Pivot Chart is linked to this Pivot Table.

These notes do not describe how to edit your Charts, only those aspects of them that relate to Pivot Tables.
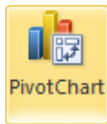

CREATING A PIVOT CHART

A Pivot Chart can be created automatically when you create the Pivot Table by making the appropriate selection in Step 1 of the Pivot Table and Pivot Chart Wizard - see page **Error! Bookmark not defined.**.

You may create further Pivot Charts at any time. Select a cell in the Pivot Table you want to create a chart for then use:
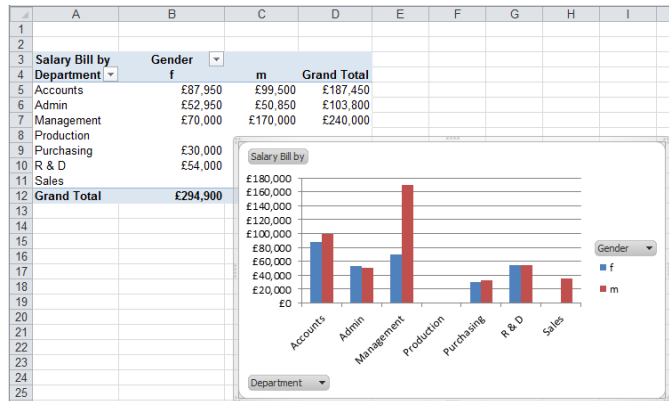
Options
Ribbon:

Creates a new Chart as a chart object in the same sheet as the Pivot Table with default options.

Pivot Charts can be move to separate Chart Sheets in the same way as normal charts.

|		
Keyboard	F11	Creates a new Chart in a new Chart Sheet with default options.
		Illustrated earlier.

Once created, you may edit any aspect of the resulting Pivot Chart using the same methods that you would use for a normal chart.

When a Pivot Chart is selected, Excel provides access to a series of Ribbons containing all the normal tools.
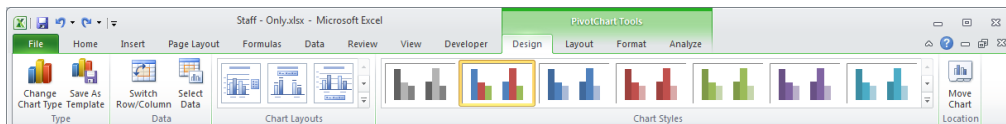
One additional Ribbon displays tools that mirror some of those available in Pivot Tables.
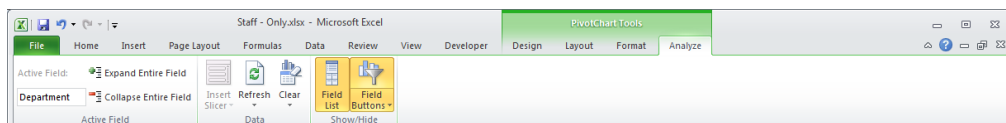
Field Buttons

Pivot Charts normally display Field Buttons. Which indicate how the data is charted:

Report Filter Fields	Still used as a Filter mechanism - normally displayed at the top left corner.
Column Labels Fields	Used as Data series and so displays on the Legend.
Row Label Fields	Used as main headings for the x-axis.
Value Fields	Used as sub-headings for the x-axis.

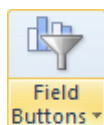**Notice** that Pivot Table sub-totals and grand totals are ignored.

You may use normal Pivot Table methods for adding new fields into the Pivot Chart and, removing them, or editing their settings etc. This information is not repeated here. Any changes you make will also be reflected in the linked Pivot Table - so be careful!

If you want the chart to appear like a normal chart, you may optionally hide or show the Field Buttons, using:
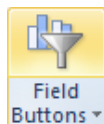
Analyze Ribbon:	Field Buttons	On off toggle for all Field Buttons,
	Field Buttons	Displays a list of options allowing more control over which Field Buttons are displayed.