



# TMS Grid Pack Developers Guide

Productivity feature packed grids for Delphi &  
C++Builder

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Web: <http://www.tmssoftware.com>  
Email: [info@tmssoftware.com](mailto:info@tmssoftware.com)

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## Introduction

Welcome to the TMS Grid Pack Developer's Guide, created by tmssoftware.com.

At tmssoftware.com, we strive to produce world class software components that enable developers to produce quality software for the most demanding of environments.

Our innovative component suites are designed to be extensible, easy to use and design time rich.

We provide full source code to enable seamless integration of our components with our customers' projects.

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## Availability

TMS Grid Pack is available as VCL and VCL.NET component.

### VCL versions:

TMS Grid Pack is available for Delphi 5,6,7,2005,2006,2007,2009,2010 and C++Builder 5,6,2006,2007,2009,2010.

TMS Grid Pack has been designed for and tested with: Windows 2000, 2003, 2008, XP, Vista, Windows 7.

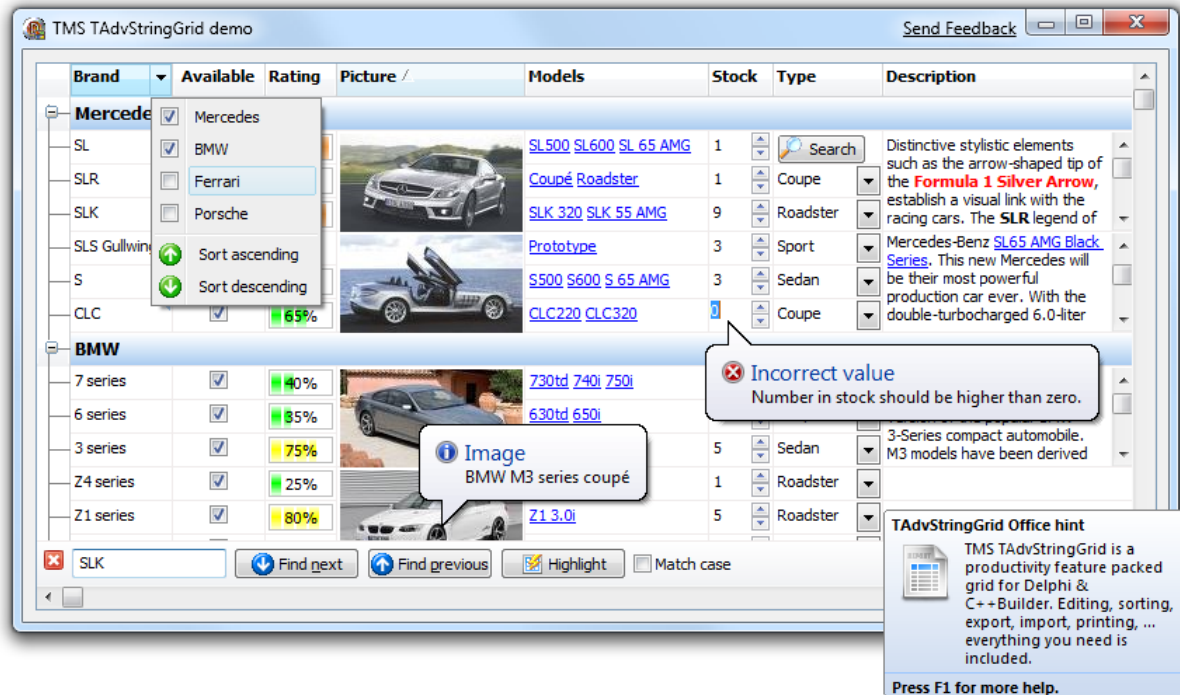
### VCL.NET versions:

TMS Grid Pack is available for Delphi 2005,2006,2007.

## TAdvStringGrid

### TAdvStringGrid description

High productivity & feature-packed grid control.



## TAdvStringGrid main features

- Built-in flexible printing
- Extensive capabilities for controlling display in cells
- Easy & fine control over editing & navigation
- Various file formats supported for import & export
- Wide range of built-in inplace editors
- Many types of graphics supported
- 3<sup>rd</sup> party support like spell checking, scripting, ...
- And more...

## TAdvStringGrid use

The TMS TAdvStringGrid component is designed to be used in the most broad types of applications needing to display or handle data in rows and columns. TAdvStringGrid is designed as drop-in replacement for the Borland TStringGrid component. As such, it is fully compatible with TStringGrid and inherits all functionality of the base class TStringGrid. For documentation on this base functionality, we refer to the Borland documentation. This manual therefore assumes the developer is familiar with the functionality of TStringGrid. For example, a grid cell value can be set with `grid.Cells[col,row]: string` just like in TStringGrid. The focused cell can be set with `grid.Row: integer & grid.Col: integer` properties, also just like TStringGrid.



## TAdvStringGrid import &amp; export capabilities

The TMS TAdvStringGrid component can save and load its data in many different formats explained here:

internal	Saves and loads grid cell data and column widths in a proprietary format
CSV	Saves and loads grid cell data in comma separated file
DOC	Saves the cell data to a Word document through OLE automation
XLS	Saves and loads grid cell data to an Excel file through OLE automation or directly without requiring Excel to be installed on the machine with TAdvGridExcelIO
XML	Saves and loads the grid cell data to XML file
MDB	Load the grid data from MDB file through OLE automation*
ASCII	Saves cell data to ASCII file
Fixed	Saves and loads the cell data to fixed length column text files
BIN	Saves and loads cell data and properties to a proprietary binary format
HTML	Saves the cell data to a HTML file
stream	Saves and loads cell data to a stream
Binary stream	Saves and loads cell data and properties to a stream
RTF	Saves the grid as rich text file

Properties that have effect on grid saving and loading are:

**SaveFixedCells: Boolean**

When true, the contents of fixed cells are also saved and loaded. Default value is true.

**SaveHiddenCells: Boolean**

When true, the contents of hidden cells are saved. Default value is false.

**SaveWithHTML: Boolean**

When false, all HTML tags are removed from cell contents if these have HTML tags. Default value is true.

**SaveWithRTF: Boolean**

When true, RTF information is saved along the cell value. When false, all text formatting is removed before saving the cell value.

**SaveVirtCells: Boolean**

When true, the displayed value of a cell is save. When false, the real grid cell value is saved. As

explained further in this guide, a grid cell value can be dynamically altered for display using the OnGetDisplText event. With this public property SaveVirtCells, it can be chosen which value will be saved.

OnFileProgress: TGridProgressEvent(Sender:TObject;progress: smallint);

This event is triggered to return the percentage of completion during save and load operations.

### Overview of methods

#### *Files*

```
procedure SaveToFile (FileName: String);
procedure LoadFromFile (FileName: String);
```

SaveToFile saves cell data and column widths to a proprietary file format. LoadFromFile loads cell data and column widths from a proprietary file format.

#### *Binary files*

```
procedure SaveToBinFile (FileName: String);
procedure LoadFromBinFile (FileName: String);
```

SaveToBinFile saves cell data and cell properties to a proprietary file format. LoadFromBinFile loads cell data and cell properties from a proprietary file format.

#### *Streams*

```
procedure SaveToStream (Stream: TStream);
procedure LoadFromStream (Stream: TStream);
```

SaveToStream saves cell data and column widths to a stream. LoadFromStream loads cell data and column widths from a stream.

Example: copying grid information from grid 1 to grid 2 through a memorystream:

```
var
  ms: TMemoryStream;
begin
  ms := TMemoryStream.Create;
  Grid1.SaveToStream(ms);
  ms.Position := 0; // reset stream pointer to first position
  Grid2.LoadFromStream(ms);
  ms.Free;
end;
```

#### *Binary streams*

```
procedure SaveToBinStream (Stream: TStream);
procedure LoadFromBinStream (Stream: TStream);
procedure SaveRectToBinStream (Rect: TRect; Stream: TStream);
procedure LoadAtPointFromBinStream (Point: TPoint; Stream: TStream);
```

SaveToStream saves cell data and cell properties to a binary stream. LoadFromStream loads cell data and cell properties from a binary stream. SaveRectToBinStream saves only cells with in rectangle coordinates specified through the Rect parameter. Finally, the method LoadAtPointFromBinStream loads cell data and cell properties from the binary stream starting from the specified cell coordinate as first top left cell of the data loaded.

### CSV files

```
procedure SaveToCSV (FileName: String);  
procedure LoadFromCSV (FileName: String; MaxRows: integer = -1);  
procedure AppendToCSV (FileName: String);  
procedure InsertFromCSV (FileName: String; MaxRows: integer = -1);
```

SaveToCSV saves cell data to a CSV file. LoadFromCSV loads cell data from a CSV file. AppendToCSV appends cell data to an existing CSV file. InsertFromCSV inserts cell data loaded from the CSV file as extra rows in the grid. Note that LoadFromCSV & InsertFromCSV have a default parameter MaxRows. Without this parameter, all rows in the CSV file are loaded in the grid. When the 2<sup>nd</sup> parameter MaxRows is used, this sets the maximum number of rows that will be loaded.

Several properties affect the CSV methods:

```
Grid.Delimiter: Char;
```

This specifies the delimiter to use for saving and loading with CSV files. By default the Delimiter is set to #0. With Delimiter equal to #0, an automatic delimiter guess is used to load data from the CSV file. To save to a CSV file, the ; character is used as separator when delimiter is #0. Setting the delimiter to another character than #0 forces the CSV functions to operate with this delimiter only.

```
Grid.QuoteEmptyCells: Boolean;
```

When true, an empty cell in the CSV file is saved as "", otherwise no characters are written to the CSV file.

```
Grid.AlwaysQuotes: Boolean;
```

When true, every cell value is saved with prefix and suffix quotes, otherwise quotes are only used if the cell data contains the delimiter character. Note that when the cell data contains quotes, the data is written with doubled quotes to the file.

### Fixed files

```
procedure SaveToFixed (FileName: string; positions: TIntList);  
procedure LoadFromFixed (FileName: string; positions: TIntList; DoTrim: boolean  
= true; MaxRows: integer = -1);
```

SaveToFixed saves cell data and column widths to a text file with fixed column lengths. LoadFromFixed loads cell data and column widths from a text file with fixed column lengths. The TIntList parameter is a list of integer values specifying the character offsets where a column starts in the file. TIntList is defined in the AdvObj unit, so to use this, include AdvObj in the uses clause of your form .PAS file.

Example: loading from a fixed file

```

var
  Il: TintList;
begin
  Il := TintList.Create(0,0);
  Il.Add(0); // first column offset
  Il.Add(15); // second column offset
  Il.Add(30); // third column offset
  Il.Add(40); // fourth column offset
  Grid.LoadFromFixedFile('myfile.txt',il);
  Il.Free;
end;

```

Note that LoadFromFixed has two additional default parameters: DoTrim & MaxRows. When DoTrim is false, spaces before or after words are not removed. Without MaxRows, all rows in the text file are loaded in the grid. When the last parameter MaxRows is used, this sets the maximum number of rows that will be loaded.

### HTML files

```

procedure SaveToHTML(FileName: String);
procedure AppendToHTML(FileName: String);

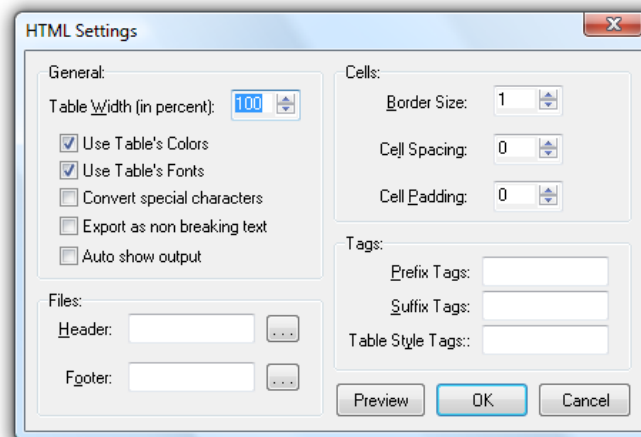
```

SaveToHTMLFile saves the cell data to a HTML file and uses the grid.HTMLSettings to control the method for saving. The cell data is saved to a HTML table. AppendToHTML appends the cell data to an existing HTML file.

With HTMLSettings, following settings can be done:

property BorderSize: Integer	Sets the border size for the HTML table
property CellSpacing: Integer	Sets the cellspacing value for the HTML table
property CellPadding: Integer	Sets the cellpadding value for the HTML table
property SaveColor: Boolean	If true, grid color information is written to the HTML table cells
property SaveFonts: Boolean	If true, grid font information is written to the HTML table cells
property FooterFile: string	File that is to be appended after the HTML table in the final HTML file
property HeaderFile: string	File that is inserted before the HTML table in the final HTML file
property TableStyle: string	Sets additional HTML table style properties
property PrefixTag: string	Sets any text that should be written in the HTML file before the table is output
property SuffixTag: string	Sets any text that should be written in the HTML file after the table is output

property ConvertSpecialChars: Boolean	When true, special characters as >, <, & ... are exported as respectively &gt; , &lt; , &amp; ...
property NonBreakingText: Boolean	When true, all text is exported as non breaking text, ie. all spaces are exported as &nbsp;
property Summary: string	Sets the HTML TABLE summary attribute for the exported grid
property AutoPreview: Boolean	When true, the exported HTML file is automatically previewed in an instance of the default browser
property ExportImages: Boolean	When true, images in the grid are also exported
property Width: Integer	Sets the width percentage of the HTML table
property XHTML: Boolean	When true, the output is XHTML compatible



## XML files

**procedure** SaveToXML (FileName: String; ListDescr, RecordDescr:string;FieldDescr:TStrings);

Saves the cell data in an XML file with following structure:

```
<ListDescr>
<RecordDescr>
<FieldDescr[0]>Cell 0,0</FieldDescr[0]>
<FieldDescr[1]>Cell 1,0</FieldDescr[1]>
<FieldDescr[2]>Cell 2,0</FieldDescr[2]>
</RecordDescr>
<RecordDescr>
<FieldDescr[0]>Cell 0,1</FieldDescr[0]>
<FieldDescr[1]>Cell 1,1</FieldDescr[1]>
<FieldDescr[2]>Cell 2,1</FieldDescr[2]>
</RecordDescr>
</ListDescr>
```

```
procedure LoadFromXML(FileName: String; LevelToRow: Boolean = false);
```

Loads the grid data from an XML file. When the optional LevelToRow parameter is true, a new row is used for every new XML node level, otherwise, XML nodes are added in additional columns.

Example:

This code snippet save a grid with 5 columns to XML and uses the text in the column headers as field descriptors in the XML file:

```
var
    sl: TStringList;
    i: integer;
begin
    sl := TStringList.Create;
    for i := 0 to grid.ColCount - 1 do
        sl.Add(grid.Cells[i, 0]);
    grid.SaveToXML('mygrid.xml', 'xmllist', 'xmlrecord', sl);
    sl.Free;
end;
```

A public property that is used for exporting to XML file is XMLEncoding that defaults to 'ISO-8859-1'. This property can be used to set a different XML encoding attribute that is saved to the XML file.

### *ASCII files*

```
procedure SaveToASCII(FileName: String);
```

SaveToASCII saves the cell data to an ASCII file, automatically using column widths to fit the widest data in cells available. A difference with fixed column width files is also that SaveToAscii will correctly split cell contents across multiple lines when MultiLineCells is set True.

```
procedure AppendToASCII(FileName: String);
```

This procedure is identical to SaveToASCII, except that it appends the data to an existing file. Note that TAdvStringGrid also comes with a component TAdvGridImportDialog. This dialog can be used to allow the user to set the fixed column widths at runtime. From a preview dialog, this is done by clicking to set the fixed column widths. The use of this dialog is explained further in this guide.

### *Access files*

```
procedure LoadFromMDB(FileName:string; Table: string);
procedure LoadFromMDBSQL(FileName:string; SQL: string);
```

LoadFromMDB loads data from a table in an Access MDB file. All rows and columns are loaded in the grid. LoadFromMDB relies on ADO and as such requires that ADO is installed on the machine. LoadFromMDBSQL loads data from an Access table with a SQL SELECT command. Note that LoadFromMDB is equivalent to LoadFromMDBSQL with the SELECT statement:

SELECT \* from TABLE

### ***Microsoft Word files***

```
procedure SaveToDoc (FileName: string; CreateNewDocument: boolean = true);
```

This procedure saves the grid data as a table in a MS Word document. By default, this is in a new document. When the parameter CreateNewDocument is true, a new document is explicitly created, when false, the table will be saved in the default active Word document.

```
procedure AppendToDoc (FileName, Bookmark: string);
```

Call grid.AppendToDoc(FileName) to add the grid data to an existing MS Word document at the end of a document. To insert the grid data at a specific bookmark present in the MS Word document, call grid.SaveToDoc(FileName, BookmarkName);

### ***Microsoft Excel files***

TAdvStringGrid supports importing & exporting Microsoft Excel files in two ways. With the methods grid.LoadFromXLS, grid.SaveToXLS, the grid imports & exports XLS files using OLE automation.

Secondly, a separate component TAdvGridExcelIO offers native import & export without requiring that Excel is installed on the machine. It is highly recommended to use TAdvGridExcelIO as it is significantly faster, has more features and does not require Microsoft Excel to be installed.

#### Using SaveToXLS / LoadFromXLS

```
procedure SaveToXLS (Filename:string; CreateNewSheet: boolean = true);
```

```
procedure SaveToXLSSheet (Filename, Sheetname:string);
```

Using these methods, the grid contents are saved to a worksheet in the XLS file, either a default worksheet when SaveToXLS(filename) is used, forced to a new worksheet with SaveToXLS(filename, true) or saved to a specific named worksheet when calling SaveToXLSSheet(Filename, Sheetname);

```
procedure LoadFromXLS (Filename:string);
```

```
procedure LoadFromXLSSheet (Filename, SheetName:string);
```

LoadFromXLS loads data from the default worksheet in the grid. With LoadFromXLSSheet, data from the named worksheet is loaded.

#### Using TAdvGridExcelIO

This is explained in a separate chapter: TAdvStringGrid import/export to XLS via TAdvGridExcelIO

### ***RTF files***

Via a separate component TAdvGridRTFIO, it is possible to save contents of the grid as RTF file. This is a Microsoft Word compatible RTF file with a table that contains the grid data. Using TAdvGridRTFIO is explained in the separate chapter: TAdvStringGrid export to RTF files via TAdvGridRTFIO.

### Advanced topics on exporting & importing

To apply transformations on cell data for loading and saving it is easy to create a descendent class from TAdvStringGrid and override the SaveCell and LoadCell methods. In these overridden methods a transformation such as encryption or decryption can be applied. The basic technique is:

```
TEncryptedGrid = class (TAdvStringGrid)
protected
    function SaveCell (ACol, ARow: Integer): string; override;
    procedure LoadCell (ACol, ARow: Integer; Value: string); override;
end;
function TEncryptedGrid.SaveCell (ACol, ARow: Integer): string;
begin
    Result := Encrypt (GridCells [ACol, ARow]);
end;
procedure TEncryptedGrid.LoadCell (ACol, ARow: Integer; Value: string);
begin
    GridCells [ACol, ARow] := Decrypt (Value);
end;
```

As such, when using methods like SaveToCSV, SaveToXLS, ... the information will be exported in encrypted format automatically.



**TAdvStringGrid sorting capabilities**

TAdvStringGrid supports various ways to sort data inside the grid. Sorting can be triggered by a mouse click on a column header or programmatically with various methods. The settings that control the behaviour of sorting in the grid are grouped in the SortSettings property. In addition, the OnGetFormat event is used to dynamically instruct the grid to the data type to use for the sort. By default, sorting on a given column starts comparing cells for the sort for the given column but upon finding equal cells, will use columns right from the main sort index column to do further comparing.

**SortSettings**

The settings that control the various sorting capabilities of TAdvStringGrid can be found under the property SortSettings. This contains following subproperties:

AutoColumnMerge: Boolean;	When true, merged cells in multiple columns are taken into account for sorting. Cell merging is explained in detail later.
AutoFormat: Boolean;	When true, the grid tries to automatically guess the format of the data in cells for the compare method
AutoSortForGrouping: Boolean	When true, the grid is automatically sorted first before a grouping is performed. The sorting is performed on the column for which the grouping will be applied.
BlankPos: TSortBlankPosition;	Sets the position empty cells get after sorting. This can be either blFirst or blLast, specifying empty cells should always come first or come last after sorting
Column: Integer;	Specifies the main sort index column
Direction: TSortDirection;	Sets the sort direction to either ascending or descending
DownGlyph: TBitmap;	Specifies the glyph to use for indicating a descending sort. If no glyph is specified a triangle is drawn.
FixedCols: Boolean;	When true, fixed columns are affected by the sort, otherwise, fixed columns remain in the original sequence after the sort.
Full: Boolean;	When true, all columns are taken into account for comparing from left to right, starting from the main sort index column
HeaderColor: TColor;	When different from clNone, the fixed column header cell can be painted in a different color for the column that is sorted. HeaderColor sets the top gradient start color.
HeaderColorTo: TColor;	Idem as HeaderColor but sets the top gradient end color.

HeaderMirrorColor: TColor;	Idem as HeaderColor but sets the bottom gradient start color.
HeaderMirrorColorTo: TColor;	Idem as HeaderColor but sets the bottom gradient end color.
IgnoreBlanks: Boolean;	When true, empty cells are ignored during the sort and can be positioned in the sort either at top or at bottom
IgnoreCase: Boolean;	When true, case sensitivity is automatically ignored when performing the sort.
IndexColor: TColor;	Sets the color of the indexed sort indicators
IndexDownGlyph: TBitmap;	Specifies the glyph to use for indicating an descending indexed sort. If no glyph is specified a triangle is drawn.
IndexShow: Boolean;	When true, sorting on an arbitrary column sequence is enabled and the indexes of this sequence displayed
IndexUpGlyph: TBitmap;	Specifies the glyph to use for indicating an ascending indexed sort. If no glyph is specified a triangle is drawn.
InitSortDirection: TSortDirection	Specifies the initial sort direction. The initial sort direction is the direction of the sort upon the first column header click on an unsorted column. After the first sort, the sort direction toggles for every click.
NormalCellsOnly: Boolean;	When true, sorting is applied to normal, i.e. non fixed cells only.
Row: Integer;	Sets the fixed row where the sort indicator is displayed and from where a column header click triggers the sort. Maximum value for row is the number of fixed rows in the grid.
Show: Boolean;	When true, the sort indicator is shown in the column header cell
SingleColumn: Boolean;	When true, only a single column is sorted. All other columns are not affected
SortOnVirtualCells: Boolean;	When true, the sorting is performed on cell text set by OnGetDisplText instead of the internal grid data. This is the default setting as the sort will correspond to what can be visibly seen in the grid.
UndoSort: Boolean;	When true, a sort undo is possible. This means that upon clicking on the header, the sorting toggles between ascending, descending and back to unsorted. The unsorted sequence is considered as the sequence

	before the first sort was performed.
UpGlyph: TBitmap;	Specifies the glyph to use for indicating an ascending sort. If no glyph is specified a triangle is drawn.

### Specifying the dataformat with OnGetFormat

The OnGetFormat event is used to instruct the grid which compare method it should use during the sorts for each column in the grid. By default, the grid is using an automatic format guess. This means that the grid checks if the data in a cell is numeric, a floating point, a date, a date + time or just alphabetic data and applies the appropriate compare methods accordingly. Although this auto format guess can be convenient, for sorting large and complex amounts of data it is not recommended. When mixed numeric and alphabetic data is available in a column, this auto format guess is easily confused and the extra checks for guessing the format take extra time. With the OnGetFormat event, the compare methods to use can be specified for each column. The event is declared as:

```
TGridFormatEvent = procedure(Sender : TObject; ACol: Integer;
    var AStyle: TSortStyle; var aPrefix, aSuffix: string) of object;
```

The TSortStyle can be:

ssAlphabetic	Use alphabetic compare
ssAlphaCase	Use case sensitive alphabetic compare
ssAlphaNoCase	Use case insensitive alphabetic compare
ssAlphaNumeric	Use combined alphabetic & numeric compare, ie. 1,5,100,A,M,K,a,r,z...
ssAlphaNumericNoCase	Use combined alphabetic & numeric compare without case sensitivity
ssAnsiAlphaCase	Use Ansi case sensitive alphabetic compare
ssAnsiAlphaNoCase	Use Ansi case insensitive alphabetic compare
ssAutomatic	Let grid automatically determine the format of data for comparing
ssCheckBox	Use checkbox value compare
ssCustom	Use custom compare method (explained later)
ssDate	Use date compare
ssDateTime	Use both date & time compare
ssFinancial	Use floating point with optionally thousand separator compare
ssHTML	Use HTML compare, ignoring HTML tags in text for compare
ssImages	Use image index compare
ssNumeric	Use numeric compare

ssRaw	Use raw compare method (explained later)
ssShortDateEU	Use fixed date format dd/mm/yyyy compare
ssShortDateUS	Use fixed date format mm/dd/yyyy compare
ssTime	Use time compare
ssUnicode	Use Unicode string compare (pre Delphi 2009 only)

The last parameters aPrefix and aSuffix, are use to instruct the grid to ignore fixed prefix or suffix text for cell data for the compare. As such, the sort format can be ssNumeric while a cell contains numeric data with some characters before or after the number as in the following example:

1234 USD  
5678 USD

Setting aSuffix to ' USD' will let the compare ignore this suffix and perform a compare only on

1234  
5678

Example: setting sort formats with OnGetFormat

Supposing a grid contains following data:

Abc	123	1/1/1980	\$ 1.025,36
Def	456	12/10/1990	\$ 958,14
Ghi	789	15/4/200	\$ 2.175,00

The OnGetFormat event is used to instruct the grid to use an alphabetic compare for the first column, a numeric compare for the second column, a date compare (based on regional settings for date format) for the third column and finally the fourth column to ignore the '\$ ' prefix and sort on floating point data with optional thousand separator.

```
procedure TForm1.AdvStringGrid1GetFormat(Sender: TObject; ACol: Integer;  
    var AStyle: TSortStyle; var aPrefix, aSuffix: String);  
begin  
    case ACol of  
        0: AStyle := ssAlphabetic;  
        1: AStyle := ssNumeric;  
        2: AStyle := ssDate;  
        3: begin  
            AStyle := ssFinancial;  
            APrefix := '$ ';  
        end;  
    end;  
end;  
end;
```

## Sort events

Two events are triggered when sorting is started by a click on a column header. Before the sort starts, the OnCanSort event is triggered. By setting the parameter DoSort to false, a sort after a column header click can be disabled. After the sort is completed, the OnClickSort event is triggered, informing the completion of the sort for a given column. As OnCanSort is triggered before the sort and OnClickSort after the sort, these two events are often used to specify an hourglass cursor during lengthy sort processes:

```
procedure TForm1.AdvStringGrid1CanSort(Sender: TObject; ACol: Integer;  
    var DoSort: Boolean);  
begin  
    Cursor := crHourGlass;  
end;  
  
procedure TForm1.AdvStringGrid1ClickSort(Sender: TObject; ACol: Integer);  
begin  
    Cursor := crDefault;  
end;
```

## Custom sorts

Two events, OnCustomCompare and OnRawCompare are used to allow implementing custom compare routines when the sort format style is specified as ssCustom or ssRaw. The OnCustomCompare is triggered for each compare of two string values and expects the result to be set through the Res parameter with values :

-1	Str1 < Str2
0	Str1 = Str2
1	Str1 > Str2

The OnRawCompare event is defined as:

```
TRawCompareEvent = procedure(Sender: TObject; ACol, Row1, Row2: Integer;  
    var Res: Integer) of object;
```

It allows comparing grid cells [ACol,ARow1] and [ACol,ARow2] in any custom way and returning the result in the Res parameter in the same way as for the OnCustomCompare event.

Example: comparing cell objects instead of cell text with OnRawCompare

As for each cell, an object can be assigned with the grid.Objects[Col,Row]: TObject property, it is easy to associate a number with each cell through:

```
Grid.Cells[Col,Row] := 'I am text'; // cell text  
Grid.Objects[Col,Row] := TObject(1234); // associated number
```

Through the OnRawCompare event, a sort can be done on this associated number instead of the cell text.

```
procedure TForm1.AdvStringGrid1RawCompare(Sender: TObject; ACol, Row1,
```

```

Row2: Integer; var Res: Integer);
var
  c1,c2: Integer;
Begin
  c1 := integer(AdvStringGrid1.Objects[ACol,Row1]);
  c2 := integer(AdvStringGrid1.Objects[ACol,Row2]);
  if (c1 = c2) then
    Res := 0
  else
    if (c1 > c2) then
      Res := 1
    else
      Res := -1;
end;

```

### Sort independent cell access

TAdvStringGrid has the capability to access cell contents with a row index irrespective of sort order. In order to use this functionality, three methods are available:

```

procedure InitSortXRef;
function SortedRowIndex (Row: Integer): Integer;
function UnsortedRowIndex (Row: Integer): Integer;

```

The InitSortXRef method initializes the current row indexing as reference. This means that if value “ABC” is on row 10, after sorting the grid in whatever sort sequence, you can access the cell with contents “ABC” on reference row 10. After calling grid.InitSortXRef, sorting can be applied programmatically or from user interface and conversion between displayed row index an reference row index can be done by the methods: SortedRowIndex and UnsortedRowIndex.

SortedRowIndex converts the reference row index to the displayed row index.

UnsortedRowIndex converts the displayed row index to the reference row index.

In addition, the following property also provide direct access to the reference row indexed cells:

```

Grid.UnSortedCells[Col,Row]: string;

```

Example: using SortedRowIndex and UnsortedRowIndex

```

// loading, initializing & sorting
Grid.SaveFixedCells := False;
Grid.LoadFromCSV('sample.csv');
Grid.InitSortXRef;
Grid.SortSettings.Column := 1;
Grid.QSort;
// shows the contents of cell 1,1 before sorting
ShowMessage(Grid.UnsortedCells[1,1]);
// shows the display index for the reference row indexed cell 1,1
ShowMessage(IntToStr(Grid.SortedRowIndex(1)));

```

### Programmatic sorting control

Programmatically invoking a sort is possible with the method `grid.QSort`. First set the properties for the sort through the property `SortSettings` and call `grid.QSort`. Calling `grid.QSort` performs the sort on column set by `grid.SortSettings.Column` for all normal rows in the grid. In addition `TAdvStringGrid` also supports grouped sorting. Grouped sorting will sort only rows that belong to the same group. It is invoked by first setting the column in `SortSettings.Column` and calling `grid.QSortGroup`. More information on grouping can be found in the paragraph for grouping specifically. Finally, it is also possible to programmatically undo a sort. This is done with the method `grid.QUnSort`.

### Programmatic control of custom sort column sequences

With `TAdvStringGrid`, it is possible to apply programmatic sorts in any column order. This is achieved through the property `grid.SortIndexes` (which is a list of column indexes to be sorted) and the method `grid.QSortIndexed`. `SortIndexes` is a list of column indexes. Column indexes can be added with methods: `grid.SortIndexes.Add(ColIndex: Integer)` or `grid.SortIndexes.AddIndex(ColIndex: Integer; Ascending: Boolean)`; It is important that when applying a new column sort order, to clear the previous list of indexes (if assigned) with `grid.SortIndexes.Clear`;

Example: using `QSortIndexed`

```
Grid.SortIndexes.Clear;  
// first column to sort is column 5 in ascending order  
Grid.SortIndexes.Add(5,true);  
// second column to sort is column 2 in descending order  
Grid.SortIndexes.Add(2,false);  
// third column to sort is column 4 in ascending order  
Grid.SortIndexes.Add(4,true);  
Grid.QSortIndexed;
```

Note: when grouping is enabled in the grid, use the methods `QSortGroup` and `QSortGroupIndexed` which are further explained under grouping.

### Ignoring columns during sorting

By default, when `grid.SortSettings.Full = true`, all columns are possibly taken in account to perform the sort, ie. when two values in a column are equal, the values in the next column are compared to determine the order. It is possible to define one or more columns that should be ignored for comparing during a sort. This is simply done by setting column indexes in the list `grid.IgnoreColumns`.

Example:

```
grid.IgnoreColumns.Clear; // clear any previous set ignored columns  
grid.IgnoreColumns.Add(2); // ignore column 2 during sort  
grid.IgnoreColumns.Add(5); // ignore column 5 during sort
```

### Persisting sort settings

Often it is desirable to persist the sorting a user has applied during execution of the application to be able restore this last sort setting when the application restarts. `TAdvStringGrid` provides a convenient way to handle this. The `TSortSettings` class features for this the methods:

```
TSortSettings.SaveToString: string;  
TSortSettings.LoadFromString(const Value: string);
```

This way, when the application closes, the result of `grid.SortSettings.SaveToString` can be stored in the registry, an INI file, XML file or other storage and when the application starts, the last sort sequence is restored by loading this value and applying it with:

```
var  
    s: string;  
begin  
    s := IniFile.ReadString('GRID', 'SORT', '');  
    Grid.SortSettings.LoadFromString(s);  
end;
```



## TAdvStringGrid inplace editing

TAdvStringGrid not only offers a huge range of built-in inplace editor types but can be extended to use any TWinControl based component as inplace editor.

By default, when setting `goEditing = true` in `grid.Options`, the editing is enabled and the default inplace editor is used. In code, editing can be enabled with:

Delphi:

```
advstringgrid1.Options := advstringgrid1.Options + [goEditing];
```

C++

```
advstringgrid1->Options << goEditing;
```

The normally used editor is set by `grid.DefaultEditor` and is by default a normal TEdit like inplace edit with no special features. Additional inplace editors are specified through the `OnGetEditorType` event. If `goEditing` is set true, all non fixed cells in the grid can be edited. To set some cells as read-only in this case, the `OnCanEditCell` event is used. The `OnCanEditCell` event is triggered before editing should start and editing can be stopped by setting the `CanEdit` parameter to false.

### *Example: setting a column to read-only*

This event handler sets column 2 and 4 as read-only:

```
procedure TForm1.AdvStringGrid1CanEditCell(Sender: TObject; ARow,
  ACol: Integer; var CanEdit: Boolean);
begin
  CanEdit := not (ACol in [2,4]);
end;
```

Alternatively, a cell can also be set as readonly with properties. To do this, following code can be used:

Delphi:

```
advstringgrid1.ReadOnly[col,row] := true;
```

C++

```
advstringgrid1->ReadOnly[col][row] = true;
```

### *Example: using the OnGetEditorType event*

This event specifies which inplace editor to use for columns 1-4.

```
procedure TForm1.AdvStringGrid1GetEditorType(Sender: TObject; ACol,
  ARow: Integer; var AEditor: TEditorType);
begin
  case ACol of
    1: AEditor := edNumeric;
    2: AEditor := edComboEdit;
    3: AEditor := edSpinEdit;
    4: AEditor := edRichEdit;
```

```
end;  
end;
```

TEditorType is defined as :

```
TEditorType = (edNormal, edSpinEdit, edComboEdit, edComboList, edEditBtn, edCheckBox,  
edDateEdit, edDateTimeEdit, edDateEditUpDown, edTimeEdit,edButton, edDataCheckBox,  
edNumeric, edPositiveNumeric, edFloat, edCapital, edMixedCase, edPassword, edUnitEditBtn,  
edLowerCase, edUpperCase, edFloatSpinEdit, edTimeSpinEdit, edDateSpinEdit, edNumericEditBtn,  
edFloatEditBtn, edCustom, edRichEdit, edUniEdit, edUniEditBtn, edUniComboEdit, edUniComboList,  
edUniMemo,edValidChars,edCalculatorDropDown, edTrackBarDropDown, edColorPickerDropDown,  
edImagePickerDropDown, edMemoDropDown, edDetailDropDown, edGridDropDown,  
edTimePickerDropDown);
```

With:

edButton	Button
edCapital	Edit with all capitalized text only
edCheckBox	Checkbox
edComboEdit	Editable combobox
edComboList	Non-editable combobox
edCustom	Custom edit control (see advanced topics for editing)
edDataCheckBox	Checkbox with check value dependent on cell text
edDateEdit	Datepicker
edDateEditUpDown	Date edit with up/down buttons
edDateSpinEdit	Date spin edit control
edDateTimeEdit	Date + time edit
edEditBtn	Edit control with button attached
edFloat	Edit allowing floating point data only
edFloatEditBtn	Floating point only edit control with button attached
edFloatSpinEdit	Floating point spin edit control
edLowerCase	Edit with all lowercase entry
edMixedCase	Edit with automatic first capital letter
edNormal	Normal inplace edit
edNumeric	Edit allowing signed numeric data only
edNumericEditBtn	Numeric only edit control with button attached

edPassword	Edit in password style
edPositiveNumeric	Edit allowing unsigned numeric data only
edRichEdit	Rich text editor
edSpinEdit	Spin edit control
edTimeEdit	Time edit
edTimeSpinEdit	Time spin edit control
edUniComboEdit	Unicode editable combobox
edUniComboList	Unicode non editable combobox
edUniEdit	Unicode edit
edUniEditBtn	Unicode edit with button attached
edUniMemo	Unicode multiline edit
edUnitEditBtn	Edit control with unit selection and button attached
edUpperCase	Edit with all uppercase entry
edValidChars	Accept only keys that are part of the value set with property grid.ValidChars:string or also grid.ValidCharSet: TCharSet
edColorPickerDropDown	Color picker with 3 color selection methods: dropdown list of colors, colorcube or color spectrum
edImagePickerDropDown	Image picker inplace edit control
edTimePickerDropDown	Inplace editor with watch in dropdown to select a time value
edTrackbarDropDown	Numeric only edit control with dropdown trackbar to select an integer value
edDetailDropDown	Combobox style inplace editor where each item in the dropdown can have an image and combination of a caption text and notes.
edGridDropDown	Edit control with grid as dropdown. Value is selected from the grid from the lookup column
edMemoDropDown	Edit control with dropdown memo
edCalculatorDropDown	Edit control with dropdown calculator

### Normal editor

With a normal cell edit control, any characters can be entered. If grid.MaxEditLength > 0, then the length of the characters to enter in a cell is limited to grid.MaxEditLength. With grid.MaxEditLength, the string length of a cell is limited only by the length of a string type. The

maximum input length can be set different from different columns using the OnGetEditorType event that is triggered before editing starts, ie:

```
procedure TForm1.AdvStringGrid1GetEditorType(Sender: TObject; ACol,
  ARow: Integer; var AEditor: TEditorType);
begin
  case ACol of
    1: AdvStringGrid1.MaxEditLength := 8;
    2: AdvStringGrid1.MaxEditLength := 16;
    else
      AdvStringGrid1.MaxEditLength := 0;
  end;
end;
```

For column 1, max. length of input is 8 characters, for column 2 it is 16 characters and other columns do not have length limitations.

### Masked editors

TAdvStringGrid inherits the behaviour to be able to work with masked inplace editors from TStringGrid. The edit mask is set through the OnGetEditMask event triggered before editing starts. This allows to set the edit mask for a given cell through the Value parameter.

Example: setting an edit mask for time editing in column 1

```
procedure TForm1.AdvStringGrid1GetEditMask(Sender: TObject; ACol,
  ARow: Integer; var Value: String);
begin
  if (ACol = 1) then
    Value := '!90:00;1;_';
end;
```

### Spin editors

The inplace spin edit control is exposed through the property grid.SpinEdit. This allows access to additional spin edit properties that control its behaviour. The most useful properties are:

property EditorEnabled: Boolean;

When true, the value is only editable by using the spin up & down buttons.

property Increment: LongInt;

Sets the increment step for integer values.

property IncrementFloat: Double;

Sets the increment step for floating point values.

property MaxLength;

Sets the maximum length (in characters) of the value that can be entered.

```
property MaxValue: LongInt;
property MinValue: LongInt;
property MinFloatValue: Double;
property MaxFloatValue: Double;
property MinDateValue: TDateTime;
property MaxDateValue: TDateTime;
```

Sets the minimum & maximum values that can be entered in the various modes.

**Example: setting spin editors with two different ranges in two different columns**

```
procedure TForm1.AdvStringGrid1GetEditorType(Sender: TObject; ACol,
  ARow: Integer; var AEditor: TEditorType);
begin
  case ACol of
    1:begin
      AEditor := edSpinEdit;
      AdvStringGrid1.SpinEdit.MinValue := 1;
      AdvStringGrid1.SpinEdit.MaxValue := 100;
      AdvStringGrid1.SpinEdit.Increment := 2;
    end;
    2:begin
      AEditor := edSpinEdit;
      AdvStringGrid1.SpinEdit.MinValue := 1;
      AdvStringGrid1.SpinEdit.MaxValue := 1000;
      AdvStringGrid1.SpinEdit.Increment := 10;
    end;
  end;
end;
```

The spin edit controls trigger following events when the up/down buttons are clicked:

```
OnSpinClick: TSpinClickEvent;
OnFloatSpinClick: TFloatSpinClickEvent;
OnTimeSpinClick: TDateTimeSpinClickEvent;
OnDateSpinClick: TDateTimeSpinClickEvent;
```

The spin click events return the current value of the spin edit control and whether the up or down button was pressed.

```
TSpinClickEvent = procedure(Sender:TObject;ACol,ARow,
  AValue: Integer; UpDown: Boolean) of object;
```

Note: by default, spin editor up/down buttons are visible when the inplace editor is active, ie. for only one spin editor at a time. If it is desirable that spin editor buttons are continuously visible, this can be enabled by setting : grid.ControlLook.SpinButtonsAlwaysVisible = true.

### Combobox editors

Two types of comboboxes can be used: an editable combobox and not-editable combobox. While the inplace combobox is exposed by `grid.Combobox`, additional methods are defined to control the items displayed in the combobox dropdown list and selected item:

```
procedure ClearComboString;
```

Removes all items from the inplace combobox editor.

```
procedure AddComboString(const s: string);
```

Adds a single item to the inplace combobox editor.

```
procedure AddComboStringObject(const s: string; AObject: TObject);
```

Adds a string + object to the inplace combobox editor.

```
function RemoveComboString(const s: string): Boolean;
```

Removes a single string value from the inplace combobox editor.

```
function SetComboSelectionString(const s: string): Boolean;
```

Sets the selected item of the combobox by string value.

```
procedure SetComboSelection(idx: Integer);
```

Sets the selected item of the combobox by index.

```
function GetComboCount: Integer;
```

Returns the number of items in the combobox.

Through these methods, combobox items can be preset in different ways for different cells.

### *Example: presetting combobox items for different columns*

In this example, an editable combobox is set for column1 with values Berlin,Paris,London,New York and in the second column a non-editable combobox with countries is used. The `OnGetEditorProp` event is used to set the values of the combobox while the `OnGetEditorType` event is used to set the editor type itself:

```
procedure TForm1.gridGetEditorProp(Sender: TObject; ACol,  
    ARow: Integer; AEditLink: TEditLink);  
begin  
    case ACol of  
        1:begin  
            grid.ClearComboString;  
            grid.AddComboString('Berlin');  
            grid.AddComboString('Paris');  
            grid.AddComboString('London');
```

```

        grid.AddComboString('New York');
    end;
2:begin
    grid.ClearComboString;
    grid.AddComboString('Germany');
    grid.AddComboString('France');
    grid.AddComboString('United Kingdom');
    grid.AddComboString('United States');
end;
end;
end;

procedure TForm1.gridGetEditorType(Sender: TObject; ACol,
    ARow: Integer; var AEditor: TEditorType);
begin
    case ACol of
        1: AEditor := edComboEdit;
        2: AEditor := edComboList;
    end;
end;

```

As the grid also exposes the ComboBox inplace editor directly, an alternative approach to specify the combobox items could be:

```

procedure TForm1.gridGetEditorProp(Sender: TObject; ACol,
    ARow: Integer; AEditLink: TEditLink);
begin
    case ACol of
        1: grid.ComboBox.Items.Assign(StringList1);
        2: grid.ComboBox.Items.Assign(StringList2);
    end;
end;

procedure TForm1.gridGetEditorType(Sender: TObject; ACol,
    ARow: Integer; var AEditor: TEditorType);
begin
    case ACol of
        1: AEditor := edComboEdit;
        2: AEditor := edComboList;
    end;
end;

```

with StringList1 and StringList2 two string list objects that hold the items that should be displayed in the combobox when editing respectively column 1 and column 2.

Note that when the combobox inplace editor is displayed for the first time, its selected item is set to the item that matches the content of the cell being edited. If the cell is empty before being edited for the first time, the combobox editor will start with the first item in the list for the type edComboList and it will start with an empty value for the edComboEdit type. To override this behavior and ensure that a specific value is set by default, use the OnGetEditText event that is triggered to query the value used by the inplace editor.

In this sample code, the `OnGetEditText` is used in combination with the `OnGetEditorType` event to ensure that when the combobox editor is started, it is preset to value “Paris” when the cell is empty:

```
procedure TForm1.gridGetEditorProp(Sender: TObject; ACol,
  ARow: Integer; AEditLink: TEditLink);
begin
  grid.ClearComboString;
  grid.AddComboString('Berlin');
  grid.AddComboString('Paris');
  grid.AddComboString('London');
  grid.AddComboString('New York');
end;
end;

procedure TForm1.AdvStringGrid1GetEditorType(Sender: TObject; ACol,
  ARow: Integer; var AEditor: TEditorType);
begin
  AEditor := edComboEdit;
end;

procedure TForm1.AdvStringGrid1GetEditText(Sender: TObject; ACol, ARow:
  Integer;
  var Value: string);
begin
  if Value = '' then
    Value := 'Paris';
end;
```

Something similar can be achieved by using the grid methods `SetComboSelection()` or `SetComboSelectionString()` to set the default selection of the combobox when inplace editing starts. The code that can be used for this is:

```
procedure TForm1.gridGetEditorProp(Sender: TObject; ACol,
  ARow: Integer; AEditLink: TEditLink);
begin
  grid.ClearComboString;
  grid.AddComboString('Berlin');
  grid.AddComboString('Paris');
  grid.AddComboString('London');
  grid.AddComboString('New York');
  grid.SetComboSelectionString('Paris');
end;
end;

procedure TForm1.AdvStringGrid1GetEditorType(Sender: TObject; ACol,
  ARow: Integer; var AEditor: TEditorType);
begin
  AEditor := edComboEdit;
end;
```



The combobox triggers three events:

```
OnComboCloseUp: TClickCellEvent;
```

Event triggered when the combobox dropdown is closed.

```
OnComboChange: TComboChangeEvent;
```

Event triggered when combo selection changes and returning the new selection index and value.

```
OnComboObjectChange: TComboObjectChangeEvent;
```

Event triggered when combo selection changes and returning the new selection index, value and associated object.

For a combobox, it is also possible to control the width of the dropdown list. The width can automatically adapt to the width of the largest text in the list when

grid.Navigation.AutoComboDropSize is set to true or a custom width can be set through the property: grid.ComboBox.DropWidth: integer;

Note that a combobox editor selects a string from the dropdown list and the selected value is stored as a string in the grid cell. In some cases, it is desirable to get the index of the selected combobox item. You can do this using:

```
index := grid.ComboBox.Items.IndexOf(grid.Cells[col,row]);
```

Additional options with using comboboxes:

By default, comboboxes are only visible when the inplace editing has started. In some situations, it might be helpful that the user can see through the dropdown image that a cell has a combobox. With TAdvStringGrid this is possible by using one property and one event handler. To enable the display of comboboxes for any cell that has a combobox inplace editor whether the cell is in edit mode or not, set grid.ControlLook.DropDownAlwaysVisible = true.

Fine control is also present to configure whether a combobox should immediately display its dropdownlist when the editor is activated in a cell. This can be enabled with the property

```
grid.MouseActions.DirectComboDrop = true
```

If a cell with a combobox should automatically stop the editing after a combobox item is selected, this can be enabled by setting grid.MouseActions.DirectComboClose = true. Otherwise, the combobox inplace editor just remains visible after selecting an item and only disappears when a new cell is selected.

### **Edit with button attached**

edEditBtn, edNumericEditBtn, edFloatEditBtn are three types of inplace edit controls with a button attached. This inplace edit control is exposed as grid.BtnEdit. Some additional properties available this way to control the behaviour of this inplace editor are:

```
property EditorEnabled: Boolean;
```

When false, the editor value can only be programmatically changed from the OnEllipsisClick event that is triggered when the button in the edit control is clicked.

```
property Glyph: TBitmap;
```

Sets the glyph that can be used on the inplace editor button.

```
property ButtonCaption: string;
```

Sets the caption that can be used on the inplace editor button.

```
property ButtonWidth: integer;
```

Sets the width of the inplace editor button.

```
property RightAlign: Boolean;
```

When true, the inplace editor is right-aligned.

### ***Example: different edit controls with button***

In this example a left and right aligned edit with button with different button caption are used:

```
procedure TForm1.AdvStringGrid1GetEditorType(Sender: TObject; ACol,
  ARow: Integer; var AEditor: TEditorType);
begin
  case ACol of
    1:begin
      AEditor := edEditBtn;
      grid.BtnEdit.RightAligned := True;
      grid.BtnEdit.EditorEnabled := False;
      grid.BtnEdit.ButtonCaption := '+';
    end;
    2:begin
      AEditor := edComboBox;
      grid.BtnEdit.RightAligned := False;
      grid.BtnEdit.EditorEnabled := True;
      grid.BtnEdit.ButtonCaption := '...';
    end;
  end;
end;
```

When the attached button is pressed, the OnEllipsisClick event is triggered. To set a value from this event, modify the parameter Value. This example uses an InputQuery call to set the value:

```
procedure TForm1.AdvStringGrid1EllipsisClick(Sender: TObject; ACol, ARow:
  Integer;
  var S: string);
begin
  InputQuery('Enter new value', 'Text', S);
```

```
end;
```

```
procedure TForm1.AdvStringGrid1GetEditorType(Sender: TObject; ACol,  
    ARow: Integer; var AEditor: TEditorType);  
begin  
    AEditor := edEditBtn;  
    AdvStringGrid1.BtnEdit.EditorEnabled := false;  
end;
```

### Edit with unit selection and button attached

This special inplace editor to do a split edit of a physical value and a physical unit, is based on the fact that such a value is always written as <value><unit> and that value contains numeric data only, while the unit is a non numeric string or symbol. So, if a cell contains some string like : 100µA the inplace unit editor will automatically allow split editing of value 100 and unit µA.

Only two things are required to get this working. First, you need to specify the inplace editor through the OnGetEditorType event. Secondly, all properties of this inplace editor can be accessed through the grid.BtnUnitEdit property. This BtnUnitEdit has a stringlist property that contains all possible units.

#### *Example: editing currents and currencies unit edit button*

```
procedure TForm1.AdvStringGrid1GetEditorType(Sender: TObject; ACol,  
    ARow: Integer; var AEditor: TEditorType);  
  
begin  
    if (aCol = 1) then  
        begin  
            grid.BtnUnitEdit.Units.Clear;  
            grid.BtnUnitEdit.Units.Add('µA');  
            grid.BtnUnitEdit.Units.Add('mA');  
            grid.BtnUnitEdit.Units.Add('A');  
            AEditor := edUnitEditBtn;  
        end;  
  
    if (aCol = 2) then  
        begin  
            grid.BtnUnitEdit.Units.Clear();  
            grid.BtnUnitEdit.Units.Add('$');  
            grid.BtnUnitEdit.Units.Add('£');  
            grid.BtnUnitEdit.Units.Add('EU');  
            AEditor := edUnitEditBtn;  
        end;  
  
end;
```

### Date picker, time and date + time selection

edDateEdit, edDateEditUpDown and edTimeEdit invoke the standard Windows TDateTimePicker control as inplace editor for date & time editing. This control is exposed as grid.DateTimePicker. Through this control additional properties such as colors for the inplace datepicker can be controlled. If a cell contains both date and time, using edDateTimeEdit allows to edit both the date & time part in the cell with a special purpose editor that has a datepicker & time edit part.

### Dropdown edit controls

For an even more rich user experience, TAdvStringGrid has a set of inplace editors for choosing colors, images, time, edit numbers via a calculator, pick values from a combobox with detail notes per item or pick values from a dropdown grid. This set of inplace editors shares a common structure. The dropdown has a header and footer. Both header and footer can contain HTML formatted informational text about the editor and can feature buttons as well. The settings for the dropdown control header and footer are exposed via grid.ControlLook.DropDownHeader and grid.ControlLook.DropDownFooter. Note that the dropdown header and footer are optional and can be turned off by setting the respective Visible property to false. When the SizeGrid property is set to true on the footer, the dropdown can be resized by dragging from the bottom-right corner. Using the time picker, memo, trackbar and calculator dropdown is straightforward. Just like with all other edit controls, use the OnGetEditorType event and set the editor to the correct editor type. For the color picker and image picker, some more detailed interaction with the grid is available. By default, the color picker will set the cell color to the color chosen and will trigger the event OnColorSelected. If we have added a shape in the cell though, it is just the color of the shape that the color picker will set. To demonstrate this, add following code:

```
procedure TForm2.AdvStringGrid1GetEditorType(Sender: TObject; ACol, ARow:
Integer; var AEditor: TEditorType);
begin
    // set this editor just for cell 1,1
    if (ACol = 1) and (ARow = 1) then
    begin
        AEditor := edColorPickerDropDown;
        // select the colorcube as color selector
        AdvStringGrid1.ColorPickerDropDown.ColorSelectionStyle := csColorCube;
    end;
end;

procedure TForm2.FormCreate(Sender: TObject);
begin
    AdvStringGrid1.Options := AdvStringGrid1.Options + [goEditing];
    AdvStringGrid1.AddShape(1,1,csRectangle, clWhite, clBlack, haBeforeText,
vaCenter);
end;
```

Similar to a color picker, an image picker dropdown can also be used to edit an imagelist image set in a cell. By default, it will just trigger the OnImageSelected event when editing is done, but when a cell has an imagelist image, it will also automatically update this image. Again, with very little code this can be achieved. Drop an ImageList on the form and assign it to grid.GridImages and add the code:

```
procedure TForm2.AdvStringGrid1GetEditorType(Sender: TObject; ACol, ARow:
Integer; var AEditor: TEditorType);
begin
    if (ACol = 1) and (ARow = 1) then
    begin
        AEditor := edImagePickerDropDown;
        // will automatically load all images from the imagelist in the image
picker
        AdvStringGrid1.ImagePickerDropDown.AddImagesFromImageList;
        // forces the imagepicker to display images in 2 columns
    end;
end;
```

```

        AdvStringGrid1.ImagePickerDropDown.Columns := 2;
    end;
end;

procedure TForm2.FormCreate(Sender: TObject);
begin
    AdvStringGrid1.Options := AdvStringGrid1.Options + [goEditing];
    AdvStringGrid1.AddDataImage(1,1,0,haBeforeText, vaCenter);
end;

```

The detail picker dropdown can be considered as a combobox with an optional extra image per item and additional notes text for each item. Its use is straightforward and becomes clear with following code:

```

procedure TForm2.AdvStringGrid1GetEditorType(Sender: TObject; ACol,
    ARow: Integer; var AEditor: TEditorType);
begin
    AEditor := edDetailDropDown;
end;

procedure TForm2.FormCreate(Sender: TObject);
var
    di: TDetailItem;
begin
    AdvStringGrid1.DetailPickerDropDown.Images := ImageList1;
    AdvStringGrid1.DetailPickerDropDown.ItemHeight := 40;

    AdvStringGrid1.DetailPickerDropDown.Items.Clear;
    di := AdvStringGrid1.DetailPickerDropDown.Items.Add;

    di.ImageIndex := 0;
    di.Caption := 'Delphi';
    di.Notes := 'Most productive IDE for Win32 development';

    di := AdvStringGrid1.DetailPickerDropDown.Items.Add;
    di.ImageIndex := 1;
    di.Caption := 'Delphi Prism';
    di.Notes := 'Take your Pascal skills to .NET';

    di := AdvStringGrid1.DetailPickerDropDown.Items.Add;
    di.ImageIndex := 2;
    di.Caption := 'Delphi PHP';
    di.Notes := 'RAD development for PHP';
end;

```

Finally it is possible to have a grid as inplace editor. The value that will be displayed in the cell is the value from the column in the grid on the selected row that is set as lookup column with property GridDropDown.LookupColumn. To set the properties for each column in the grid, the grid.Columns collection is available. Via this column of type TDropDownColumn, it can be defined whether a column contains text or an imagelist image. The items in the grid can be added via grid.Items which is a collection of TDropDownItem objects. How everything falls into place is made clear with the sample code to initialize a dropdown grid:

```
var
    dc: TDropDownColumn;
    di: TDropDownItem;
begin
    AdvStringGrid1.GridDropDown.Images := ImageList1;
    dc := AdvStringGrid1.GridDropDown.Columns.Add;
    dc.Header := '';
    dc.ColumnType := ctImage;
    dc.Width := 30;

    dc := AdvStringGrid1.GridDropDown.Columns.Add;
    dc.Header := 'Brand';
    dc.ColumnType := ctText;
    dc := AdvStringGrid1.GridDropDown.Columns.Add;
    dc.Header := 'Type';
    dc.ColumnType := ctText;

    di := AdvStringGrid1.GridDropDown.Items.Add;
    di.ImageIndex := 0;
    di.Text.Add('');
    di.Text.Add('BMW');
    di.Text.Add('7 series');

    di := AdvStringGrid1.GridDropDown.Items.Add;
    di.ImageIndex := 1;
    di.Text.Add('');
    di.Text.Add('Mercedes');
    di.Text.Add('S class');

    di := AdvStringGrid1.GridDropDown.Items.Add;
    di.ImageIndex := 2;
    di.Text.Add('');
    di.Text.Add('Porsche');
    di.Text.Add('911');

    di := AdvStringGrid1.GridDropDown.Items.Add;
    di.ImageIndex := 3;
    di.Text.Add('');
    di.Text.Add('Audi');
    di.Text.Add('A8');

    AdvStringGrid1.GridDropDown.LookupColumn := 1;
end;
```

### **Edit controls with lookup and auto history**

The normal inplace edit and comboboxes have the capability to do lookup on predefined values and as such perform auto completion while typing. This feature is enabled by setting grid.Lookup to True. The values to lookup for are set in the stringlist LookupItems. Auto completion can be case sensitive or not and this is controlled by grid.LookupCaseSensitive. With LookupHistory set True, the lookup item list automatically grows with items typed in the grid that are not yet in the LookupItems list.

## *Example: Using lookup for inplace editors*

This code initializes the built-in lookup with some predefined value:

```
begin
  with AdvStringGrid1 do
    begin
      Options := Options + [goEditing];
      LookupItems.Clear;
      LookupItems.Add('BMW');
      LookupItems.Add('Mercedes');
      LookupItems.Add('Audi');
      LookupItems.Add('Porsche');
      LookupItems.Add('Ferrari');
      Lookup := true;
    end;
  end;
```

Typing 'M' in a cell, results in automatic lookup to 'Mercedes'



## Direct access to inplace editors

All inplace editors can also be directly accessed. This allows controlling additional inplace editor properties that might not be exposed by the grid. The inplace editors are exposed as public properties and listed here:

- Grid.NormalEdit: normal basic inplace edit control
- Grid.SpinEdit: inplace spin edit control
- Grid.BtnEdit: inplace edit with embedded button
- Grid.BtnUnitEdit: inplace edit with embedded unit selection and button
- Grid.ComboBox: inplace combobox
- Grid.DateTimePicker: inplace datetimepicker
- Grid.InplaceRichEdit: inplace rich editor
- Grid.UniEdit: inplace Unicode editor
- Grid.UniEditBtn: inplace Unicode editor with button attached
- Grid.UniCombo: inplace Unicode combobox
- Grid.UniMemo: inplace Unicode memo
- Grid.ColorPickerDropDown: color picker inplace editor
- Grid.CalculatorDropDown: calculator inplace editor
- Grid.GridDropDown: grid inplace editor
- Grid.DetailDropDown: detail list inplace editor
- Grid.MemoDropDown: dropdown memo control inplace editor
- Grid.TrackBarDropDown: trackbar dropdown inplace editor
- Grid.TimePickerDropDown: time picker inplace editor
- Grid.ImagePickerDropDown: image picker inplace editor

Note: the NormalEdit inplace editor is only created upon need for the first inplace edit. This means that the property Grid.NormalEdit it is not assigned as long as no inplace editing is started.

### Advanced topic: rich text inplace editor

With a minimum effort, TAdvStringGrid allows rich text inplace editing. Only 2 event handlers and one property open the way to rich text editing in every cell or selected cells of TAdvStringGrid.

#### *Specifying the rich text editing*

As with all editor types, rich text inplace editing for a cell is set with the OnGetEditorType event. For the cells that need to be edited with an inplace rich text editor, just specify the edRichEdit as inplace editor :

```
procedure TForm1.GridGetEditorType(Sender:TObject; ACol, ARow: Integer; var
AEditor: TEditorType);
begin
    AEditor := edRichEdit
end;
```

#### *Rich Text formatting in inplace rich text editor*

TAdvStringGrid exposes its rich text inplace editor through the property Grid.InplaceRichEdit. Through this property the selection attributes of the inplace editor can be set just as if it was a normal standalone richedit control. The button that sets the font bold style therefore is implemented in the following way:

```
procedure TForm1.BoldBtnClick(Sender: TObject);
begin
    if Grid.InplaceRichEdit.Visible then
        if fsBold in Grid.InplaceRichEdit.SelAttributes.Style then
            Grid.InplaceRichEdit.SelAttributes.Style :=
Grid.InplaceRichEdit.SelAttributes.Style - [fsBold]
        else
            Grid.InplaceRichEdit.SelAttributes.Style :=
Grid.InplaceRichEdit.SelAttributes.Style + [fsBold];
end;
```

Other settings are done in a similar way.

#### *Updating toolbar settings from the inplace rich text editor*

An event is used to let toolbar settings for selected characters in the rich text editor reflect the current selected style such as fontstyle, fontname etc.. This event OnRichEditSelectionChange is triggered whenever the user changes the selection in the inplace rich editor. In this event, the toolbar button style can then set to reflect the setting of the selected text.

For example, the BoldBtn style is set in this event handler in the following way:

```
procedure TForm1.GridInplaceRichEditSelectionChange(Sender:TObject);
begin
    BoldBtn.Down := fsBold in Grid.InplaceRichEdit.SelAttributes.Style;
end;
```



### *Special focus considerations*

Normally, whenever another control gains focus, the TAdvStringGrid inplace editor is hidden and the inplace editor text is set in the grid's cell. However, with rich text inplace editing this behaviour is not wanted. If the inplace editor would be hidden, the selection would disappear and no longer available to apply changes such as font changes. Therefore, for a rich text inplace editor the editor remains visible even when another control on the form gains focus. Some controls, such as a font selection combobox can then be used to set the selected font name. However, for other control that perform something like a grid print or preview, the rich text inplace editor should be hidden and the cell contents should be updated before doing the print. This can be done with the grid.HideInplaceEdit method.

### **Example: changing fontname through fontname combobox:**

```
procedure TForm1.FontNameChange(Sender:TObject);
begin
    if Grid.InplaceRichEdit.Visible then
        Grid.InplaceRichEdit.SelAttributes.Name :=
Fontname.Items[Fontname.ItemIndex];
end;
```

For the print button this is:

```
procedure TForm1.PrintBtnClick(Sender:TObject);
begin
    grid.HideInplaceEdit;
    grid.Print;
end;
```

### **Advanced topic: custom inplace editors**

TAdvStringGrid allows using other inplace editors than those built-in. This is achieved through a component TEditLink which takes care of the communication of your edit control and the grid. In order to use another inplace editor, it is sufficient to write an EditLink descendant with some methods that do the specific communication with the edit control. The only requirement is that the edit control is descendant from TWinControl which should not be a problem since almost all are.

In depth look at the TEditLink component:

```
TEditLink = class(TComponent)
public
    constructor Create(aOwner:TComponent); override;
    destructor Destroy; override;
    procedure EditKeyDown(Sender: TObject; var Key: Word; Shift:
TShiftState);
    property EditCell:TPoint;
    property Grid:TAdvStringGrid;
    procedure HideEditor;
    function GetCellValue:string;
    procedure SetCellValue(s:string);
    procedure CreateEditor(aParent:TWinControl); virtual;
    procedure DestroyEditor; virtual;
    procedure SetFocus(value:boolean); virtual;
    procedure SetRect(r:trect); virtual;
    procedure SetVisible(value:boolean); virtual;
```

```

procedure SetProperties; virtual;
function GetEditControl:TWinControl; virtual;
function GetEditorValue:string; virtual;
procedure SetEditorValue(s:string); virtual;
published
property EditStyle:TEditStyle;
property PopupWidth:integer;
property PopupHeight:integer;
property WantKeyLeftRight:boolean;
property WantKeyUpDown:boolean;
property WantKeyHomeEnd:boolean;
property WantKeyPriorNext:boolean;
property WantKeyReturn:boolean;
property WantKeyEscape:boolean;
property Tag:integer;
end;

```

The EditLink presents a series of virtual methods, properties and helper functions that can be used to communicate with the edit control. You can override these virtual methods where the default behaviour of the TEditLink must be changed. Below is a discussion of each of these virtual methods :

```

procedure CreateEditor(aParent:TWinControl);

```

Override this method to create an instance of your edit control. Assign the aParent parameter to its Parent property. In this stage, the edit control should still be invisible. **It is necessary to override this method.**

```

procedure DestroyEditor;

```

Override this method to free the instance of your inplace editor after editing. **It is necessary to override this method.**

```

procedure SetFocus(value:boolean);

```

Override this method only if a special action is required at the time your edit control receives or loses focus. Overriding this method is normally not required.

```

procedure SetRect(r:trect);

```

With this method the coordinates and size is set for the inplace edit control to fit in the cell where inplace editing happens. An override of this method should only be necessary when your inplace edit control does not fit into the cell itself, like for example a combobox that drops out of the cell. In this case, you can just set the height of the edit control in the SetRect method.

```

procedure SetVisible(value:boolean);

```

Override this method only if a special action is required at the time your edit control is made visible or is hidden again. Overriding this method is normally not required.

```

procedure SetProperties(value:boolean);

```

Override this method if properties of the edit control must be set after it is visible. Some edit control properties only work properly when set when the edit control is visible. In this case, the SetProperties method is the ideal place.

```

function GetEditControl:TWinControl;

```

Override this method to return your edit control as TWinControl. Your edit control should be descendant of TWinControl so you can cast it to a TWinControl. For example :

result:=TWinControl(myEdit); **It is necessary to override this method.**

**function** GetEditorValue:string;

Override this function to return the value of your edit control as a string to put into the cell after editing. **It is necessary to override this method.**

**procedure** SetEditorValue(s:string);

Override this method to set the value of your edit control from the current cell value before editing. **It is necessary to override this method.**

Further, there are some helper functions:

**procedure** HideEditor;

Hides the inplace edit control. This method should be called when your edit control loses focus. It is typically called from your edit control OnExit event.

**procedure** EditKeyDown;

Default key handler for special keys that are used inside the grid, such as arrow keys, return key etc..

**function** GetCellValue:string;

Retrieves the cell value of the cell being edited. Normally this is not used, but done through the SetEditorValue method.

**procedure** SetCellValue(s:string);

Sets the cell value of the cell being edited. Normally this is not used, but done through the GetEditorValue method.

The EditLink properties are:

**property** EditStyle:TEditStyle;

Determines if your edit control is esInplace or esPopup style. Specify esPopup style only for inplace edit control that can fully overlap the grid, for example when using a TMemo that could hang out of the grid during editing. All other edit control, including a combobox should be declared as esInplace since their main editing part stays inside the grid's cell.

**property** PopupWidth:integer;

Defines the width of the overlapping edit control in esPopup style.

**property** PopupHeight:integer;

Defines the height of the overlapping edit control in esPopup style.

**property** PopupLeft: integer;

Defines the left position of the popup edit control. By default when zero this is automatically positioned under the cell being edited.

**property** PopupTop: integer;

Defines the top position of the popup edit control. By default when zero this is automatically

positioned under the cell being edited.

```
property WantKeyXXXX:boolean;
```

Defines if the edit control handles the key itself or the grid's default key handler should handle the key. For multiline inplace editors for example, it might be necessary to let your edit control handle the return key itself instead of the grid.

```
property Tag:integer;
```

Property that can be used to further identify your EditLink descendant.

```
property Grid:TAdvStringGrid;
```

Returns the grid being edited.

```
property EditCell:TPoint;
```

Returns the coordinates of the cell being edited.

#### *Using the TEditLink with TAdvStringGrid*

After the TEditLink descendant has been written to communicate with your edit control, it is necessary to tell TAdvStringGrid to use this EditLink component and thus also your edit control. To achieve this, the TAdvStringGrid's EditLink property is used with the OnGetEditorType event. In the OnGetEditorType event, the inplace editor is defined as edCustom and either globally or in this event, the EditLink property of TAdvStringGrid can be set to your descendant TEditLink. Of course, when the grid's EditLink property is set globally, only one custom inplace editor type can be used, but when it is set from the OnGetEditorType event, nothing prevents you from writing multiple TEditLink descendant components and assign them dependent on which cells you want to edit in the grid. As such, a typical OnGetEditorType event could look like :

```
procedure TForm1.AdvStringGrid1GetEditorType(Sender: TObject; aCol,
  aRow: Integer; var aEditor: TEditorType);
begin
  case aCol of
    2: advstringgrid1.EditLink := EditLink1;
    3: advstringgrid1.EditLink := EditLink2;
    4: advstringgrid1.EditLink := EditLink3;
    5: advstringgrid1.EditLink := EditLink4;
    6: advstringgrid1.EditLink := EditLink5;
  end;

  if aCol in [2,3,4,5,6] then
    aEditor := edCustom;
end;
```

Here, 5 different EditLink types have been used to use a different inplace editor for 5 different columns. As your edit control will not have been constructed yet in the OnGetEditorType event, this is not a good place to specify properties of your edit control dependent of the position of the edit control in the grid. Although this is usually not necessary, it can be interesting for example to change your edit control's color or font depending on the color or font of the cell being edited. This can be achieved in the OnGetEditorProp event which is called after your edit control has been constructed with help of the EditLink specified. In the example below, a TAdvEdit control is used as inplace editor and the focus color is adapted to the banding color used in the grid:

```
procedure TForm1.AdvStringGrid1GetEditorProp(Sender: TObject; aCol, aRow:
  Integer; aEditLink: TEditLink);
```

```
begin
  if Assigned(aEditLink) then
    begin
      if acol = 2 then
        begin
          if odd(arrow) then
            (aEditLink.GetEditControl as TAdvEdit).FocusColor:=clInfoBk
          else
            (aEditLink.GetEditControl as TAdvEdit).FocusColor:=clWhite;
          end;
        end;
      end;
    end;
end;
```

Example: TEditLink to use TAdvEdit in TAdvStringGrid (minimal implementation)

```
type
TAdvEditEditLink = class(TEditLink)
private
  FEdit:TAdvEdit;
protected
  procedure EditExit(Sender:TObject);
public
  procedure CreateEditor(aParent:TWinControl); override;
  procedure DestroyEditor; override;
  function GetEditorValue:string; override;
  procedure SetEditorValue(s:string); override;
  function GetEditControl:TWinControl; override;
end;
```

To link TAdvEdit with TAdvStringGrid, only a minimum set of TEditLink methods are used :

In the CreateEditor method, the TAdvEdit instance is created, its parent is set, the OnKeyDown event is assigned to the default EditKeyDown handler, size is set to 0 to make sure it is always invisible, some properties like ModifiedColor, ShowModified and BorderStyle are set. Finally, since TAdvEdit should handle the Left, Right arrow keys as well as Home & End keys, the properties WantKeyLeftRight and WantKeyHomeEnd are set accordingly :

```
{ TAdvEditEditLink }

procedure TAdvEditEditLink.CreateEditor(AParent:TWinControl);
begin
  FEdit := TAdvEdit.Create(Grid);
  FEdit.BorderStyle := bsNone;
  FEdit.OnKeyDown := EditKeyDown;
  FEdit.OnExit := EditExit;
  FEdit.Width := 0;
  FEdit.Height := 0;
  FEdit.Parent := AParent;
  WantKeyLeftRight := True;
  WantKeyHomeEnd := True;
end;
```

The DestroyEditor simply frees the instance of the inplace editor:

```
procedure TAdvEditEditLink.DestroyEditor;
begin
  if Assigned(FEdit) then
    FEdit.Free;
  FEdit := nil;
end;
```

```
end;
```

Since the TAdvEdit component works with strings as well to edit, the GetEditorValue and SetEditorValue methods are simply setting and getting the cell contents to and from the TAdvEdit component's Text property:

```
function TAdvEditEditLink.GetEditorValue:string;
begin
    Result := FEdit.Text;
end;

procedure TAdvEditEditLink.SetEditorValue(s: string);
begin
    FEdit.Text := s;
end;
```

In order to hide the editor when it loses focus, the EditExit procedure for the OnExit event, calls the HideEditor method :

```
procedure TAdvEditEditLink.EditExit(Sender: TObject);
begin
    HideEditor;
end;
```

Finally, much of the magic behind the TEditLink works because TAdvStringGrid treats the inplace editor as a TWinControl descendant, and therefore the grid must be able to obtain it as such with the GetEditControl method :

```
function TAdvEditEditLink.GetEditControl: TWinControl;
begin
    Result := FEdit;
end;
```

#### *Making more edit control properties available at design time*

This was the minimal implementation of the TEditLink that uses the TAdvEdit component with its default properties. To make the TAdvEdit properties accessible at design time, the TAdvEdit properties can be added to the TEditLink component and transferred from the TEditLink component to the TAdvEdit component in the SetProperties method. In the TAdvEditEditLink component provided this is done in following way:

```
TAdvEditEditLink = class(TEditLink)
public
    procedure SetProperties; override;
published
    property EditAlign:TEditAlign read FEditAlign write FEditAlign;
    property EditColor:TColor read FEditColor write FEditColor;
    property ModifiedColor:TColor read FModifiedColor write FModifiedColor;
    property EditType:TAdvEditType read FEditType write FEditType;
    property Prefix:string read FPrefix write FPrefix;
    property ShowModified:boolean read FShowModified write FShowModified;
    property Suffix:string read FSuffix write FSuffix;
    property Precision:integer read FPrecision write FPrecision;
end;
```

The set of properties that is exposed with the TEditLink is used for TAdvEdit in the SetProperties method :

```
procedure TAdvEditEditLink.SetProperties;  
begin  
    inherited;  
    FEdit.Color := FEditColor;  
    FEdit.FocusColor := FEditColor;  
    FEdit.EditAlign := FEditAlign;  
    FEdit.ModifiedColor := FModifiedColor;  
    FEdit.Prefix := FPrefix;  
    FEdit.Suffix := FSuffix;  
    FEdit.ShowModified := FShowModified;  
    FEdit.Precision := FPrecision;  
end;
```

### Using the TFormControlEditLink class

An easier way to use a custom TWinControl descendent component as inplace editor is by using the TFormControlEditLink class. To start using this component, drop a TFormControlEditLink on the form and the edit control you want to use as inplace editor. Assign the control to TFormControlEditLink.Control. Implement the grid's OnGetEditorType event as:

```
procedure TForm1.AdvStringGrid1GetEditorType(Sender: TObject; ACol,  
    ARow: Integer; var AEditor: TEditorType);  
begin  
    case ACol of  
        1: begin  
            AEditor := edCustom;  
            AdvStringGrid1.EditLink := FormControlEditLink1;  
        end;  
    end;  
end;
```

From now, starting editing in the grid will show the control as inplace editor and leaving focus hides this inplace editor. Only thing left is to implement two events for TFormControlEditLink that will transfer the value of the control to the grid and vice versa. In this example, this is achieved with:

```
procedure TForm1.FormControlEditLink1GetEditorValue(Sender: TObject;  
    Grid: TAdvStringGrid; var AValue: string);  
begin  
    AValue := MyControl.Text;  
end;  
  
procedure TForm1.FormControlEditLink1SetEditorValue(Sender: TObject;  
    Grid: TAdvStringGrid; AValue: string);  
begin  
    MyControl.Text := AValue;  
end;
```

### Validating editing

An important part of editing is its validation. While the grid includes many capabilities to force that only desired values can be entered, in many cases an extra validation is required. TAdvStringGrid triggers the event OnCellValidate when editing in a cell ends. The event can be triggered in all cases the editing of a cell ends or only when the editing ends with the value of the cell effectively

changed. This can be chosen with the public property `grid.AlwaysValidate: Boolean`. By default, `grid.AlwaysValidate` is set to `False`. Through the parameters `Value: string` and `Valid: Boolean`, it can be returned whether the edited value is valid or not and the value can be optionally automatically restored or auto-corrected.

In this sample, the `OnCellValidate` event is used to force entering a value with a length of minimum 3 characters and maximum 5 characters. When the entry is incorrect, the original cell value is restored:

```
procedure TForm1.AdvStringGrid1CellValidate(Sender: TObject; ACol,
  ARow: Integer; var Value: string; var Valid: Boolean);
begin
  valid := (length(value) >= 3) and (length(value) <= 5);
  if not valid then
    Value := AdvStringGrid1.OriginalCellValue;
end;
```

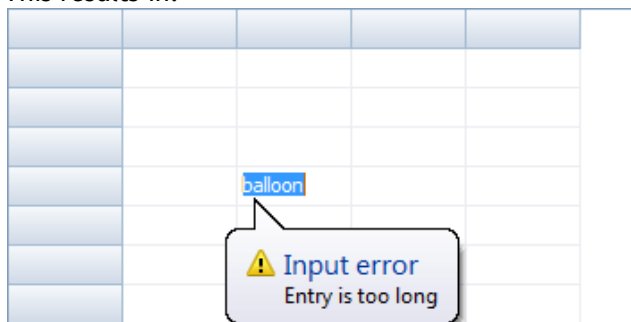
The grid provides a mechanism to notify the user of the reason the entry is not valid by showing a balloon.

When the `Valid` parameter of the `OnCellValidate` event is set to `false` the balloon will show when `grid.InvalidEntryTitle`, `grid.InvalidEntryText` are a non empty text. Additionally, the icon can be set via `grid.InvalidEntryIcon`. The `OnCellValidate` event handler here shows how a different balloon invalid entry text is set when the length of the input is smaller than 3 or larger than 5:

```
procedure TForm2.AdvStringGrid1CellValidate(Sender: TObject; ACol,
  ARow: Integer; var Value: string; var Valid: Boolean);
begin
  if length(value) < 3 then
  begin
    Advstringgrid1.InvalidEntryTitle := 'Input error';
    Advstringgrid1.InvalidEntryText := 'Entry not sufficiently long';
    Valid := false;
  end;

  if length(value) > 5 then
  begin
    Advstringgrid1.InvalidEntryTitle := 'Input error';
    Advstringgrid1.InvalidEntryText := 'Entry is too long';
    Valid := false;
  end;
end;
```

This results in:





Note 1: in order to display balloons in the grid, it is required to set `grid.Balloon.Enable = true`.

Note 2: when reparenting the grid, it is required to set `grid.Balloon.Enable = false` before changing the parent programmatically and set `grid.Balloon.Enable = true` again after the new parent is set.

Further balloon settings are available under `grid.Balloon` and discussed in the paragraph about adding balloons to the grid.

## TAdvStringGrid mouse and navigation control

Extensive control is available for controlling navigation with keyboard and mouse in the grid and control of automatic key triggered actions such as clipboard handling. These settings are available through the grid.Navigation and grid.MouseActions properties.

**Navigation properties**

AdvanceAuto: Boolean;	When true, editing with masked inplace edit automatically advances to the next cell when the mask has been completed.
AdvanceAutoEdit: Boolean;	When true, after pressing return to advance the inplace editor to the next cell, this cell is automatically put into editing mode.
AdvanceDirection: TAdvanceDirection;	Sets the directorion of the auto advance upon pressing Enter or Return to either adTopLeft or adLeftRight.
AdvanceInsert: Boolean;	When true, pressing enter on the last cell of the last row automatically inserts a new row
AdvanceOnEnter: Boolean;	When true, pressing Return or Enter automatically advances to the next cell. The direction of the auto advance is controlled by the AdvanceDirection property
AllowClipboardAlways: Boolean;	Allows clipboard actions irrespective of cells being read-only
AllowClipboardColGrow: Boolean;	When true, the number of columns in the grid can grow if more columns are pasted than already present in the grid
AllowClipboardRowGrow: Boolean;	When true, the number of rows in the grid can grow if more rows are pasted than already present in the grid
AllowClipboardShortCuts: Boolean;	When true, pressingCtrl-Ins, Shift-Ins, Shift-Del, Ctrl-X, Ctrl-V, Ctrl-C automatically triggers the clipboard handling. Unless AllowClipboardAlways is set true, clipboard actions are only applied on editable cells.
AllowCtrlEnter: Boolean;	When true, pressing Ctrl-Enter will add a line break in an inplace editor.
AllowDeleteRow: Boolean;	When true, pressing the Del key removes a row. The OnAutoDeleteRow event is triggered.
AllowFmtClipboard: Boolean;	Allows copy and paste of both cell text and cell properties in TAdvStringGrid or between multiple

	TAdvStringGrid controls.
AllowInsertRow: Boolean;	When true, pressing the Ins key inserts a new row. The OnAutoInsertRow event is triggered. The position of the inserted row is controlled by the InsertPosition property.
AllowRTFClipboard: Boolean;	Allows copy and paste of rich text in the grid
AllowSmartClipboard: Boolean;	When true, pasting automatically completes ranges in selected cells. If for example 2 cells are copied on the clipboard with values '1' and '2', pasting this in 10 cells will paste as '1','2','3'...'10'
AlwaysEdit: Boolean;	When true, the inplace editor is always visible. When this behaviour is wanted, this needs to be set true instead of the TStringGrid goAlwaysShowEditor in grid.Options
AppendOnArrowDown: Boolean;	When true, pressing the down arrow on the last row of the grid will automatically insert a new row.
AutoComboDropSize: Boolean;	When true, the combobox dropdown size automatically adapts to the largest string in the combobox
AutoGotoIncremental: Boolean;	Can be used combined with AutoGotoWhenSorted where the lookup for text is incremental, i.e. the search refines with each character typed.
AutoGotoWhenSorted: Boolean;	When true, typing a character automatically moves the current cell to the first cell that starts with character typed. This applies for pressing characters in sorted columns only.
ClipboardPasteAction: TClipboardPasteAction;	Value can be set to paReplace or paInsert. When ClipboardPasteAction is paReplace, cells are replaced from the top left corner with pasted cell values. When ClipboardPasteAction is paInsert, cells are inserted in the grid from the top, left selected cell.
CopyHTMLTagsToClipboard: Boolean;	When true, HTML tags are also copied on the clipboard
CursorWalkAlwaysEdit: Boolean;	Controls whether the inplace editor of the next cell after pressing left / right is automatically put in edit mode or not
CursorWalkEditor: Boolean;	When true, pressing cursor left key if caret is on first character position moves to previous cell, pressing cursor right key when caret is on last

	character position moves to the next cell
EditSelectAll: Boolean;	When true, all text is selected when the inplace editor starts. Otherwise, no text is selected and the caret is after the last character position.
HomeEndKey: THomeEndAction;	Defines the behaviour of Home and End key as either going to top/bottom row or left rightmost column
ImproveMaskSel: Boolean;	Automatically positions entry on first editable character of the mask edit instead of selecting the full mask
InsertPosition: TInsertPosition;	Determines if a row is inserted before or after the current row when Ins is pressed and AllowInsertRow is True
KeepHorizScroll: Boolean;	When true, navigating up or down in the grid with a horizontally scrolled grid keeps this horizontal scroll instead of scrolling back to leftmost position
KeepScrollOnSort: Boolean;	When true, the horizontal scroll position is not changed when the grid is sorted by clicking on a column header. When false, the horizontal scroll position is reset to the leftmost position.
LeftRightRowSelect: Boolean;	When true, the default behaviour applies and if row selection is enabled, pressing left/right arrow keys change the selected row. When false, left/right arrow keys change the horizontal scroll
LineFeedOnEnter: Boolean;	When true, pressing Ctrl-Enter adds a linefeed in the cell instead of stopping the inplace edit
MoveRowOnSort: Boolean;	When true, the current selected row remains in focus after sort
MoveScrollOnly: Boolean;	When true, only the scroll position in the grid changes when pressing keys Up,Down,Next,Prior,Home,End. When false, it is the selection that changes in the grid for these keys.
SkipFixedCells: Boolean;	When true, using the arrow keys to move the selected cell will let the selection jump over fixed (non-selectable) cells in the grid.
TabAdvanceDirection: TAdvanceDirection;	Sets the directorion of the auto advance upon pressing Tab to either adTopLeft or adLeftRight. Note that goTabs must be set true in grid.Options to allow tab keys in the grid.

TabToNextAtEnd: Boolean;	When true and goTabs is set True in grid.Options, after tabbing inside the grid to the last cell, the focus moves to the next control
--------------------------	---

### MouseActions properties

AllColumnSize: Boolean;	When true, resizing one column resizes all columns proportionally. Note that goColSizing needs to be set to True in grid.Options for this
AllRowSize: Boolean;	When true, resizing one row resizes all rows proportionally. Note that goRowSizing needs to be set to True in grid.Options for this
AllSelect: Boolean;	When true, all cells can be selected by clicking in the topleft fixed cell
AutoSizeColOnDbClick: Boolean;	When true, a double click on the column edge will autosize the column to the text width.
CaretPositioning: Boolean;	When true, clicking a cell to start inplace editing automatically positions the caret on the position where the mouse click happened to start editing
CheckAllCheck: Boolean;	When true, a checkbox click in the top fixed row will automatically set all checkboxes in the column below to the same setting as the top checkbox.
ColSelect: Boolean;	When true, a full column can be selected by clicking a column header cell
DirectComboClose: Boolean;	When true, the combobox inplace editing automatically ends when its dropdown is closed.
DirectComboDrop: Boolean;	When true, clicking on a cell with combobox inplace editor immediately causes a dropdown of the combobox
DirectDateClose: Boolean;	When true, the datepicker inplace editing automatically ends when its dropdown calendar is closed.
DirectDateDrop: Boolean;	When true, clicking on a cell with datepicker inplace editor immediately causes a dropdown of the calendar.
DirectEdit: Boolean;	When true, clicking a cell immediately starts editing instead of first selecting the cell and entering edit mode after another mouse click.
DisjunctCellSelect: Boolean;	When true, allows selection of disjunct cells through Ctrl + left mouse click. The list of disjunct selected cells can be obtained with the SelectedCell[Index:

	Integer]: TGridCoord property where SelectedCellCount is returning the number of selected cells.
DisjunctColSelect: Boolean;	When true, allows selection of disjunct columns through Ctrl + left mouse click. The selectionstate of columns can be obtained through grid.ColSelect[ARow: Integer]: Boolean
DisjunctRowSelect: Boolean;	When true, allows selection of disjunct rows through Ctrl + left mouse click. The selectionstate of rows can be obtained through grid.RowSelect[ARow: Integer]: Boolean
DisjunctRowSelectNoCtrl: Boolean;	When true and combined with DisjunctRowSelect = true, disjunct row selection is possible without keeping the Ctrl key down.
EditOnDblClickOnly: Boolean;	When true, the inplace editing is only started when double clicking on a cell. Otherwise, the editing is started by default upon a single click in a selected cell.
FixedColsEdit: TGridFixedCellEdit;	Selects the type of editor for the fixed column
FixedRowsEdit: TGridFixedCellEdit;	Selects the type of editor for the fixed row
HotmailRowSelect: Boolean;	When true, row selection can be done through clicks on the checkbox in the first fixed column.
MoveRowOnNodeClick: Boolean;	When true, clicking on a node also moves the selected cell or row to the row where the node is positioned.
NoAutoRangeScroll: Boolean;	When true, scrolling range selection is not automatically started when clicking a half visible cell at bottom or right side of the grid
NodeAllExpandContract: Boolean;	When true, a node in the top fixed row will expand or collaps all nodes in the column below the fixed cell.
NoScrollOnPartialRow: Boolean;	When true, the grid is not automatically scroll to bring a partially visible row in view that is clicked.
PreciseCheckBoxCheck: Boolean;	When true, a checkbox will only toggle when the mouse is over the checkbox, otherwise the checkbox will toggle for a click anywhere in the cell.
RangeSelectAndEdit: Boolean;	When true, range selection and editing style (goRangeSelect and goEditing in grid.Options) can be combined

RowSelect: Boolean;	When true, a full row can be selected by clicking a row header cell
RowSelectPersistent: Boolean;	When true, in a grid with disjunct selected rows with nodes, the selection of rows is persisted when nodes collapse or expand.
SelectOnRightClick: Boolean;	When true, the mouse right-click button operates just like the left button to select a cell
SizeFixedCol: Boolean;	Allows sizing with mouse of the first fixed column(s) which otherwise cannot be sized when goColSizing is True in grid.Options
SizeFixedRow: Boolean;	Allows sizing with mouse of the first fixed row(s) which otherwise cannot be sized when goRowSizing is True in grid.Options
WheelAction: TWheelAction	Selects whether a mouse wheel move will scroll the grid or move the selection in the grid.
WheelIncrement: integer	Selects the number of rows to move for a mouse wheel movement. When zero, the default number as configured in Windows is used.

## TAdvStringGrid cell and cell properties access

Various properties enable handling cell data. The most simple way is to use the `grid.Cells[ACol,ARow]`: string property. In addition TAdvStringGrid provides:

<code>grid.AllCells[ACol,ARow]: string;</code>	Access the grid cell as string irrespective of hidden columns or rows. <code>grid.AllCells</code> returns the cell as displayed, ie. after possible processing of the real cell text by the event <code>OnGetDisplText</code>
<code>grid.AllFloats[ACol,ARow]: Double;</code>	Access the grid cell as float irrespective of hidden columns or rows
<code>grid.AllGridCells[ACol,ARow]: string;</code>	Access the grid cell as string irrespective of hidden columns or rows. <code>grid.AllGridCells</code> returns the cell as stored, ie. before possible processing by the event <code>OnGetDisplText</code>
<code>grid.AllObjects[ACol,ARow]: TObject;</code>	Access the <code>TObject</code> that can be associated with each cell irrespective of hidden columns or rows
<code>grid.AllWideCells[ACol,ARow]: widestring</code>	Access the grid cell as <code>widestring</code> irrespective of hidden columns or rows
<code>grid.Dates[ACol,ARow]: TDateTime;</code>	Access the grid cell as date
<code>grid.Floats[ACol,ARow]: Double;</code>	Access the grid cell as double. If no floating point data is in the cell, the value 0.0 is returned. When setting the cell data through <code>grid.Floats</code> , the <code>grid.FloatFormat</code> property is used to format the floating point data as text.
<code>grid.GridCells[ACol,ARow]: string;</code>	Access the grid cell as string. <code>grid.GridCells</code> returns the cell as stored, ie. before possible processing by the event <code>OnGetDisplText</code>
<code>grid.Ints[ACol,ARow]: Integer;</code>	Access the grid cell as integer. If no integer is in the cell, the value 0 is returned.
<code>grid.Objects[ACol,ARow]: TObject;</code>	Access the <code>TObject</code> that can be associated with each cell
<code>grid.Times[ACol,ARow]: TDateTime;</code>	Access the grid cell as time
<code>grid.WideCells[ACol,ARow]: widestring</code>	Access the grid cell as <code>widestring</code>
<code>grid.OriginalCells[ACol,ARow]: string</code>	Provides access to cells irrespective of column ordering. The cells can be accessed with the original column index before a user started to move columns (when <code>goColMoving</code> is true in <code>grid.Options</code> )

Two ways exist to apply colors, fonts & alignment to grid cells. A dynamic way exists that allows setting these properties through events. The dynamic cell settings through events is a flexible and



memory friendly way to apply colors, alignment etc.. to grid cells as no additional storage is required per cell for storing these cell properties.

### Dynamic cell properties

The events to handle these settings are:

#### OnGetCellColor:

```
TGridColorEvent = procedure (Sender: TObject; ARow, ACol: Integer;  
    AState: TGridDrawState; ABrush: TBrush; AFont: TFont ) of object;
```

This event is triggered when painting a cell and queries for the background brush of the cell and the font.

#### OnGetAlignment:

```
TGridAlignEvent = procedure (Sender: TObject; ARow, ACol: Integer;  
    var HAlign: TAlignment; var VAlign: TAsgVAlignment) of object;
```

The grid align event is also triggered when painting a cell and queries for horizontal and vertical text alignment in a cell.

#### OnGetCellGradient:

```
TGridGradientEvent = procedure (Sender: TObject; ARow, ACol: Integer;  
    var Color, ColorTo, ColorMirror, ColorMirrorTo: TColor) of object;
```

This event is triggered to dynamically set a dual (mirrored) gradient. The upper half rectangular gradient is from Color to ColorTo, the bottom half rectangular gradient is from ColorMirror to ColorMirrorTo.

### *Example: setting font color and alignment depending on cell values*

```
procedure TForm1.AdvStringGrid1GetCellColor(Sender: TObject; ARow,  
    ACol: Integer; AState: TGridDrawState; ABrush: TBrush; AFont: TFont);  
begin  
    if grid.Ints[ACol,ARow] > 0 then  
        AFont.Color := clBlack  
    else  
        AFont.Color := clRed;  
end;
```

```
procedure TForm1.AdvStringGrid1GetAlignment(Sender: TObject; ARow,  
    ACol: Integer; var HAlign: TAlignment; var VAlign: TAlignment);  
begin  
    if (grid.Ints[ACol,ARow] >= 1000) then  
        HAlign := taRightJustify  
    else  
        HAlign := taLeftJustify;  
end;
```

### Static cell properties

Cell properties can also be set directly. Using this approach of course requires more memory as the properties are stored with each cell. Possible properties are:

```
property Alignments[Col,Row: Integer]: TAlignment;  
property Colors[Col,Row: Integer]: TColor;  
property ColorsTo[Col,Row: Integer]: TColor;  
property FontColors[Col,Row: Integer]: TColor;  
property FontStyles[Col,Row: Integer]: TFontStyles;  
property FontSizes[Col,Row: Integer]: Integer;  
property FontNames[Col,Row: Integer]: string;
```

Example: setting a cell 2,3 to red background, bold Tahoma font and right aligned

```
Grid.Colors[2,3] := clRed;  
Grid.FontStyles[2,3] := Grid.FontStyles[2,3] + [fsBold];  
Grid.FontNames[2,3] := 'Tahoma';  
Grid.Alignments[2,3] := taRightJustify;
```

Note: the property grid.ColorsTo[Col,Row: Integer]: TColor is used for specifying vertical gradients in cells from color set by Colors[] to color set by ColorsTo[].

This sets a vertical gradient from red to white in cell 1,1:

```
Grid.Colors[1,1] := clRed;  
Grid.ColorsTo[1,1] := clWhite;
```

## TAdvStringGrid cell graphics

TAdvStringGrid has support to add all kinds of graphics to a cell. These include:

Bitmap	Windows bitmap
Icon	Windows icon
ImageList	Imagelist element
DataImage	Cell data dependent imagelist element
Images	Multiple imagelist elements
Picture	Picture
FilePicture	Picture file reference
Rotated	Rotated text
Comment	Comment indicator
CheckBox	Checkbox
DataCheckBox	Cell data dependent checkbox
Radiogroup	Radiobuttons
Radiobutton	Radiobutton
XP Progress	XP style Progressbar
Progress	Progressbar
ProgressPie	Progress pie
RangeIndicator	Bi-color range indicator
Button	Button
BitButton	BitButton
Balloon	Balloon
Shapes	Series of graphic shapes
Rating	Rating control
Interface	Custom graphics via interface

**Bitmaps**

The functions available to handle bitmaps in cells are:

```
function CreateBitmap (ACol,ARow: Integer;transparent: Boolean;
hal:TCellHalign; val:TCellValign):TBitmap;

procedure AddBitmap (ACol,ARow: Integer;ABmp:TBitmap;Transparent: Boolean;
hal:TCellHalign; val:TCellValign);

procedure RemoveBitmap (ACol,ARow: Integer);

function GetBitmap (ACol,ARow: Integer):TBitmap;
```

The difference between CreateBitmap and AddBitmap is that with CreateBitmap, the bitmap instance is created, maintained and destroyed by the grid while with AddBitmap it is the responsibility of the programmer to create the instance and destroy it.

In code this difference becomes clear:

```
// add bitmap from resource to the grid
Grid.CreateBitmap (2,3,True,haBeforeText,vaTop).LoadFromResourceName (HInstance,'TEST');
```

**var**`Bmp: TBitmap;``Bmp := TBitmap.Create;``Bmp.LoadFromResourceName(HInstance, 'TEST');``Grid.AddBitmap(2, 3, True, haBeforeText, vaTop);`*// at the end of the application, the bitmap needs to be destroyed*`Bmp.Free;`

### Icons

The functions available to handle icons in cells are:

**function** CreateIcon (ACol, ARow: Integer; hal: TCellHalign;`val: TCellValign): TIcon;`**procedure** AddIcon (ACol, ARow: Integer; AIcon: TIcon; hal: TCellHalign;`val: TCellValign);`**procedure** RemoveIcon (ACol, ARow: Integer);

The same logic applies for Icons as for Bitmaps for the difference between CreateIcon and AddIcon.

### Imagelist elements

An image from the imagelist assigned the the grid.GridImages property can be inserted in a cell.

The following methods are available for this:

**procedure** AddImageIdx (ACol, ARow, Aidx: Integer; hal: TCellHalign; val: TCellValign);**procedure** RemoveImageIdx (ACol, ARow: Integer);**function** GetImageIdx (ACol, ARow: Integer; var idx: Integer): Boolean;

The Idx parameter is the index of the image in the imagelist. The GetImageIdx returns false if GetImageIdx was called for a cell that does not contain an imagelist element.

It is also possible to add an imagelist element with an index that is set through the cell text with these methods:

**procedure** AddDataImage (ACol, ARow, Aidx: Integer; hal: TCellHalign; val: TCellValign);**procedure** RemoveDataImage (ACol, ARow: Integer);**function** HasDataImage (ACol, ARow: Integer): Boolean;

To set image 2 from the imagelist in a cell 2,3, this requires:

`Grid.AddDataImage(2, 3, 2, haBeforeText, vaTop);`

This sets the cell text to '2'. If later the cell text is changed to '3', the image will automatically change to image 3 of the imagelist.

### Multiple imagelist elements

To add multiple images in a cell, two methods are defined:

```
procedure AddMultiImage (ACol,ARow,Dir: Integer; hal:TCellHalign;  
val:TCellValign);
```

```
procedure RemoveMultiImage (ACol,ARow: Integer);
```

The Dir parameter sets the direction of the images, with 0 = horizontal and 1 = vertical.

After calling AddMultiImage, the indexes of the images can be set with the property

```
Grid.CellImages[ACol,ARow]: TIntList;
```

Example: setting 3 imagelist based images in a cell

```
Grid.AddMultiImage(2,3,0,haBeforeText,vaTop);  
  
Grid.CellImages[2,3].Add(2); // index of first image  
Grid.CellImages[2,3].Add(0); // index of second image  
Grid.CellImages[2,3].Add(5); // index of third image
```

### Pictures

Adding pictures is very similar to adding bitmaps to a cell. The CreatePicture and AddPicture are available to add a picture that is either created, maintained and destroyed by the grid or a picture that is created, maintained and destroyed by the application. An extra parameter for adding pictures is the stretch mode. This controls how the picture is stretched in the cell and can be:

```
TStretchMode =  
(noStretch,Stretch,StretchWithAspectRatio,Shrink,ShrinkWithAspectRatio);
```

noStretch	the picture is not stretched
Stretch	stretch horizontally & vertically to fit in the cell
StretchWithAspectRatio	stretch horizontally & vertically with aspect ratio to fit in the cell
Shrink	only shrink the image when it is too large for the cell
ShrinkWithAspectRatio	shrink with aspect ratio when image is too large

```
function CreatePicture (ACol,ARow:Integer; transparent:Boolean;  
stretchmode:TStretchMode; padding:Integer; hal:TCellHalign;  
val:TCellValign):TPicture;
```

```
procedure AddPicture (ACol,ARow: Integer;APicture:TPicture;transparent:  
Boolean; stretchmode:TStretchMode; padding: Integer; hal:TCellHalign;  
val:TCellValign);
```

```
procedure RemovePicture (ACol,ARow: Integer);
```

```
function GetPicture (ACol,ARow: Integer):TPicture;
```

With normal pictures, once the pictures are created or added, the picture requires memory necessary for holding the picture. When holding a large amount of large pictures, this can quickly become a problem. Therefore, a TFilePicture can be created and inserted. A TFilePicture only contains a reference to the file picture and does not require memory to hold the picture. The TFilePicture will load and display the picture only for the visible cells.

```
function CreateFilePicture (ACol,ARow: Integer;Transparent: Boolean;  
StretchMode:TStretchMode; padding:Integer; hal:TCellHalign;  
val:TCellValign): TFilePicture;
```

```
procedure AddFilePicture (ACol,ARow:  
Integer;AFilePicture:TFilePicture;Transparent:  
Boolean;stretchmode:TStretchMode;padding:  
Integer;hal:TCellHalign;val:TCellValign);
```

```
procedure RemoveFilePicture (ACol,ARow: Integer);
```

```
function GetFilePicture (ACol,ARow: Integer): TFilePicture;
```

Example: adding a picture with normal picture methods and file picture methods

```
Grid.CreatePicture (2,3,True,Shrink,0,haLeft,vaTop).LoadFromFile ('TST.JPG');  
Grid.CreateFilePicture (2,3,True,Shrink,0,haLeft,vaTop).Filename :=  
'TST.JPG';
```

### Rotated text

Text rotated in any angle can be added in a cell. Note that it is required that font used for the cell is a TrueType font. Non truetype fonts are not guaranteed to work with text rotation. Following methods are available to help with handling rotated text in cells:

```
procedure AddRotated (ACol,ARow: Integer; AAngle: Smallint; s: string);
```

```
procedure SetRotated (ACol,ARow: Integer; AAngle: SmallInt);
```

```
procedure RemoveRotated (ACol,ARow: Integer);
```

```
function IsRotated (ACol,ARow: Integer;var aAngle: Integer): Boolean;
```

Adding 90 degrees rotated text is as such easy:

```
Grid.AddRotated (2,3,90,'This is rotated');
```

### Comments

A comment indicator is a little triangle in the right top corner of the cell that indicates a comment text is available for the cell. When the mouse is over the comment indicator, this comment is displayed as a hint. The color of the little triangle comment indicator is red by default but can be set in another color with the property grid.ControlLook.CommentColor: TColor or it can be set as parameter of the method AddColorComment.

This is an overview of comment related methods & properties:

```
procedure AddComment (ACol,ARow: Integer; Comment:string);
```

Adds a comment with default color to cell ACol,ARow.

```
procedure AddColorComment (ACol,ARow: Integer; Comment:string; Color:
TColor);
```

Adds a comment with color to cell ACol,ARow.

```
procedure RemoveComment (ACol,ARow: Integer);
```

Removes the comment from cell ACol,ARow.

```
procedure RemoveAllComments;
```

Removes comments from all cells in the grid.

```
function IsComment (ACol,ARow: Integer;var comment:string): Boolean;
```

The IsComment method returns true when the specified cell effectively contains a comment and it returns this comment text in the comment parameter.

```
property CellComment [ACol,ARow: integer]: string;
```

Provides access to cell comments as property.

### Checkbox and DataCheckbox

Two types of checkboxes exist. A normal checkbox can be added to a cell with some text. The checkbox state is set through the SetCheckBoxState method. A data checkbox is added to a cell and the checkbox state reflects the cell text. If the cell text is equal to the grid.CheckTrue property, the checkbox is displayed as checked, if the cell text is equal to the grid.CheckFalse property, the checkbox is displayed as not checked. The checkbox is displayed grayed when the cell is set to readonly with the OnCanEditCell event. If it is not desirable that a checkbox looks disabled for readonly cells, set grid.NoDisabledCheckRadioLook = true. If a data checkbox is used, clicking the checkbox will cause the cell text to change from grid.CheckFalse to grid.CheckTrue or vice versa.

This is an overview of methods that can be used with checkboxes:

```
procedure AddCheckBox (ACol,ARow: Integer;State,Data: Boolean);
procedure RemoveCheckBox (ACol,ARow: Integer);
function HasCheckBox (ACol,ARow: Integer): Boolean;
function HasDataCheckBox (ACol,ARow: Integer): Boolean;
function GetCheckBoxState (ACol,ARow: Integer;var state: Boolean): Boolean;
function SetCheckBoxState (ACol,ARow: Integer;state: Boolean): Boolean;
function ToggleCheckBox (ACol,ARow: Integer): Boolean;
procedure AddCheckBoxColumn (ACol: Integer);
procedure RemoveCheckBoxColumn (ACol: Integer);
```

*Example: counting the number of checked checkboxes in a column*

```
var
  I, Num: integer;
  State: Boolean;
begin
  Num := 0;
  for I := grid.FixedRows to grid.RowCount - 1 do
  begin
    if grid.GetCheckboxState(Col, I, State) then
      if State then inc(Num);
    end;
  end;
```

***Example: alternative to count checked data checkboxes***

Supposing the checkboxes have been added with `grid.AddCheckBox(Col, Row, False, True);`

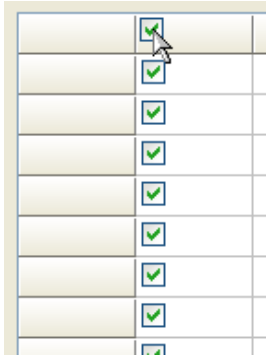
```
var
  I, Num: integer;
begin
  Num := 0;
  for I := grid.FixedRows to grid.RowCount - 1 do
  begin
    if grid.Cells[Col, I] = grid.CheckTrue then
      inc(Num);
    end;
  end;
```

Three events can be triggered from the checkbox, the `OnCheckboxClick`, `OnCheckboxMouseUp` and the `OnCheckBoxChange` event. The `OnCheckBoxChange` event is triggered whenever the state of a checkbox changes as a result from a click of the user on the grid. Note that the `OnCheckBoxChange` event will also be triggered for each checkbox changing its state by a click on a column header checkbox.

Sometimes, it is desirable to have a checkbox in a fixed column header cell that can immediately check or uncheck all checkboxes in the column. It is easy to have this type of functionality in `TAdvStringGrid`:

```
with AdvStringGrid1 do
Begin
  Options := Options + [goEditing];
  AddCheckBoxColumn(1);
  AddCheckBox(1, 0, false, false);
  MouseActions.CheckAllCheck := true;
end;
```





Programmatically, the entire column of checkboxes can be checked or unchecked with the methods:

```
procedure CheckAll (Col: Integer);
procedure UncheckAll (col: Integer);
```

### Radiobuttongroups

To add a radiobuttongroup to the grid, a stringlist is used for the text associated with each radiobutton. With the AddRadio and CreateRadio methods the same logic is applied to a stringlist maintained by the grid and a stringlist maintained by the application as for a bitmap with the AddBitmap and CreateBitmap methods. The direction of the radiobuttons in the grid cell is set with the DirRadio parameter and can be horizontal (DirRadio = 0) or vertical (DirRadio = 1).

```
procedure AddRadio (ACol, ARow, DirRadio, IdxRadio: Integer; sl: TStrings);
function CreateRadio (ACol, ARow, DirRadio, IdxRadio: Integer): TStrings;
procedure RemoveRadio (ACol, ARow: Integer);
function IsRadio (ACol, ARow: Integer): Boolean;
function GetRadioIdx (ACol, ARow: Integer; var IdxRadio: Integer): Boolean;
function SetRadioIdx (ACol, ARow, IdxRadio: Integer): Boolean;
function GetRadioStrings (ACol, ARow: Integer): TStrings;
```

Example: adding radiobuttons maintained by the application

```
var
  i: integer;
begin
  radopt1 := TStringList.Create;
  radopt1.Add('Delphi');
  radopt1.Add('C++Builder');
  radopt1.Add('JBuilder');

  radopt2 := TStringList.Create;
  radopt2.Add('Std');
  radopt2.Add('Prof');
  radopt2.Add('C/S');

  with AdvStringGrid1 do
  begin
    for I := 1 to RowCount - 1 do
    begin
      AddRadio(1, i, 0, -1, radopt1);
      AddRadio(2, i, 1, -1, radopt2);
    end
  end
```

```
end;  
end;  
end;
```

To get the radiobutton index, the GetRadioIdx can be used which returns in the Radioidx parameter the value of the selected radiobutton or -1 if no radiobutton is selected.

Example: getting the selected radiobutton

```
var  
    Idx: Integer;  
if Grid.GetRadioIdx(2,3,idx) then  
    ShowMessage('Radiobutton '+inttostr(idx)+' selected');
```

The radiobuttongroups trigger two events : OnRadioClick and OnRadioMouseUp

### RadioButton columns

Instead of having a radiogroup in a single cell, it is also possible to add a radiogroup in a column of the grid. Following methods are provided to handle radio button groups in grid columns:

```
procedure AddRadioButton(ACol,ARow: integer; State:boolean);  
procedure RemoveRadioButton(ACol,ARow: integer);  
function HasRadioButton(ACol,ARow: integer): boolean;  
function IsRadioButtonChecked(ACol,ARow: integer): boolean;  
function SetRadioButtonState(ACol, ARow: integer; State: boolean): boolean;  
procedure AddRadioButtonColumn(ACol: integer);  
procedure RemoveRadioButtonColumn(ACol: integer);  
procedure SetRadioButtonColumnIndex(ACol, Index: integer);  
function GetRadioButtonColumnIndex(ACol: integer): integer;
```

The radiobutton in a cell triggers the event : OnRadioButtonClick

In this sample code, two columns of 3 radiobutton cells are created:

```
procedure TForm1.FormCreate(Sender: TObject);  
begin  
    AdvStringGrid1.Options := AdvStringGrid1.Options + [goEditing];  
    AdvStringGrid1.AddRadioButton(1,1,true);  
    AdvStringGrid1.AddRadioButton(1,2);  
    AdvStringGrid1.AddRadioButton(1,3);  
    AdvStringGrid1.Cells[1,1] := 'France';  
    AdvStringGrid1.Cells[1,2] := 'Germany';  
    AdvStringGrid1.Cells[1,3] := 'United Kingdom';  
    AdvStringGrid1.AddRadioButton(2,1,true);  
    AdvStringGrid1.AddRadioButton(2,2);  
    AdvStringGrid1.AddRadioButton(2,3);  
    AdvStringGrid1.Cells[2,1] := 'Paris';  
    AdvStringGrid1.Cells[2,2] := 'Berlin';  
    AdvStringGrid1.Cells[2,3] := 'London';  
    AdvStringGrid1.AutoSizeCol(1);  
    AdvStringGrid1.AutoSizeCol(2);  
end;
```

	<input type="radio"/> France	<input type="radio"/> Paris	
	<input checked="" type="radio"/> Germany	<input type="radio"/> Berlin	
	<input type="radio"/> United Kingdom	<input checked="" type="radio"/> London	

### Button and BitButtons

Always visible buttons and buttons with a bitmap can be added to cells in the grid. The width and height of these buttons can be set as well as the caption and/or glyph. This is achieved through following methods:

```

procedure AddButton (ACol,ARow, bw, bh:
Integer;Caption:string;hal:TCellHalign;val:TCellValign);
procedure SetButtonText (ACol,ARow: Integer; Caption: string);
procedure PushButton (ACol,ARow: Integer;push: Boolean);
procedure RemoveButton (ACol,ARow: Integer);
function HasButton (ACol,ARow: Integer): Boolean;
procedure AddBitButton (ACol,ARow,bw,bh:Integer; Caption:string;
Glyph:TBitmap; hal:TCellHalign; val:TCellValign);
function CreateBitButton (ACol,ARow,bw,bh: Integer; Caption:string;
hal:TCellHalign; val:TCellValign): TBitmap;

```

Again the same approach for adding buttons with a bitmap maintained by the grid and one by the application is provided with the AddBitButton and CreateBitButton method. For the first method AddBitButton, the application needs to create, maintain and destroy the bitmap, for the CreateBitButton method the grid creates, maintains and eventually destroys the bitmap.

The buttons fire the OnButtonClick event when clicked.

Note: by design, a button in a read-only cell is disabled. If this behavior is not desired, set grid.ControlLook.NoDisabledButtonLook = True.

### Progressbars and ProgressPie

Two types of progress indicators can be displayed in a grid cell: a rectangular progress bar and a circular pie type progress indicator. The AddProgress method provides two color parameters, one for the zero to current position part of the progress bar and one for the current position to end part of the bar. With the AddProgressEx method, additional color settings for font color in both parts is possible. The progress bar fills the complete cell and as such the position of the progress bar reflects a value between 0 and 100 set in the cell text.

```

procedure AddProgress (ACol,ARow: Integer;FGColor,BKColor: TColor);
procedure AddProgressEx (ACol,ARow:
Integer;FGColor,FGTextColor,BKColor,BKTextColor: TColor);
procedure AddProgressFormatted (ACol,ARow:
Integer;FGColor,FGTextColor,BKColor,BKTextColor: TColor; Fmt: string; Min,
Max: Integer);

```

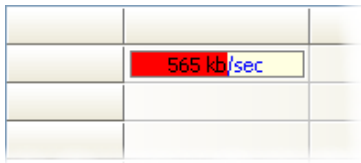
```
procedure RemoveProgress (ACol,ARow: Integer);
procedure AddAdvProgress (ACol,ARow: Integer;Min:integer=0;Max:integer=100);
procedure RemoveAdvProgress (ACol,ARow: Integer);
```

Example: adding progressbar and setting position to 50

```
Grid.AddProgress (2,3,clRed,clWhite);
Grid.Ints [2,3] := 50;
```

A method is available AddProgressFormatted that allows to include the numeric formatting of the value in the progressbar, as shown in this code snippet:

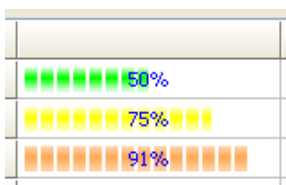
```
begin
  AdvStringGrid1.AddProgressFormatted (1,1,clRed,clBlack,clInfoBk,clBlue,'%d
kb/sec',0,1000);
  AdvStringGrid1.Ints [1,1] := 565;
end;
```



Adding an advanced progress bar:

Using grid.AddAdvProgress, it is possible to add a Windows themed style progressbar (available from Windows XP or higher) with many additional options. The settings for the progressbar appearance can be found under Grid.ProgressAppearance. This allows to have progressbars with colors dependent on level of progress. This sample code adds three XP style progressbars to the grid with default progress level color settings:

```
with AdvStringGrid1 do
begin
  ProgressAppearance.CompletionSmooth := false;
  AddAdvProgress (1,1);
  Ints [1,1] := 50;
  AddAdvProgress (1,2);
  Ints [1,2] := 75;
  AddAdvProgress (1,3);
  Ints [1,3] := 91;
end;
```



The circular pie type progress bar allows a compact visual progress indication in a cell that can contain text as well. The value of the progress pie is set with the method SetProgressPie.

```

procedure AddProgressPie (ACol,ARow: Integer; Color: TColor; Value:
Integer);
procedure SetProgressPie (ACol,ARow: Integer; Value: Integer);
procedure RemoveProgressPie (ACol,ARow: Integer);

```

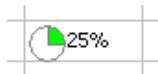
Example: adding progress pie with text and position 25

```

Grid.AddProgressPie (2,3,clLime,25);
Grid.Cells[2,3] := '25% completion';

```

The progress pie is always left aligned in the cell and before the optional text in the cell.



Note: the style of the progress bar is also affected by the ControlLook property. This is discussed in detail for the ControlLook property.

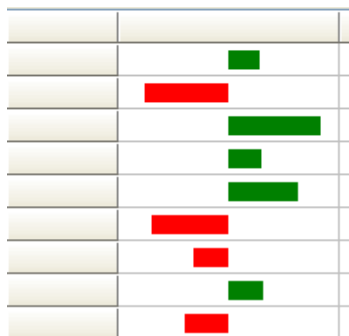
### Range Indicator

A range indicator can show negative and positive ranges of value visually as bars in 2 different colors, a color for negative range and a color for a positive range. The method to add a range indicator is:

```
AddRangeIndicator(Col,Row,Range,NegColor,PosColor,ShowValue);
```

with:

Col,Row: cell where to add range indicator  
Range: min/max boundaries of range, ie. From -Range to +Range (default 100)  
NegColor: color of negative range bar (default Red)  
PosColor: color of positive range bar (default Black)  
ShowValue: when true shows value (default False)



Such range indicator is added with:

```

procedure TForm1.FormCreate (Sender: TObject);
var
    i: integer;
begin
    for i := 1 to AdvStringGrid1.RowCount - 1 do
        begin
            AdvStringGrid1.AddRangeIndicator (1,i,100,clRed,clGreen,false);
            AdvStringGrid1.Ints[1,i] := -100 + Random(200);
        end;
end;

```

```
end;
```

## Balloons

A balloon appears when the mouse hovers over a cell. A balloon features 3 elements: a title, a text and an icon. To add and remove balloons, following methods are available:

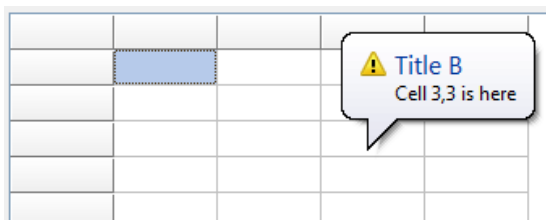
```
procedure AddBalloon(ACol, ARow: Integer; Title, Text: string; Icon:
TBalloonIcon);
procedure RemoveBalloon(ACol, ARow: integer);
function HasBalloon(ACol, ARow: integer): boolean;
function IsBalloon(ACol, ARow: integer; var Title, Text: string; var Icon:
TBalloonIcon): boolean;
```

TBalloonIcon is defined as:

biNone: no icon  
biInfo: information icon  
biWarning: warning icon  
biError: error icon

Adding a balloon can be done with:

```
procedure TForm2.FormCreate(Sender: TObject);
begin
    AdvStringGrid1.Balloon.Enable := true;
    AdvStringGrid1.AddBalloon(2, 2, 'Title A', 'Cell 2,2 is here', biError);
    AdvStringGrid1.AddBalloon(3, 3, 'Title B', 'Cell 3,3 is here', biWarning);
end;
```



Note: in order to display a balloon, either via method AddBalloon or dynamically via the event OnCellBalloon, grid.Balloon.Enable must be set to true. Further settings for the balloon tooltips are available through grid.Balloon with properties:

<b>AutoHideDelay:</b> integer;	Sets the delay in milliseconds to auto hide the balloon.
<b>BackgroundColor:</b> TColor;	Sets the background color of the balloon tooltip.
<b>Enable:</b> Boolean;	When true, displaying balloon tooltips is enabled.
<b>InitialDelay:</b> integer;	Sets the delay in milliseconds to wait before the first balloon tooltip is shown.

<b>ReshowDelay:</b> integer;	Sets the delay in milliseconds to wait before a new balloon tooltip is shown.
<b>TextColor:</b> TColor;	Sets the text color of the balloon tooltip.
<b>Transparency:</b> integer;	Sets the transparency of the balloon tooltip.

## Shapes

Often it is desirable to have a little graphic representation and not having to resort to image resources for this makes it easy to have graphics in many colours and many shapes in a resource friendly way. The grid offers a range of such shapes that can be added via the method `grid.AddShape(ACol,ARow: integer; Shape: TCellShape; FillColor,LineColor: TColor; hal: TCellHAlign; val: TCellVAlign);`

The type `TCellShape` is defined in the unit `AdvUtil` and the supported shapes are:

<code>csRectangle</code>	rectangular
<code>csCircle</code>	circle
<code>csTriangleLeft</code>	left oriented triangle
<code>csTriangleRight</code>	right oriented triangle
<code>csTriangleUp</code>	up oriented triangle
<code>csTriangleDown</code>	down oriented triangle
<code>csDiamond</code>	diamond shape
<code>csLineVert</code>	single vertical line
<code>csLineHorz</code>	single horizontal line
<code>csRoundRect</code>	rounded rectangle
<code>csEllips</code>	ellips
<code>csSquare</code>	square
<code>csRoundSquare</code>	rounded square
<code>csStar</code>	star
<code>csArrowUp</code>	arrow up
<code>csArrowDown</code>	arrow down
<code>csArrowLeft</code>	arrow left
<code>csArrowRight</code>	arrow right
<code>csHalfStar</code>	half star

To demonstrate this, following code adds 4 different shapes to the grid:

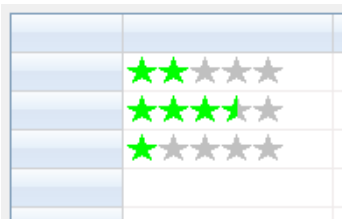
```
begin
  AdvStringGrid1.AddShape(1,1,csDiamond,clLime, clSilver,
haBeforeText,vaTop);
  AdvStringGrid1.AddShape(1,2,csCircle,clRed, clSilver,
haBeforeText,vaTop);
  AdvStringGrid1.AddShape(1,3,csStar,clYellow, clSilver,
haBeforeText,vaTop);
  AdvStringGrid1.AddShape(1,4,csArrowUp,clBlue, clSilver,
haBeforeText,vaTop);
end;
```



### Rating control

As commonly seen in many web interfaces, the grid provides a specific graphic type to add a rating control to a cell. The rating control consists of a number of star shapes. The number of fully or half coloured stars represents the value. To add a rating control to a cell, call `grid.AddRating(ACol,ARow,Scale: integer; FullColor,EmtpyColor: TColor)`. The parameters `ACol,ARow` set the cell where to add the rating control. The `Scale` parameter sets the number of stars to use in the rating control and the parameters `FullColor,EmtpyColor` set the color for fully coloured stars and non coloured stars. When the grid cell is not read-only, the value of the rating control can be change by clicking on the cell. The value can also be programmatically set and retrieved with `grid.Floats[Col,Row]: double`. This example code adds 3 rating controls in the grid and presets its values:

```
begin
  AdvStringGrid1.AddRating(1,1,5,clLime,clSilver);
  AdvStringGrid1.Floats[1,1] := 2.0;
  AdvStringGrid1.AddRating(1,2,5,clLime,clSilver);
  AdvStringGrid1.Floats[1,2] := 3.6;
  AdvStringGrid1.AddRating(1,3,5,clLime,clSilver);
  AdvStringGrid1.Floats[1,3] := 1.1;
end;
```





## Using a vertical scrollbar per cell in TAdvStringGrid

When text is too large to fit in a cell, you could increase the cell size, ie. increase the row height, the column width or both. This is not always practical, as the higher the row height is, the less rows can be displayed. The same applies for the column width. The text could also be displayed cut-off but this solution is also far from ideal. Now, an alternative solution is available with the capability to add a vertical scrollbar to a cell. Any cell can as such have its own scrollbar and scroll separately the cell's text or HTML formatted text. This feature is made available with the `grid.AddScrollbar()` method. With this method a scrollbar is added to a cell. The scrollbar range and pagesize can either be automatically set according to the size of the text in a cell or can be programmatically set. <br>

This is an overview of the methods available:

```
grid.AddScrollbar(col,row: integer; AutoRange: Boolean);
```

Adds a scrollbar to cell col,row and when AutoRange is true, the scrollbar range and pagesize is automatically calculated.

```
grid.RemoveScrollbar(col,row: integer);
```

*Removes the scrollbar again from the cell*

```
grid.HasScrollBar(col,row: integer): Boolean
```

*Returns true when the cell col,row has a scrollbar*

```
grid.HasAutoRangeScrollBar(col,row: integer): Boolean
```

*Returns true when the cell col,row has an autorange scrollbar*

```
grid.SetScrollPosition(col,row,position: integer);
```

*Programmatically sets the position of the scrollbar in cell col,row*

```
grid.GetScrollPosition(col,row,position: integer): integer;
```

*Programmatically gets the position of the scrollbar in cell col,row*

```
grid.SetScrollProp(col,row: integer; Prop: TScrollProp);
```

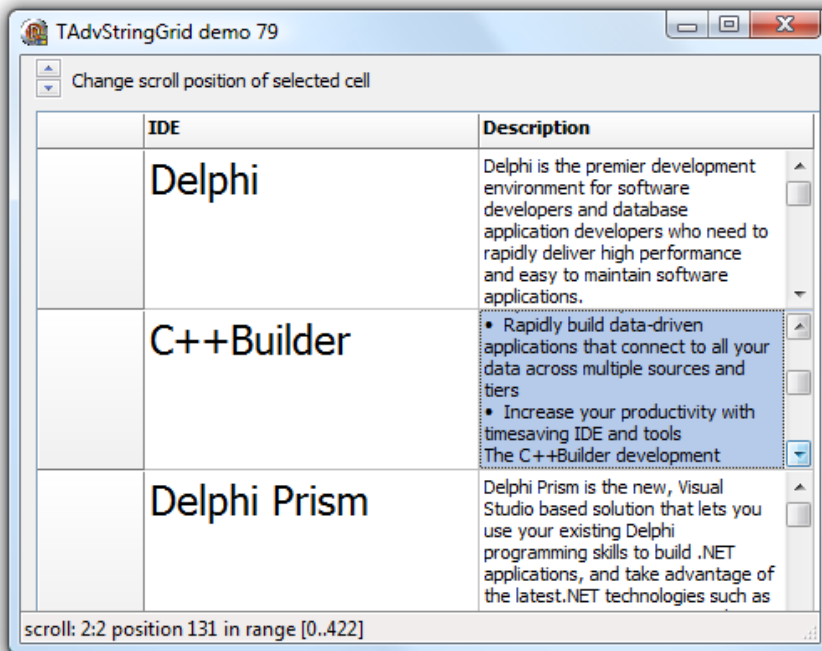
*Sets the scrollbar range & pagesize*

```
grid.GetScrollProp(col,row: integer): TScrollProp;
```

*Gets the scrollbar range & pagesize*

In the sample, these capabilities are demonstrated by adding very long HTML formatted text in 3 cells of the grid. In these cells, first an autorange scrollbar was added with:

```
AdvStringGrid1.AddScrollBar(2,1,true);  
AdvStringGrid1.AddScrollBar(2,2,true);  
AdvStringGrid1.AddScrollBar(2,3,true);
```



When text is set in a cell, the scrollbar will then appear when necessary. In this sample, it is also demonstrated how the scrollbar position can be programmatically set. This is done from an UpDown control for the cell that is selected. Upon cell selection, the UpDown control is initialized to the cell's scrollbar range:

```

procedure TForm2.AdvStringGrid1SelectCell(Sender: TObject; ACol, ARow:
Integer;
    var CanSelect: Boolean);
var
    sp: TScrollProp;
begin
    if AdvStringgrid1.HasScrollBar(ACol, ARow) then
        begin
            sp := AdvStringgrid1.GetScrollProp(ACol, ARow);
            updown1.Min := 0;
            updown1.Max := sp.Range;
            updown1.Position := sp.Range -
AdvStringgrid1.GetScrollPosition(ACol, ARow);
        end;
    end;

procedure TForm2.UpDown1Changing(Sender: TObject; var AllowChange:
Boolean);
var
    sp: TScrollProp;
begin
    if AdvStringGrid1.HasScrollBar(AdvStringgrid1.Col, AdvStringGrid1.Row)
then
        begin
            AdvStringGrid1.SetScrollPosition(AdvStringgrid1.Col,
AdvStringGrid1.Row, updown1.Max - updown1.Position);
        end;
    end;

```

```
end;  
end;
```

## TAdvStringGrid HTML formatted cells

The cells in TAdvStringgrid have support for various HTML tags through which fine control of the display is possible. The HTML formatting support is by default enabled but can be turned off by setting the property EnableHTML to False. The supported tags form a subset of the HTML tags and are further named as mini html

### Supported tags

- **B : Bold tag**

<B> : start bold text

</B> : end bold text

Example : This is a <B>test</B>

- **U : Underline tag**

<U> : start underlined text

</U> : end underlined text

Example : This is a <U>test</U>

- **I : Italic tag**

<I> : start italic text

</I> : end italic text

Example : This is a <I>test</I>

- **S : Strikeout tag**

<S> : start strike-through text

</S> : end strike-through text

Example : This is a <S>test</S>

- **A : anchor tag**

<A href="value" title="HintValue"> : text after tag is an anchor. The 'value' after the href identifier is the anchor. This can be an URL (with ftp,http,mailto,file identifier) or any text. If the value is an URL, the shellexecute function is called, otherwise, the anchor value can be found in the OnAnchorClick event

</A> : end of anchor

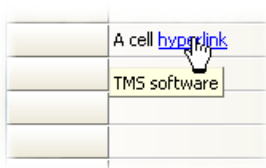
Examples :

This is a <A href="mailto:myemail@mail.com">test</A>

This is a <A href="http://www.tmssoftware.com">test</A>

This is a <A href="somevalue">test</A>

Hints for hyperlinks defined in HTML can also be directly be set with the Title attribute. If no Title attribute is specified, the HREF value is used as hint value. Hyperlink hints are enabled when grid.AnchorHint is set to true and grid.ShowHint is set to true.



Example:

The hint for this cell is set by:

```
advstringgrid1.Cells[1,3] := 'A cell <a href="http://www.tmssoftware.com"
title="TMS software">hyperlink</a>';
```

- **FONT : font specifier tag**

<FONT face='facevalue' size='sizevalue' color='colorvalue' bgcolor='colorvalue'> : specifies font of text after tag.

with

- face : name of the font
  - size : HTML style size if smaller than 5, otherwise pointsize of the font
  - color : font color with either hexadecimal color specification or Borland style color name, ie clRed, clYellow, clWhite ... etc
  - bgcolor : background color with either hexadecimal color specification or Borland style color name
- </FONT> : ends font setting

Examples :

This is a <FONT face="Arial" size="12" color="clRed">test</FONT>

This is a <FONT face="Arial" size="12" color="#FF0000">test</FONT>

- **P : paragraph**

<P align="alignvalue" [bgcolor="colorvalue"]> : starts a new paragraph, with left, right or center alignment. The paragraph background color is set by the optional bgcolor parameter.  
</P> : end of paragraph

Example : <P align="right">This is a test</P>

Example : <P align="center">This is a test</P>

Example : <P align="left" bgcolor="#ff0000">This has a red background</P>

Example : <P align="right" bgcolor="clYellow">This has a yellow background</P>

- **HR : horizontal line**

<HR> : inserts linebreak with horizontal line

- **BR : linebreak**

<BR> : inserts a linebreak

- **BODY : body color / background specifier**

<BODY bgcolor="colorvalue" background="imagefile specifier"> : sets the background color of the HTML text or the background bitmap file

Example :

<BODY bgcolor="clYellow"> : sets background color to yellow

<BODY background="file://c:\test.bmp"> : sets tiled background to file test.bmp

- **IND : indent tag**

This is not part of the standard HTML tags but can be used to easily create multicolumn text  
<IND x="indent"> : indents with "indent" pixels

Example :

This will be <IND x="75">indented 75 pixels.

- **IMG : image tag**

<IMG src="specifier:name" [align="specifier"] [width="width"] [height="height"]  
[alt="specifier:name"] > : inserts an image at the location

specifier can be :

idx : name is the index of the image in the associated imagelist  
 ssys : name is the index of the small image in the system imagelist or a filename for which the corresponding system imagelist is searched  
 lsys : same as ssys, but for large system imagelist image  
 file : name is the full filename specifier  
 res : name of a resource bitmap (not visible at design time)  
 no specifier : name of image in an PictureBox

Optionally, an alignment tag can be included. If no alignment is included, the text alignment with respect to the image is bottom. Other possibilities are : align="top" and align="middle"

The width & height to render the image can be specified as well. If the image is embedded in anchor tags, a different image can be displayed when the mouse is in the image area through the Alt attribute.

Examples :

This is an image <IMG src="idx:1" align="top">

This is an image <IMG src="ssys:1"> and another one <IMG src="ssys:worfile.doc">

This is an image <IMG src="file://c:\my documents\test.bmp">

This is an image <IMG src="res://BITMAP1">

This is an image <IMG src="name">

- **SUB : subscript tag**

<SUB> : start subscript text

</SUB> : end subscript text

Example : This is <SUP>9</SUP> / <SUB>16</SUB> looks like <sup>9</sup>/<sub>16</sub>

- **SUP : superscript tag**

<SUP> : start superscript text

</SUP> : end superscript text

- **BLINK : blink tag** (the EnableBlink needs to be set to true to enable this)

<BLINK> : start blinking text

</BLINK> : stop blinking text

Example : This is <FONT color="clred"><BLINK>blinking red</BLINK></FONT>text.

- **UL : list tag**

<UL> : start unordered list tag

</UL> : end unordered list

Example :

<UL>

<LI>List item 1

<LI>List item 2

<UL>

<LI> Sub list item A

<LI> Sub list item B

</UL>

<LI>List item 3

</UL>

- **LI : list item**  
<LI> : new list item
- **SHAD : text with shadow**  
<SHAD> : start text with shadow  
</SHAD> : end text with shadow
- **Z : hidden text**  
  
<Z> : start hidden text  
</Z> : end hidden text
- **HI : hilight**  
  
<HI> : start text hilighting  
</HI> : stop text hilighting
- **E : Error marking**  
  
<E> : start error marker  
</E> : stop error marker

- **Special characters**

Following standard HTML special characters are supported :

&lt; ; less than : <  
 &gt; ; greater than : >  
 &amp; ; &  
 &quot; ; "  
 &nbsp; ; non breaking space  
 &trade; ; trademark symbol  
 &euro; ; euro symbol  
 &sect; ; section symbol  
 &copy; ; copyright symbol  
 &para; ; paragraph symbol

### HTML formatting related events

The hyperlinks that can be added inside a cell cause following events when the mouse is over or clicked on hyperlink. The events are :

**OnItemAnchorClick** : triggered when a hyperlink is clicked in a cell

**OnItemAnchorEnter** : triggered when the mouse enters a hyperlink

**OnItemAnchorExit** : triggered when the mouse leaves a hyperlink

**OnItemAnchorHint** : triggered when the mouse is over a hyperlink to query the hint for the link (this is enabled if the property grid.AnchorHint is set true)

Example: Handling hyperlink clicks in TAdvStringGrid

A hyperlink is added with

```
grid.Cells[0,0] :=  
  'This is a <a href="myhyperlink">hyperlink<a>';
```

When the mouse clicked on the hyperlink, the `OnItemAnchorClick` is called with a reference to the cell coordinates and the `Anchor` parameter is 'myhyperlink'. The `AutoHandle` parameter is by default true and causes that the grid will automatically open the default application for the hyperlink. Setting this parameter `AutoHandle` allows custom handling of the hyperlink click.



## TAdvStringGrid HTML forms

Combining multiple buttons in a cell, adding more than one checkbox in a cell, editing different items in a cell, it is possible with TAdvStringGrid and its mini HTML forms. Mini HTML forms bring a solution allowing unlimited capabilities to specify cell contents and behaviour.

TAdvStringgrid, controls can be specified through a the tag <CONTROL>

The CONTROL tag takes following parameters:

```
<CONTROL ID="ControlID" VALUE="ControlValue" TYPE="ControlType" WIDTH="ControlWidth"
MAXLEN="ControlMaxLenValue">
```

with:

ControlID = unique ID string per cell for the control

ControlType = "EDIT" or "CHECK" or "RADIO" or "COMBO" or "BUTTON"

ControlWidth = width of the control in pixels

ControlValue = value of the control depending on the type :

ControlMaxLenValue = optional maximum edit length of edit control. When MAXLEN attribute is not specified or value of ControlMaxLenValue is 0, string length is not limited.

"TRUE", "FALSE" for checkboxes and radiobuttons

Button caption for button control

Text value for edit and combobox controls

With this information, forms can be specified like:

```
with AdvStringGrid1 do
begin
```

```
    Cells[1,ARow] := '<CONTROL TYPE="CHECK" WIDTH="15" ID="CK1"> <b>Patient
information</b> <BR>' +
        'Name : <CONTROL TYPE="EDIT" WIDTH="80" VALUE="" ID="ED1"> ' +
        'Prenome : <CONTROL TYPE="EDIT" WIDTH="80" VALUE="" ID="ED2"> ' +
        '<CONTROL TYPE="BUTTON" WIDTH="80" VALUE="Clear" ID="BTN1"><BR><BR>' +
        '<IMG src="idx:0" align="middle"> Available : <CONTROL TYPE="COMBO"
WIDTH="60" ID="CO1"> ' +
        '<IMG src="idx:1" align="middle"> Payment : <CONTROL TYPE="COMBO"
WIDTH="80" VALUE="" ID="CO2"> ' +
        '<IMG src="idx:2" align="middle"> Last visit : <CONTROL TYPE="EDIT"
WIDTH="80" VALUE="" ID="ED3">';
end;
```

Getting and setting control values is done with the property grid.ControlValues[Col,Row,ID]: string;

The screenshot displays a TAdvStringGrid form with two rows of patient information. Each row contains a checkbox, text fields for Name and Prenome, a Clear button, a calendar icon, a dropdown for Available, a dropdown for Payment, and a date field for Last visit.

Row	Available	Payment	Last visit
1	MO	VISA	1/06/2002
2	MO	VISA	2/06/2002

Example: setting form values through the control ID and ControlValues property:

```
with AdvStringGrid1 do
begin
    ControlValues[1,ARow,'CK1'] := 'TRUE';
    ControlValues[1,ARow,'ED1'] := 'Name'+IntToStr(ARow);
    ControlValues[1,ARow,'ED2'] := 'PreName'+IntToStr(ARow);
    ControlValues[1,ARow,'CO1'] := 'MO';
    ControlValues[1,ARow,'CO2'] := 'VISA';
    ControlValues[1,ARow,'ED3'] := DateToStr(Now + ARow);
end;
```

The events that are used for handling form controls are :

OnControlClick : event triggered when a mini HTML form control is clicked

OnControlComboList : event querying the values for a combobox as well as its style

OnControlEditDone : event triggered when editing of the mini HTML form control starts

All events return the cell for the control, the control ID, type and value. For the OnControlComboList event, a stringlist is passed as parameter where the values that need to be displayed in the combobox can be added. With the Edit parameter, the combobox can be set as either dropdownlist (Edit = False) or as editable combobox (Edit = true).

Example: Using the OnControlComboList event for setting combobox items in a form:

```
procedure TForm1.AdvStringGrid1ControlComboList(Sender: TObject; ARow,
    ACol: Integer; CtrlID, CtrlType, CtrlVal: String; Values: TStringList;
    var Edit: Boolean; var DropCount: Integer);
begin
    Values.Clear;
    if CtrlID = 'CO1' then
    begin
        Values.Add('MO');
        Values.Add('TU');
        Values.Add('WE');
        Values.Add('TH');
        Values.Add('FR');
        Values.Add('SA');
        Values.Add('SU');
        Edit := False; // combo dropdownlist
    end;

    if CtrlID = 'CO2' then
    begin
        Values.Add('VISA');
        Values.Add('AMEX');
        Values.Add('MASTERCARD');
        Values.Add('CASH');
        Values.Add('N/A');
        Edit := True; // combo dropdown edit
    end;
end;
```

## TAdvStringGrid miscellaneous display control

**Showing active cell in fixed cells**

With the property `ActiveCellShow` set true, it is possible to indicate the fixed row and column cell for column and row where the focus cell is found, in a different color and different font. The background color of the fixed cell is set with `ActiveCellColor`, the font is set with the `ActiveCellFont` property. For normal display, the fixed cell uses the `FixedColor` background color and `FixedFont` for text.

Note: when active cell display is activated and multiple fixed columns or fixed rows are shown in the grid, the active cells are displayed on the innermost fixed columns/rows.

**Background gradient or bitmap**

TAdvStringGrid can show a bitmap or gradient as background in fixed cells only, normal cells only or for all cells. The background bitmap is set with the `grid.BackGround.Bitmap` property. The selection for which cells the background should be displayed is set with `grid.BackGround.Cells`. This background bitmap can be tiled (`grid.BackGround.Display = bdTile`) or displayed at a fixed (`grid.BackGround.Display = bdFixed`) position (set with `grid.BackGround.Top` and `grid.BackGround.Left`)

To show a background gradient, set `grid.BackGround.Display` to `bdGradientVert` or `bdGradientHorz` and select gradient start and end color with `grid.BackGround.Color` and `grid.BackGround.ColorTo`.

**Bands**

Banding of alternate colors is enabled in TAdvStringGrid with setting `grid.Bands.Active = True`.

The alternating colors are set with `grid.Bands.PrimaryColor` and `grid.Bands.SecondaryColor`. The number of rows to display in primary color is set with `grid.Bands.PrimaryLength`, the number of rows to display in secondary color is set with `grid.Bands.SecondaryLength`. Finally, it can be selected whether the banding should be printed or not with the `grid.Bands.Print` property.

Note: when using a descendent class such as TAdvColumnGrid or TDBAdvGrid, it is required to set the property `ShowBands = true` for the columns where bands should be displayed.

**Control look**

Various settings are combined here that control how inplace controls look in the grid. The `ControlLook` property has following subproperties:

CheckAlwaysActive: Boolean;	When true, a checkbox is always displayed as active, irrespective of the readonly state of the cell
CheckedGlyph: TBitmap;	Sets the glyph for a custom checked checkbox
CheckSize: Integer;	Sets the size of a checkbox
Color: TColor;	Sets the color for Borland style checkbox and radiobuttons
CommentColor: TColor;	Sets the default comment triangle indicator color
ControlStyle: TControlStyle;	See below

DropDownAlwaysVisible: Boolean;	When true, the combobox dropdown button is always displayed, irrespective of the editing mode
FixedDropDownButton: Boolean;	When true, a fixed cell has an additional right side dropdown button when the mouse hovers the cell
FixedGradient*: TColor;	Series of properties that control the top & bottom gradient of the fixed cell in normal, hot & down state.
FlatButton: Boolean;	When true, inplace buttons are displayed in flat style
NoDisabledButtonLook: Boolean;	By default, buttons added in the grid in read only cells are shown as disabled. To override this, set this property to true.
NoDisabledCheckRadioLook: Boolean	By default, checkboxes and radiobuttons added in the grid in read only cells are shown as disabled. To override this, set this property to true.
ProgressBorderColor: TColor;	Sets the color of a progress bar border
ProgressMarginX: Integer;	Horizontal margin on left and right for the progressbar in a cell
ProgressMarginY: Integer;	Vertical margin on top and below for the progressbar in a cell
ProgressXP: Boolean;	When true, the progressbar is drawn with the Windows XP visual style
RadioAlwaysActive: Boolean;	When true, a radiobutton is always displayed as active, irrespective of the readonly state of the cell
RadioOffGlyph: TBitmap;	Sets the glyph for a custom unchecked radiobutton
RadioOnGlyph: TBitmap;	Sets the glyph for a custom checked radiobutton
RadioSize: Integer;	Sets the size of a radiobutton
SpinButtonsAlwaysVisible: Boolean;	When true, buttons of spin editor inplace editors are always visible, irrespective of the editing state of a cell.
UnCheckedGlyph: TBitmap;	Sets the glyph for a custom unchecked checkbox

The ControlStyle can have following values:

```
TControlStyle = (csClassic, csFlat, csWinXP, csBorland, csTMS, csGlyph, csTheme);
```

With:

csBorland	Borland style checkboxes and radiobuttons
-----------	---

csClassic	Normal Windows control look
csFlat	Flat control look
csGlyph	Use glyphs defined in ControlLook for checkboxes and radiobuttons
csTheme	Use Windows theme API (available in Windows XP or later) to draw checkboxes, radiobuttons, buttons, ...
csTMS	TMS style checkboxes and radiobuttons
csWinXP	Fixed Luna style control look (works on all Windows versions)

### Global cell text appearance settings

Several grid properties affect global look of cell text which are:

AutoNumAlign	When true, automatically selects right alignment for cells containing numeric data only
EnhTextSize	When true, text that does not fit in the grid cell is displayed with end ellipsis
MultiLineCells	When true, cell text containing line feeds is displayed on multiple lines
URLFull	When true, the protocol specifier is displayed along with the hyperlink, otherwise it is used internally but not displayed
URLShow	When true, cell text starting with protocol specifiers <a href="http://">http://</a> , <a href="ftp://">ftp://</a> , <a href="mailto:">mailto:</a> , is displayed in the URLColor and underlined
URLShowInText	When true, any hyperlink of the type <a href="http://">http://</a> , <a href="http://">http://</a> , <a href="ftp://">ftp://</a> , <a href="mailto:">mailto:</a> , that occurs in the text of a cell is displayed in the URLColor and underlined and will act as a hyperlink when clicked. This means that if the cell content is "Visit <a href="http://www.tmssoftware.com">http://www.tmssoftware.com</a> for details", the hyperlink will be automatically underlined without any need to write HTML <A> tags. This is different from using just URLShow = true, where the entire cell text is treated as hyperlink or not.
WordWrap	When true, cell text is wordwrapped. This can be dynamically set for individual cells by using the event OnGetWordWrap. Note that when WordWrap is enabled, text in the cell is always vertically top aligned. The Windows wordwrap text drawing API can only display wordwrapped text top aligned.

### Cell selection

By default, selected cells are displayed in the clHighLight background color and clHightLightText font color. Set grid.ShowSelection = false if the grid should not display selected cells. Settings that control display of selected cells are:

SelectionColor: TColor;	Sets the background color of selected cells
SelectionColorTo: TColor;	When different from clNone, sets the gradient end color of a

	selected cell.
SelectionMirrorColor: TColor;	When different from clNone, sets the bottom gradient start color of a selected cell.
SelectionMirrorColorTo: TColor;	When different from clNone, sets the bottom gradient end color of a selected cell.
SelectionRectangle: Boolean;	When true, a wide border rectangle is displayed around selected cells
SelectionResizer: Boolean;	When true, the selection rectangle is displayed with rectangular grip in bottom right corner to resize the selection
SelectionRTFKeep: Boolean;	When true, RTF text colors are not affected by selection text color in selected cells
SelectionTextColor: TColor;	Sets the text color of selected cells
ShowSelection: Boolean;	When true, selected cells are displayed in SelectionColor and SelectionTextColor

The selection in the grid can be hidden temporarily by the method `grid.HideSelection` and unhidden later with `grid.UnHideSelection`.

Note: by default, when the `SelectionTextColor` is set to a color different from `clNone`, the `SelectionTextColor` has priority over the font color of the cell itself. This is to ensure that for the combination `SelectionColor/SelectionTextColor`, the cell text is always guaranteed to be visible. If it is not desirable that the selection text color is different from the cell font color, set `grid.SelectionTextColor` to `clNone`. With this setting, the cell text color will be always used.

### **Advanced topic: Smart cell resizing**

With `SelectionResizer` and `SelectionRectangle` set true, the selection can be resized by dragging the bottom left corner. If the property `grid.Navigation.AllowSmartClipboard` is set true as well, the resizing of the selection will cause the smart clipboard operation to try to fill the new selection based on the information found in the first selected cells. It will try to guess the data format of the cells of the original selection and try to find the delta between 2 or more cells of the original selection and apply this delta for completion for the new selection.

#### ***Example: original selection***

	1	1	
	2	2	
	3		
	4		

#### ***Resized to new selection***

	1	1
	2	2
	3	3
	4	4

### Highlighting and marking errors in cells

With the <Hl> tag and <E> tag an arbitrary part of the text can be highlighted or underlined with error lines. TAdvStringGrid has a range of methods that allow to automatically highlight or unhighlight text in cells or mark or unmark text in cells. The following set of methods is available for this:

```
function HighlightText (DoCase: Boolean; S,Text: string):string;
function UnHighlightText (S:string):string;
procedure HighlightInCell (DoCase: Boolean; Col,Row: Integer; HiText: string);
procedure HighlightInCol (DoFixed,DoCase: Boolean; Col: Integer; HiText:
string);
procedure HighlightInRow (DoFixed,DoCase: Boolean; Row: Integer; HiText:
string);
procedure HighlightInGrid (DoFixed,DoCase: Boolean; HiText: string);
procedure UnHighlightInCell (Col,Row: Integer);
procedure UnHighlightInCol (DoFixed: Boolean; Col: Integer);
procedure UnHighlightInRow (DoFixed: Boolean; Row: Integer);
procedure UnHighlightInGrid (DoFixed: Boolean);
function MarkText (DoCase: Boolean; S,Text: string):string;
function UnMarkText (S:string):string;
procedure MarkInCell (DoCase: Boolean; Col,Row: Integer; HiText: string);
procedure MarkInCol (DoFixed,DoCase: Boolean; Col: Integer; HiText: string);
procedure MarkInRow (DoFixed,DoCase: Boolean; Row: Integer; HiText: string);
procedure MarkInGrid (DoFixed,DoCase: Boolean; HiText: string);
procedure UnMarkInCell (Col,Row: Integer);
procedure UnMarkInCol (DoFixed: Boolean; Col: Integer);
procedure UnMarkInRow (DoFixed: Boolean; Row: Integer);
procedure UnMarkInGrid (DoFixed: Boolean);
procedure RemoveMarker (ACol,ARow: Integer);
procedure RemoveAllMarkers;
```

### *Example: highlighting TMS in a cell*

```
Grid.Cells[2,3] := 'This is TMS software';
Grid.HighlightInCell (False,2,3,'TMS');
```

This will display the cell as :

This is **TMS** software

Later the highlighting can be removed by calling grid.UnHiLightInGrid(False). This will remove highlighting in any cell of the grid.

### Automatic sizing and numbering of columns and rows

TAdvStringGrid has several built-in methods to let the grid automatically adapt the column width or row height to fit the text of cells.

Methods:

```
procedure AutoSizeCol (Col: integer);
```

Adapts the width of column Col to have all text in cells in this column fit.

```
procedure AutoSizeColumns (DoFixedCols: Boolean; Padding: integer);
```

Adapts the width of all columns (including fixed columns when DoFixedCols = true) to the width of the text. An additional parameter Padding can be used to add some extra padding width to the column's width.

```
procedure AutoFitColumns (DoFixedCols: Boolean = true);
```

Changes the width of all columns proportionally to ensure all columns fill the entire width of the grid. When DoFixedCols = false, the size of the fixed columns is not affected, only the size of the normal columns is proportionally changed.

```
procedure AutoSizeRow (Row: integer);
```

Adapts the height of row Row to have all text in cells in this row fit.

```
procedure AutoSizeRows (DoFixedRows: Boolean; Padding: integer);
```

Adapts the height of all rows (including fixed rows when DoFixedRows = true) to the height of the text. An additional parameter Padding can be used to add some extra padding width to the row's height.

```
procedure AutoNumberCol (Col: integer);
```

Fills the rows of a column with a series of numbers, incrementing from first row to total number of rows. The grid public property AutoNumberOffset sets the value of the first row and the property AutoNumberStart sets the first row index from where auto numbering should be applied.

```
procedure AutoNumberRow (Row: integer);
```

Fills the columns of a row with a series of numbers, incrementing from first column to total number of columns. The grid public property AutoNumberOffset sets the value of the first column and the property AutoNumberStart sets the first column index from where auto numbering should be applied.



## TAdvStringGrid nodes

A multi-level hierarchy row expand/contract functionality can be added to TAdvStringGrid through Nodes. Working with nodes involves three topics:

- putting nodes in the grid
- node appearance
- reacting to node click events

Following functions are available to work with nodes in the grid:

```
procedure AddNode (aRow, Span:integer);
```

*Adds a node in the grid spanning Span rows*

```
procedure RemoveNode (aRow:integer);
```

*Removes a node at row aRow.*

```
function IsNode (aRow:integer):boolean;
```

*Returns true if the row contains a node*

```
function GetNodeState (ARow:integer):boolean;
```

*Returns true if the node is in contracted state*

```
procedure SetNodeState (ARow:integer;value:boolean);
```

*Sets the state of node*

```
procedure ExpandNode (ARow:integer);
```

*Expands the node at row ARow.*

```
procedure ContractNode (ARow:integer);
```

*Contracts the node at row ARow*

```
procedure ExpandAll;
```

*Expands all nodes*

```
procedure ContractAll;
```

*Contracts all nodes*

```
function GetNodeSpan (aRow: Integer): Integer;
```

*Retrieves the number of rows a node spans*

```
function GetNodeLevel (aRow: Integer): Integer;
```

*Retrieves the depth level of a node*

```
procedure InsertChildRow (ARow: Integer);
```

*Inserts a new row within the span of a node*

```
procedure RemoveChildRow (ARow: Integer);
```

*Removes a child row from a node*

Everything starts by adding a node to a grid and this is done with the AddNode method. The first parameter is what we call the visible row position in the grid where you want to add a node. When working with hidden rows, there is a difference between visible row position and real row position which takes the hidden rows into account. (Whenever you want to map the visible row position to a real row position, use the RealRowIndex method) The second parameter in the AddNode method is the span of the node, that is, the number of rows to expand or contract when clicking this node. If this span parameter is zero, the node will automatically expand or contract to the next found node in the grid.

The RemoveNode and IsNode methods are simply doing what their names refer to. Also notice in this case, that the row refers to the visible row position!

With these function, you can start adding simple row expand/contract functionality to your grid. In the example procedure below, nodes are inserted to allow expansion or contracting of equal cells in column 1:

```
var
    i,j:integer;
begin
    with advstringgrid1 do
    begin
        I := 1;
        J := 1;
        while (I < RowCount - 1) do
        begin
            while (Cells[1,J] = Cells[1,J + 1]) and (J < RowCount - 1) do
                Inc(j);
            if (I <> J) then
                AddNode(I,J - I + 1);
            I := J + 1;
            J := I;
        end;
        Row := 1;
        Col := 1;
    end;
end;
```

In order to programmatically expand or contract nodes, either the function GetNodeState, SetNodeState or ExpandNode and ContractNode are available. The difference is the used row mapping. GetNodeState and SetNodeState work with this visible row index, while ExpandNode and ContractNode work with the real row index. Often, you will want to maintain the exact real row position of the node to expand and use the ExpandNode or ContractNode method. This is because the visible row position can change all the time by user interaction, while the real row position is under program control:

```
procedure TForm1.Button3Click(Sender: TObject);
begin
    AdvStringGrid1.ExpandNode(RealRow);
end;
```

```
procedure TForm1.Button4Click(Sender: TObject);
begin
    AdvStringGrid1.ContractNode(RealRow);
end;
```

**end;**

A second topic involved in using nodes, is the node appearance. Nodes always appear in the first column (index 0) and can be one of 4 types : cnflat, cn3D, cnglyph or cnXP. A flat node is simply a rectangle with the well known + / - sign in it. The 3D node type is a raised or sunken rectangle while you can also specify your own glyph for the expand or contract state. The appearance of the node is controlled through the CellNode property of TAdvStringGrid. You can specify here the glyphs as well as the color of the flat and 3D node.

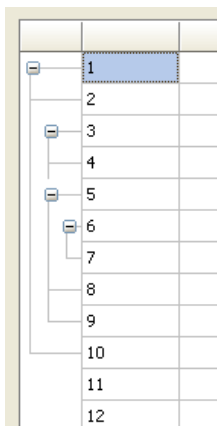
Further properties of CellNode are:

ShowTree: Boolean; when true, a tree connecting the nodes is drawn

ShowTreeFull: Boolean; when true, a tree is drawn horizontally till the right side of the cell

TreeColor: TColor; sets the color of the tree lines.

### Multilevel nodes



TAdvStringGrid supports multi level nodes. This is done by inserting nodes within the span of an existing (parent) node. It is required that the span of a child node is within the span of the parent node. If this is not the case, the multi-level node setup is incorrect and will not work properly. The above node scheme is obtained by following code:

```
advstringgrid1.AutoNumberCol(1);
advstringgrid1.AddNode(1,10); // main node
advstringgrid1.AddNode(3,2); // child node 1
advstringgrid1.AddNode(5,5); // child node 2
advstringgrid1.AddNode(6,2); // child node of child node 2
```

Last but not least, four event handlers give feedback on user node expansion or contraction through the OnExpandNode, OnContractNode and OnBeforeExpandNode and OnBeforeContractNode events. For the OnExpandNode, OnContractNode, two additional parameters come with this event handler: the visible row index of the node clicked as well as the real row index of this node:

```
procedure TForm1.AdvStringGrid1ExpandNode(Sender: TObject; ARow,
  ARowReal: Integer);
begin
  ShowMessage('Expand : ' + IntToStr(ARow) + '-' + IntToStr(ARowReal));
end;
```

For the OnBeforeExpandNode and OnBeforeContractNode and additional parameter Allow by reference is available with which it can be dynamically controlled whether the node can contract/expand or not.

## TAdvStringGrid filtering

**Basic filtering**

With the filtering capabilities in TAdvStringGrid, showing only a filtered set of rows in the grid is easy. Two properties are used for filtering. First there is the FilterData property, which is a TCollection of filter conditions for each column and second is the property FilterActive through which filtering is performed when set true.

Taking a closer look at the FilterData collection, this is a TCollection of elements with following properties:

Column: Integer; integer value, setting the column for which to apply the filter condition

Condition: string; this is a string setting the filtering condition

CaseSensitive: Boolean; sets whether the filter is case sensitive or not

Data: TFilterCells; controls what specific cell data the filter should apply to (see below)

Suffix: string; sets the suffix string to ignore for the filtering condition

Prefix: string; sets the prefix string to ignore for the filtering condition

Operation: TFilterOperation; sets the logical operation between multiple filters

The Condition property can contain a condition in following formats:

substring filtering:

S\*, S? : \* or ? denote multi or single character matches

>, <, >=, <= : larger than, less than, larger or equal, less or equal (when data is numeric or a date, comparison take place based on numeric data or date based, otherwise on alphabetic comparisons)

=, ! : equal or not equal

&, ^ : logical AND, logical OR

Thus, an expression : >20 & <30 is a valid filtering expression as well as !A\*

The filter can also detect dates, ie. It can use something like : >10/4/2003 & <10/5/2003

Note: when the filter condition includes a space character or logical expression character, use quotes, for example, this filter condition filters on 'C&A' (and not C and A) by setting

Condition := "'C&A'";

When the Prefix or Suffix property is set, this string is ignored as start or end string part of the cell to perform the match with. For example, if cells display a value as currency (ie. 150\$), setting the Suffix to '\$' will allow to ignore the end '\$' character and enable to specify a numeric based filter condition (ie. >100)

By default, setting multiple filter conditions is a logical AND operation (the Operation property is by default foNone). For speed reasons, by default a short-circuit evaluation is done. When choosing another logical operation, an extensive evaluation is done applying the choosen operation between each successive filter.

Example:

To apply a filter on 2 columns where rows should be accepted when the condition for column A matches or the condition for column B matches, setup is:

```
with filter.Add do
```

```
begin
    Condition := ConditionForA;
    Column := A;
    Operation := foAND; // perform AND with default True result
end;

with filter.Add do
begin
    Condition := ConditionForB;
    Column := B;
    Operation := foOR; // perform OR with previous filter
end;
```

To start the actual filtering, the property FilterActive is first set to False to disable all filtering. After this, the FilterData collection is setup and then FilterActive is set to True to apply the filter.

If the filter condition is set in the first row for each column, setting up and applying the filter becomes:

```
var
    i:integer;
begin
    with AdvStringGrid1 do
    begin
        FilterActive := False;
        Filter.Clear; // clearing any previous filter settings
        for I := FixedCols to ColCount - 1 do
        begin
            if (Cells[i,0]<>'') then // add filter for column if filter present
            with Filter.Add do
            begin
                Condition := Cells[i,0];
                Column := i;
                CaseSensitive := False; // filter is not case sensitive
            end;
        end;
        FilterActive := True; // applying the filter
    end;
end;
```

By default, filtering is based on displayed cell text, ie. the value that was possible dynamically set with the event OnGetDisplText. That means that when virtual cells are used, the filtering will be based by default on the virtual cell text. To enable the filtering to happen for the actual cell data, set FilterData.Data to fcNormal. Other than virtual or normal cell text, it is also possible to specify:

fcStripHTML: filtering is based on displayed cell text but with HTML tags removed

fcCalculated: this applies in first place to TadvSpreadGrid to enable filtering on formula itself or the formula result.

fcRow: a row matches the filter when the string set in the condition is found in any of the cells of a row.

This filter will show all rows where any of its columns contains the word “text”:

```
with grid.Filter.Add do
begin
    Condition := 'text';
    Data := fcRow;
```

```
end;  
grid.FilterActive := true;
```

### Filter dropdown in column header

To make filtering in the grid available from the UI, each column header can display a filter dropdown button from where a filter can be chosen. Upon selection of a filter from the dropdown, it is applied to the grid. The settings that control the display of the filter are grouped under grid.FilterDropDown. Following settings are available via the grid.FilterDropDown property:

```
grid.FilterDropDown.AutoSize: Boolean
```

When true, the size of the dropdown adapts to the text in the list

```
grid.FilterDropDown.Color: TColor
```

Sets the background color of the dropdown list

```
grid.FilterDropDown.ColumnWidth: Boolean
```

When true, the filter dropdown width is equal to the column width

```
grid.FilterDropDown.Font: TFont
```

Sets the font of the filter dropdown list

```
grid.FilterDropDown.Glyph: TBitmap
```

Sets the glyph displayed in the column header indicating a filter is available

```
grid.FilterDropDown.Height: integer
```

Sets the height of the dropdown list

```
grid.FilterDropDown.Width: integer
```

Sets the width of the dropdown list

The content of the filter dropdown list is set via the event grid.OnGetColumnFilter. This event passes a TStringList that can be filled with filter specifiers. Note that the filter specifiers can be friendly names. It is only from the OnFilterSelect event that the real filtercondition must be applied. The code snippet below shows how the filter is set for different columns in the grid:<br>

```
procedure TForm2.AdvStringGrid1GetColumnFilter(Sender: TObject; Column:  
Integer; Filter: TStringList);  
begin  
    case Column of  
    1:  
        begin  
            Filter.Add('Clear');  
            Filter.Add('Within range');  
            Filter.Add('Exceptions');  
        end;  
    2:  
        begin
```

```

        Filter.Add('Clear');
        Filter.Add('>50');
        Filter.Add('<50');
    end;
3:
    begin
        Filter.Add('Clear');
        Filter.Add('>20');
        Filter.Add('<20');
    end;
4:
    begin
        Filter.Add('Clear');
        Filter.Add('>20');
        Filter.Add('<20');
    end;

end;
end;

```

When a selection is made from the filter dropdown list, the event OnFilterSelect is triggered. This returns the column, the index of the filter and the friendlyname of the filter. Via the parameter FilterCondition, the real filter condition can be set. In the code shown here, the OnFilterSelect converts the filter friendlyname "Clear" to an empty filter condition and it also sets a filter condition for column 1 for friendly names "Within range" and "Exceptions". It also updates the column header to show the filter that is applied.

```

procedure TForm2.AdvStringGrid1FilterSelect(Sender: TObject; Column,
    ItemIndex: Integer; FriendlyName: string; var FilterCondition: string);
begin
    if FilterCondition = 'Clear' then
        FilterCondition := '';
    if (Column = 1) then
        begin
            case ItemIndex of
                1: FilterCondition := '>20 & <80';
                2: FilterCondition := '<20 | >80';
            end;
        end;
    AdvStringgrid1.Cells[Column, 0] := FriendlyName;
end;

```

	Within range	>50	>20	<20
27	Clear		31	16
49	Within range		82	2
34	Exceptions	81	81	14
59		88	66	11
76		98	49	3
48		99	23	19
43		68	75	3
61		80	46	16

By default, the filter is displayed in the first fixed row of the grid. If the grid has multiple fixed rows, it possible to control on what fixed row the filter dropdown is displayed with the property grid.FilterDropDownRow.

### Auto filters

The grid has a built-in capability to automatically create the filter consisting of an alphabetically sorted list of unique column values. To enable this feature, set `grid.FilterDropDownAuto` to `true`. In addition to the list of unique values, an entry is optionally added that can be used to clear the filter. The value of this entry is set by `grid.FilterDropDownClear`: string and defaults to '(All)'. When the auto filter capability is enabled, every column header automatically gets the filter dropdown icon. When the auto filter is only needed for some specific columns, the `OnGetColumnFilter` event can be used to remove the filter by simply clearing the prefilled filter list. This sample code shows how the auto filter can be set to only columns 1 and 2:

```
procedure TForm13.AdvStringGrid1GetColumnFilter(Sender: TObject;  
  Column: Integer; Filter: TStrings);  
begin  
  if not (Column in [1,2]) then  
    Filter.Clear;  
end;
```

### Incremental filters

Incrementally applying filters can be done by calling `grid.ApplyFilter` several times after each other. To remove the last filter or to remove all filters call `grid.RemoveLastFilter` or `grid.RemoveAllFilters` respectively. In the code snippet below, two filters are applied after each other and finally the last filter operation is removed, leaving the result of the first applied filter:

```
procedure TForm2.Button1Click(Sender: TObject);  
begin  
  with advstringgrid1.Filter.Add do  
    begin  
      condition := '>50';  
      column := 1;  
    end;  
    advstringgrid1.ApplyFilter;  
  
    with advstringgrid1.Filter.Add do  
      begin  
        condition := '<75';  
        column := 1;  
      end;  
      advstringgrid1.ApplyFilter;  
  
      advstringgrid1.RemoveLastFilter;  
end;
```

### Narrow down filtering

Another filtering the Narrow-Down capability. With this method, the grid can filter in incremental steps to find all rows with a specific word or all rows that have a specific word in one column. In the demo, the edit control's `OnChange` method event handler just calls `grid.NarrowDown(searchvalue)`. This causes that the grid will always show all rows containing the word in the edit control as the user types the search specification in the edit control. The checkbox controls whether the search for a word in a row is done for the full row or restricted to one column only (column 1 in this case):

```
procedure TForm1.Edit1Change(Sender: TObject);  
begin  
  if Checkbox1.Checked then  
    AdvStringGrid1.NarrowDown(Edit1.Text, 1)
```



```
else
    AdvStringGrid1.NarrowDown(Edit1.Text);
end;
```

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coupe ☐ Narrow down in column 1 only

	Audi	TT Coupe	1781	132	4	180	1235000	0	
	BMW	318is coupe	1895	103	4	140	1182358	0	
	BMW	320i coupe	1991	110	6	150	1200000	0	
	BMW	323i coupe	2494	120	6	163	1285000	0	
	BMW	328i coupe	2793	142	6	193	1365000	0	
	BMW	M3 coupe	3201	236	6	321	2023000	0	
	BMW	Z3 coupe 2,8	2793	141	6	192	1360000	0	
	BMW	Z3 M coupe	3201	236	6	321	2040000	0	
	JAGUAR	XK8 coupe	3996	209	8	280	2600000	1	
	MASERATI	Ghibli Coupe 2,0	1996	225	6	306	2035825	4	
	MASERATI	Ghibli Coupe 2,8	2790	209	6	284	2053975	4	

## TAdvStringGrid grouping

TAdvStringGrid has built-in single level automatic grouping and grouped sorting. This makes it easy to add grouping features with a few lines of code. Grouping means that identical cells within the same column are removed and shown as a grouping row for the other cells in the rows.

Example:

United States	New York	205000
United States	Chicago	121200
United States	Detroit	250011
Germany	Köln	420532
Germany	Frankfurt	122557
Germany	Berlin	63352

Grouped on the first column this becomes:

- United states	
New York	205000
Chicago	121200
Detroit	250011
- Germany	
Köln	420532
Frankfurt	122557
Berlin	63352

Grouped sorting on the first column becomes:

- United states	
Chicago	121200
Detroit	250011
New York	205000
- Germany	
Berlin	63352
Frankfurt	122557
Köln	420532

This is an overview of the grouping methods:

```
procedure Group(ColIndex:integer);
procedure UnGroup;
property GroupColumn:integer;
procedure SubGroup(ColIndex:integer);
```

The Group method groups based on the column ColIndex. It automatically adds the expand / contract nodes. When expand / contract nodes are available, the normal sort when a column header is clicked changes to inter group sorting.

The Group method is equivalent to assignment of the GroupColumn property, ie :

AdvStringGrid.Group(5) has the same effect as AdvStringGrid.GroupColumn := 5;

Note that the column for grouping can only start from column 1, since column 0 is the placeholder for the expand / contract nodes. The GroupColumn property has the additional benefit that it returns -1 when grouping is not active. Otherwise it returns the current grouped column.

To undo the effect of grouping, the UnGroup method can be used, or as an alternative, the GroupColumn property can be set to -1.

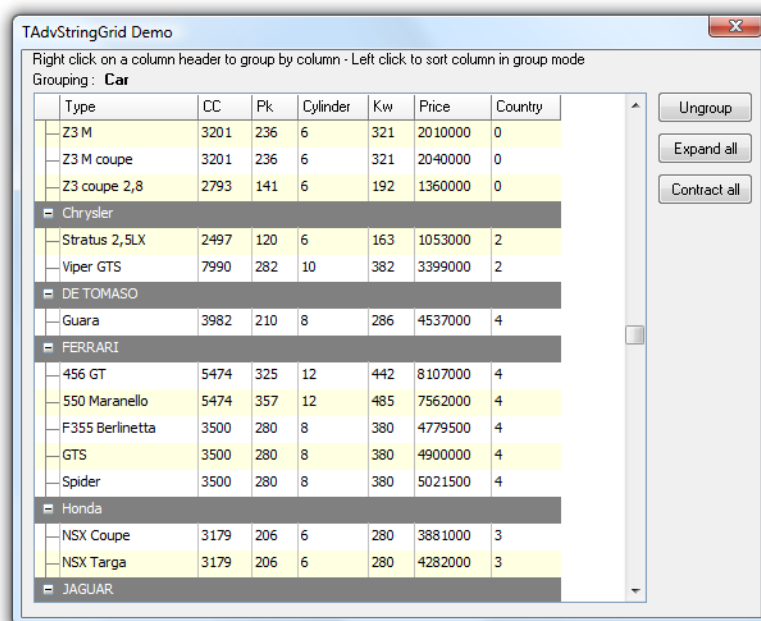
Example: loading a CSV file, applying grouping and performing a grouped sort

```
// loading CSV file in normal cells
AdvStringGrid1.SaveFixedCells := False;
AdvStringGrid1.LoadFromCSV('cars.csv');
// automatically adapt column width to max. text width in columns
AdvStringGrid1.AutoSizeColumns(False,10);
// insert column as placeholder for nodes
AdvStringGrid1.InsertCols(0,1);
// setting width of node column to fixed width of 20
AdvStringGrid1.ColWidths[0] := 20;
// do grouping on column 1
AdvStringGrid1.GroupColumn := 1;
// apply grouped sorting on (new) column 1
AdvStringGrid1.SortSettings.Column := 1;
AdvStringGrid1.QSortGroup;
```

When a grouped view is no longer necessary, it can be removed by:

```
AdvStringGrid.UnGroup;
```

## Extra grouping features



Some extra capabilities for more visually appealing grouping can be set through the property grid.Grouping. Through this property it can be enabled that group headers are automatically set in a different color and that cells from a group header are automatically merged. In addition, a group can also have a summary line. A summary line is an extra row below items that belong to the same group. This summary line can be used to put calculated group values in. The color for this summary line can also be automatically set as well as cell merging performed on this.

Grouping property:

AutoSelectGroup: Boolean	When true, clicking on the group header automatically selects all rows within the group (when goRowSelect = true)
GroupCountFormat: string	Specifies the display format for the group count in the group header
HeaderColor: TColor	When different from clNone, sets the background color for group header rows
HeaderColorTo: TColor	When different from clNone, set the gradient end color for a merged group header
HeaderLineColor: TColor	Sets the line color for the header underline
HeaderLineWidth: Integer	Sets the line width for the header underline
HeaderTextColor: TColor	When different from clNone, sets the font color for group header rows
HeaderUnderline: Boolean	When true, an extra line under a header is displayed
MergeHeader: Boolean	When true, the group headers are automatically merged
MergeSummary: Boolean	When true, the group summary row is automatically merged
ShowGroupCount: Boolean	When true, the number of rows within each group is shown in the group header. The property GroupCountFormat controls the display format of the group count
Summary: Boolean	When true, a summary line is automatically added for each group
SummaryColor: TColor	When different from clNone, sets the background color for group summary rows
SummaryColorTo: TColor	When different from clNone, set the gradient end color for a merged group summary row
SummaryLine: Boolean;	When true, an extra line in a summary row is displayed
SummaryLineColor: TColor;	Sets the line color for the summary line
SummaryLineWidth: Integer;	Sets the line width for the summary line
SummaryTextColor: TColor	When different from clNone, sets the font color for group summary rows

### Group calculations

TadvStringGrid has built-in function to automatically calculate group sums, average, min, max, count. The group results are set in the group header row if no summary row is shown, otherwise the group summary row is used by default. Group calculations are performed per column.

Available functions:

```
grid.GroupSum(AColumn: Integer);
```

*Calculates column sums per group*

```
grid.GroupAvg (AColumn: Integer);
```

*Calculates column averages per group*

```
Grid.GroupMin (AColumn: Integer);
```

*Calculates column minimum per group*

```
Grid.GroupMax (AColumn: Integer);
```

*Calculates column minimum per group*

```
Grid.GroupCount (AColumn: Integer);
```

*Calculates number of rows in a group for each group*

```
Grid.GroupCustomCalc (AColumn: Integer);
```

*Allows to perform a custom calculation of group data with the event OnGroupCalc*

If there is a need for a special group calculation that is not available in the standard group calculation functions, the method grid.GroupCustomCalc can be used. For each group in the grid, this will trigger the event

```
grid.OnGroupCalc (Sender: TObject; ACol, FromRow, ToRow: Integer; var Res: Double);
```

The meaning of the parameters is:

ACol : column to perform calculation for

FromRow: first row in the group

ToRow: last row in the group

Res: variable parameter to use to set the result

In this sample, the grid is initialized with random number, is grouped on column 1 and for the first column in the grouped grid the standard deviation is calculated:

```
procedure TForm1.AdvStringGrid1GroupCalc (Sender: TObject; ACol, FromRow,
    ToRow: Integer; var Res: Double);
var
    i: integer;
    d, m, sd: double;
begin
    // calculate mean
    m := 0;
    for i := FromRow to ToRow do
    begin
        m := m + advstringgrid1.Floats[ACol,i];
    end;
    m := m / (ToRow - FromRow + 1);
    // calculate standard deviation
```

```

sd := 0;
for i := FromRow to ToRow do
begin
    sd := sd + sqr(advstringgrid1.Floats[ACol,i] - m);
end;
sd := sd / (ToRow - FromRow);
Res := sqrt(sd);
end;
procedure TForm1.FormCreate(Sender: TObject);
var
    i: integer;
begin
    AdvStringGrid1.RowCount := 100;
    AdvStringGrid1.RandomFill(false,100);
    for i := 1 to AdvStringGrid1.RowCount - 1 do
        AdvStringGrid1.Ints[1,i] := random(5);
    end;
    AdvStringGrid1.Grouping.Summary := true;
    AdvStringGrid1.Grouping.MergeHeader := true;
    AdvStringGrid1.Grouping.ShowGroupCount := true;
    AdvStringGrid1.Group(1);
    AdvStringGrid1.GroupCustomCalc(1);
end;

```

This results in:

0 (19)			
14	50	2	
24	5	50	
26	85	91	
32	46	24	
37	42	74	
39	54	26	
41	3	99	
66	1	30	
68	75	3	
72	41	54	
74	19	14	
77	49	88	
81	81	14	
83	31	31	
85	76	18	
88	82	2	
98	49	3	
99	23	19	
27,36			
1 (20)			
7	96	78	
77	57	75	

## Subgroups

With the SubGroup (and corresponding SubUnGroup) it is possible to create subgroups in a grouped grid. Adding a subgroup to a grouped grid is done starting from the leftmost normal column.

0					
0	0	0	1	1	
0	0	2	2	1	
0	1	0	2	0	
0	1	1	0	1	
0	1	2	2	0	
0	1	2	2	0	
0	2	0	0	2	
0	2	0	2	2	
0	2	1	0	1	
0	2	1	2	0	
1	1	0	0	0	
1	1	0	0	2	
2	0	0	1	2	
2	0	0	2	1	
2	0	2	1	1	
2	1	2	0	2	
2	1	2	1	1	
2	2	2	2	0	
1					
0	1	0	2	1	

0					
0					
0					
0	1	1			
2	2	1			
1					
0	2	0			
1	0	1			
2	2	0			
2	2	0			
2	2	0			
2					
0	0	2			
0	2	2			
1	0	1			
1	2	0			
1					
1					

In this example, a first group is created by calling grid.Group(1). Two additional subgroups are added by calling grid.SubGroup(1) and grid.SubGroup(2);

The full code used to create this starting from a default grid is:

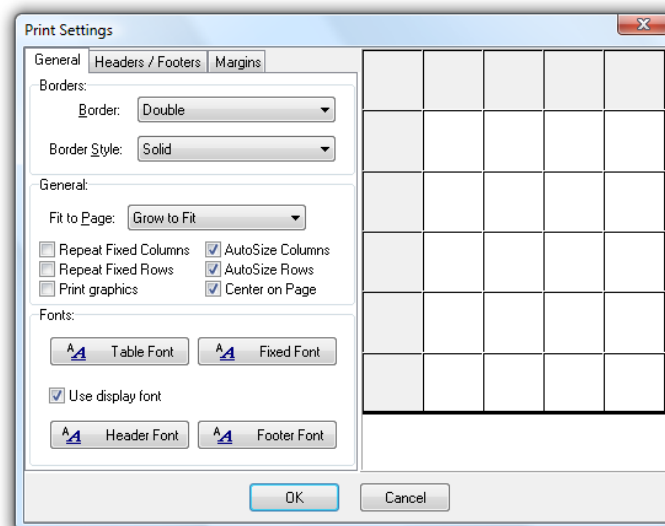
```

procedure TForm1.Button1Click(Sender: TObject);
begin
    AdvStringGrid1.RowCount := 100;
    AdvStringGrid1.Randomfill(false,3);
    AdvStringGrid1.Group(1);
    AdvStringGrid1.SubGroup(1);
    AdvStringGrid1.SubGroup(2);
    AdvStringGrid1.ColWidths[1] := 10;
    AdvStringGrid1.ColWidths[2] := 10;
end;

```

## TAdvStringGrid printing capabilities

TAdvStringGrid has built-in support to print its contents. Several methods exist to start printing the grid or a selection of cells from the grid. In addition to the methods, the PrintSettings property controls the various options for printing the grid.



## PrinterSettings details

Borders	<p>The Borders property can be:</p> <p>pbNoborder : no border is printed</p> <p>pbSingle : single line width border is printed</p> <p>pbDouble : double line width border is printed</p> <p>pbVertical : only vertical single line borders are printed</p> <p>pbHorizontal : only horizontal single line borders are printed</p> <p>pbAround : only border around the grid is printed</p> <p>pbAroundVertical : only outer vertical borders of the grid are printed</p> <p>pbAroundHorizontal : only outer horizontal borders of the grid are printed</p>
BorderStyle	Line drawing style for border of type TPenStyle
Centered	When true, printout is centered on the page.
ColumnSpacing	Controls distance to skip between 2 columns in units of 1/10mm.
Date	<p>The position has the type TPrintPosition with following values</p> <p>ppNone : no date is printed</p> <p>ppTopLeft : data is printed in top left corner</p> <p>ppTopRight : date is printed in top right corner</p> <p>ppTopCenter : date is printed centered on top</p>



	<p>ppBottomLeft : date is printed in bottom left corner</p> <p>ppBottomCenter : date is printed centered at bottom</p> <p>ppBottomRight : date is printed in bottom right corner</p>
DateFormat	Holds the date formatting parameter. Default value is dd/mm/yyyy.
FitToPage	<p>FitToPage controls what method is used for fitting grid data on a page:</p> <p>fpNever : never use page fitting.</p> <p>fpAlways : always fit to page, no matter what the scalefactor is</p> <p>fpGrow : only fit to page by increasing font size / column widths</p> <p>fpShrink : only fit to page by decreasing font size / column widths</p> <p>fpCustom : call the OnFitToPage event, to query for allowing pagefit with calculated scalefactor.</p>
FixedFont	Sets the font for fixed cells for printout
FixedHeight	Height of rows for printout in 0.1mm. Overrides the auto calculated row height if UseFixedHeight is true
FixedWidth	Width of columns for printout in 0.1mm. Overrides the auto calculated column width if UseFixedWidth is true
Font	Sets font of printout
FooterFont	Sets font for the footer
FooterSize	Controls distance to skip at end of page in units of 1/10mm.
HeaderFont	Sets font for the header
HeaderSize	Controls distance to skip at start of page in units of 1/10mm.
JobName	Sets title for print job in printer spooler
LeftSize	Controls distance to skip at left side of page in units of 1/10mm.
MaxPagesOffset	Sets the offset of the total nr. of pages printed.
NoAutoSize	If true, disables the automatic column sizing to optimize paper use and retain full column text visibility but uses column sizes proportional to column sizes on display and prints using wordwrapping if wordwrap property is true
NoAutoSizeRow	When true, no automatic row height calculation is performed and the row height of the printed grid is proportional to the on screen row height.
Orientation	Sets printer orientation to landscape or portrait (defined in the Printers unit)
PageNr	<p>The position has the type TPrintPosition with following values</p> <p>ppNone : no page number is printed</p> <p>ppTopLeft : page number is printed in top left corner</p> <p>ppTopRight : page number is printed in top right corner</p>

	<p>ppTopCenter : page number is printed centered on top</p> <p>ppBottomLeft : page number is printed in bottom left corner</p> <p>ppBottomCenter : page number is printed centered at bottom</p> <p>ppBottomRight : page number is printed in bottom right corner</p>
PageNumberOffset	Sets the offset of the page numbers printed.
PageNumSep	Sets the separator between actual printed page and total nr. of pages. If PageNumSep is a zero length string, total number of pages is not printed. Default value is '/'
PagePrefix	Sets the prefix for page numbering for printout
PageSuffix	Sets the suffix for page numbering for printout
PrintGraphics	When true, graphics are printed
RepeatFixedCols	When true, printout of fixed columns is repeated on each page.
RepeatFixedRows	When true, printout of fixed rows is repeated on each page.
RightSize	Controls distance to skip at right side of page in units of 1/10mm.
RowSpacing	Controls distance to skip between 2 columns in units of 1/10mm.
Time	<p>Sets the position where time of printout needs to be printed. The position is of the type TPrintPosition and can be:</p> <p>ppNone : no time is printed</p> <p>ppTopLeft : time is printed in top left corner</p> <p>ppTopRight : time is printed in top right corner</p> <p>ppTopCenter : time is printed centered on top</p> <p>ppBottomLeft : time is printed in bottom left corner</p> <p>ppBottomCenter : time is printed centered at bottom</p> <p>ppBottomRight : time is printed in bottom right corner</p>
Title	Defines where the title is printed. This is of the type TPrintPosition with equal settings as for Time
TitleLines	TitleLines is a stringlist that can be used instead of TitleText to hold a multiple title lines
TitleSpacing	Controls the space between the grid title and the actual grid data in 0.1mm units
TitleText	TitleText holds a single line title only. When using multiline titles, use the TitleLines property
UseFixedHeight	If true, uses value FixedHeight, else auto calculation is done
UseFixedWidth	If true, uses value FixedWidth, else auto calculation is done
UseDisplayFont	When true, the PrintSettings.Font and PrintSettings.FixedFont properties are ignored and the grid's display fonts are used for printing

UseDefaultOrientation	When true, the default printer orientation is used as opposed to forcing the orientation to the PrintSettings.Orientation setting.
-----------------------	--

### Print methods

The methods available for printing are listed here. Two categories exist: the methods that print to the currently selected default printer and equivalent methods that just draw on the selected canvas. Printing can be done for: full grid, programmatically chosen rectangle of cells, selected cells, disjunct selected rows or disjunct selected columns.

```

procedure Print;
procedure PrintRect (Gridrect:TGridRect);
procedure PrintSelection;
procedure PrintSelectedRows;
procedure PrintSelectedCols;
procedure PrintPreview (Canvas:TCanvas;Displayrect:TRect);
procedure PrintPreviewRect (Canvas:TCanvas; Displayrect:TRect;
Gridrect:TGridRect);
procedure PrintPreviewSelection (Canvas:TCanvas; Displayrect:TRect);
procedure PrintPreviewSelectedRows (Canvas:TCanvas; Displayrect:TRect);
procedure PrintPreviewSelectedCols (Canvas:TCanvas; Displayrect:TRect);

```

### Print related events

OnPrintPage	Event triggered at start of each page
OnPrintPageDone	Event triggered after printing of a page completes
OnPrintStart	Event triggered before starting printing pages. This event returns the number of pages that will be required for the print and through parameters FromPage, ToPage it is possible to select a subset of pages to be printed
OnPrintCancel	Event triggered after printing each page with parameter Cancel that can be set true to cancel further printing
OnFitToPage	Event triggered after fit to page calculations have been done. This allows to override the calculated scale factor
OnPrintNewPage	Event triggered after each row is printed allowing to force a page break on an arbitrary row in the grid
OnPrintSetColumnWidth	Event triggered after calculation of required column widths, allowing to override the calculated column width
OnPrintSetRowHeight	Event triggered after calculation of required row heights, allowing to override the calculated row height

### Using the helper dialog components TAdvPreviewDialog and TAdvGridPrintSettingsDialog

Using these dialogs is straightforward. Both dialogs have a property Grid. Put the component on the same form as the grid's form and assign the grid to the AdvPreviewDialog.Grid or AdvGridPrintSettingsDialog.Grid property.

For the printsettings dialog following configurations are possible:

Caption	Sets the caption text of the printsettings dialog
INIFile	Sets the filename where to load/store printsettings
Options	Selects which parts of the print settings are enabled for changing. By default all settings are enabled for changing
PrintDimensions	Selects which dimensions are used in the settings dialog. This can be inches or millimetres
PrintPreview	When true, a small preview rectangle is displayed in the print settings dialog

For the print preview dialog following configurations are possible:

CloseAfterPrint	When true, if the Print button is pressed on the preview dialog to start a print, the dialog is automatically closed after printing has finished
DialogCaption	Sets the caption text of the preview dialog
DialogCloseBtn	Sets the close button text
DialogNextBtn	Sets the text of the next page button
DialogPrevBtn	Sets the text of the previous page button
DialogPrintBtn	Sets the text of the print button
PreviewCenter	Positions the preview dialog always in the screencenter
PreviewFast	Shows a preview without doing page number calculation resulting in a faster display
PreviewHeight PreviewWidth PreviewLeft PreviewTop	Sets the dimensions and position of the preview dialog
PrinterSetupDialog	When true, choosing Print from the preview dialog will first show the printer setup dialog before starting the print
PrintSelectedCols	Shows only selected columns in the preview. Mutually exclusive with PrintSelectedRows and PrintSelection
PrintSelectedRows	Shows only selected rows in the preview. Mutually exclusive with PrintSelectedCols and PrintSelection
PrintSelection	Shows only selected cells in the preview. Mutually exclusive with

	PrintSelectedRows and PrintSelectedCols
ShowMaximized	When true, the preview dialog is started in maximized state

### Public print related properties

A series of additional public read-only properties are available that return information during the printing process:

PrintPageRect: TRect;	Returns the physical dimensions (in logical coordinates) of the currently printed page
PrintPageWidth: Integer;	Returns the page width in logical coordinates
PrintColWidth[ACol: Integer]: Integer;	Returns the width of the column on paper in logical coordinates
PrintColOffset[ACol: Integer]: Integer;	Returns the indent from left of the column on paper in logical coordinates
PrintColStart: Integer;	Position from left in logical coordinates of the first column left border
PrintColEnd: Integer;	Position from right in logical coordinates of the last column right border
PrintNrOfPages: Integer;	Returns number of pages required

Example: printing a company logo in the page header

The OnPrintPage event is used to print a custom header on each page. This event is triggered for each page and thus allows to add any custom information on the printout. In this example, the space allocated for the custom header is set through the PrintSettings.HeaderSize property. It is important to know that printing is happening in MM\_LOMETRIC mode, meaning a positive X-axis used but a negative Y-axis.

```
procedure TForm1.AdvStringGrid1PrintPage(Sender: TObject; Canvas: TCanvas;  
    pagenr, pagexsize, pageysize: Integer);  
var  
    bmp: TBitmap;  
    r: TRect;  
    ratio: double;  
  
begin  
    bmp := TBitmap.Create;  
    bmp.LoadFromFile('athena.bmp');  
  
    ratio := bmp.Width/bmp.Height;  
  
    r.Left := AdvStringGrid1.PrintColOffset[1];  
    r.Top := -0;  
    r.Right := r.Left + Round(AdvStringGrid1.PrintSettings.HeaderSize*ratio);  
    r.Bottom := r.Top - AdvStringGrid1.PrintSettings.HeaderSize;
```

```
Canvas.StretchDraw(r,bmp);  
bmp.Free;  
  
r.Left := r.Right;  
r.Top := 0;  
Canvas.TextOut(r.Left,r.Top,'Printed with TAdvStringGrid');  
r.Top := r.Top - Canvas.TextHeight('gh');  
Canvas.TextOut(r.left,r.top,'showing how to add a bitmap in the header');  
  
r.Left := AdvStringGrid1.PrintColOffset[1];  
r.Right := AdvStringgrid1.PrintColOffset[8];  
r.Top := -AdvStringgrid1.PrintSettings.HeaderSize+2;  
Canvas.MoveTo(r.left,r.top);  
Canvas.LineTo(r.right,r.top);  
end;
```

## TAdvStringGrid clipboard handling

Handling standard keyboard shortcuts for clipboard is enabled by setting the property `grid.Navigation.AllowClipboardShortCuts` to `True`. Note that by default clipboard cut and paste operations only apply on editable cells. This can be overridden by setting the property `Grid.Navigation.AllowClipboardAlways` to `true`. When clipboard actions are performed by keyboard shortcuts in the grid, the following events are triggered:

- `OnClipboardPaste`
- `OnClipboardBeforePasteCell`
- `OnClipboardAfterPasteCell`
- `OnClipboardBeforePasteWideCell`
- `OnClipboardAfterPasteWideCell`
- `OnClipboardCopy`
- `OnClipboardCut`

These events have a parameter `Allow`, through which the clipboard operation can be cancelled by setting it to `false`. These clipboard events are called one time before the clipboard action happens and thus affect multiple cells in case multiple cells are involved in the clipboard operation.

In addition, the event `OnClipboardBeforePasteCell` is triggered before each cell value is replaced by its new value, allowing programmatic control whether the pasted values can be accepted or automatic replacement of pasted values. The `OnClipboardBeforePasteWideCell` is the equivalent event in case a Unicode text value is pasted in a cell.

The `OnClipboardAfterPasteCell` and `OnClipboardAfterPasteWideCell` are triggered after the actual paste for the cell was performed.

Finally, following clipboard methods are available to do programmatic clipboard operations:

```
procedure CutToClipboard;  
procedure CutSelectionToClipboard;  
procedure CopyToClipboard;  
procedure CopyToClipboardAsHTML;  
procedure CopySelectionToClipboard;  
procedure PasteFromClipboard;  
procedure PasteSelectionFromClipboard;
```

TAdvStringgrid supports following clipboard formats:

### 1) Standard text format (Unicode text for Delphi 2009, ANSI text for older versions)

This mode performs a copy & paste of just unformatted text. This mode is compatible with tables in many other applications such as Microsoft Excel, Microsoft Word or any text editor.

### 2) Rich text format

This mode performs a copy & paste of cell text including cells with rich text formatting

### 3) Binary format (proprietary format)

This mode performs a copy & paste of cells including cell properties such as color, alignment, font, ... This clipboard format can only be pasted within TAdvStringGrid.

By default, standard text format is enabled. To allow rich text clipboard format, set `grid.Navigation.AllowRTFClipboard` to true. To allow also formatted text copy & paste, set `grid.Navigation.AllowFmtClipboard` to true.

A paste operation will by default always overwrite the cells starting from the top/left cell of the selection in the grid. A paste operation can also insert cells instead. This mode is selected with `grid.Navigation.ClipboardPasteAction`.

In this sample code snippet, pasting in the grid will automatically insert new cells. By implementing the `OnClipboardBeforePasteCell`, it is ensured in code that no cell text will be longer than 4 characters when pasting text:

```
procedure TForm1.AdvStringGrid1ClipboardBeforePasteCell(Sender: TObject;  
  ACol, ARow: Integer; var Value: string; var Allow: Boolean);  
begin  
  if length(Value) > 4 then  
    Value := copy(Value, 1, 4);  
end;  
procedure TForm1.FormCreate(Sender: TObject);  
begin  
  AdvStringGrid1.Navigation.AllowClipboardShortCuts := true;  
  AdvStringGrid1.Navigation.ClipboardPasteAction := paInsert;  
end;
```



## TAdvStringGrid floating footer use

With the floating footer (for which the settings are organised in the property grid.FloatingFooter) an always visible fixed footer can be displayed in the grid. This footer is always visible independent of vertical scrolling in the grid. The floating footer can currently be organised in 3 different ways set by the FooterStyle property:

fsFixedLastRow  
fsColumnPreview  
fsCustomPreview

With the fsFixedLastRow style, the last row is always displayed in the fixed floating footer instead of in regular grid cells. With the fsFixedLastRow style, all columns are displayed in the fixed footer in the same way these would be displayed normally in the last row. This means that all settings that affect display of row with index RowCount - 1 (= last row) apply to the display of the fixed floating footer.

In fsColumnPreview mode, the fixed floating footer displays the column set by grid.FloatingFooter.Column: Integer for the current focused row. This can be used as a convenient way to display cell contents that would not fit in a small column, in the full grid width of the fixed floating footer for the selected row.

Finally, the fsCustomPreview mode enables combined column previewing through the CustomTemplate. With the custom template, different column contents can be shown by a referencing HTML tag. Suppose column 1 contains the name of a person, column 2 the prename and column 3 the address. This can be combined in a convenient preview of full name and address through a CustomTemplate like :

'Person : <B><#1> <#2></B> Address : <i><#3>';

Example: using fsFixedLastRow style to display always visible last row of the grid

The fsFixedLastRow style is chosen in the FloatingFooter settings and the last row is used to display the column sums. The following method puts the column sums into the last row :

```
procedure TForm1.UpdateSums;
var
  i: Integer;
begin
  for i := 1 to AdvStringGrid1.ColCount - 1 do
    AdvStringGrid1.Floats[i, AdvStringGrid1.RowCount - 1] :=
      AdvStringGrid1.ColumnSum(i, 1, AdvStringGrid1.RowCount - 2);
    AdvStringGrid1.FloatingFooter.Invalidate;
  end;
```

To synchronise updating the floating footer whenever a cell value changes through editing, the UpdateSums method is called from the OnCellValidate event which is triggered whenever editing changes a cell.

```
procedure TForm1.AdvStringGrid1CellValidate(Sender: TObject; Col,
Row: Integer; var Value: String; var Valid: Boolean);
begin
  UpdateSums;
end;
```

While the above example shows how displaying custom calculated values in the floating footer can be achieved, TAdvStringGrid already provides some predefined column calculation methods. The predefined column calculations can be set with:

```
Grid.FloatingFooter.ColumnCalc[ColumnIndex: Integer]: TColumnCalcType;
```

Where TColumnCalcType is:

```
TColumnCalcType = (acNONE,acSUM,acAVG,acCOUNT,acMIN,acMAX,acCUSTOM);
```

acAVG	Auto calculated column average
acCOUNT	Auto calculated column row count
acCUSTOM	Whenever a floating footer value needs to be updated, the event OnFooterCalc is triggered
acMAX	Auto calculated column maximum value
acMIN	Auto calculated column minimum value
acNONE	No automatic calculation done
acSUM	Auto calculated column sum

Default type is acNone, thus by default the value in the floating footer in fsFixedLastRow style is the contents of the last row cell.

Example: setting up column 2 with auto calculated sum and column 4 with auto calculated average

```
Grid.FloatingFooter.ColumnCalc[2] := acSum;
Grid.FloatingFooter.ColumnCalc[4] := acAverage;
```

Example: using custom footer calculation to calculate standard deviation

This code initializes a default grid with a visible floating footer and calculation acCUSTOM for the first editable column. The OnFooterCalc event calculates the standard deviation while the sum is automatically calculated for the 2<sup>nd</sup> editable column:

```
procedure TForm1.FormCreate(Sender: TObject);
begin
    with AdvStringGrid1 do
    begin
        ColCount := 20;
        RandomFill(false, 100);
        Options := Options + [goEditing];
        FloatingFooter.Visible := true;
        FloatingFooter.ColumnCalc[1] := acCUSTOM;
        FloatingFooter.ColumnCalc[2] := acSUM;
    end;
end;
procedure TForm1.AdvStringGrid1FooterCalc(Sender: TObject; ACol, ARow:
Integer; var Value: string);
```

```

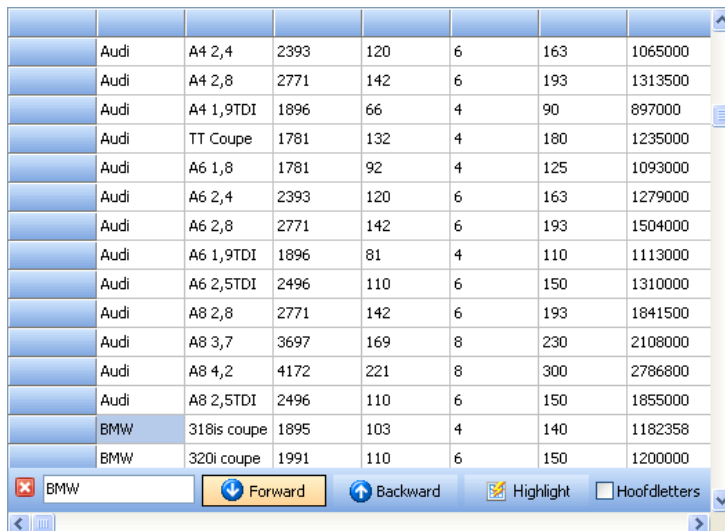
var
  i: integer;
  d, m, sd: double;
begin
  // calculate mean
  m := 0;
  for i := advstringgrid1.FixedRows to ARow do
  begin
    m := m + advstringgrid1.Floats[ACol,i];
  end;
  m := m / (ARow - advstringgrid1.FixedRows + 1);
  // calculate standard deviation
  sd := 0;
  for i := advstringgrid1.FixedRows to ARow do
  begin
    sd := sd + sqr(advstringgrid1.Floats[ACol,i] - m);
  end;
  sd := sd / (ARow - advstringgrid1.FixedRows);
  Value := Format(advstringgrid1.FloatFormat, [sqrt(sd)]);
end;

```

## TAdvStringGrid search pane

TAdvStringGrid has a built-in Firefox style search pane. The settings for this Search pane can be found under SearchFooter. This has properties for setting colors, button texts and hints. When the Search pane is set visible with setting SearchFooter.Visible = true, text to search for can be typed

in the edit control and when a matching cell is found, the grid will automatically move the focus to the first matching cell. From there, other matching cells can be found with the Forward/Backward buttons.



SearchFooter options:

AutoSearch: boolean	When true, search starts while typing in the search edit control
Color: TColor	Sets the search panel background start gradient
ColorTo: TColor	Sets the search panel background end gradient
FindNextCaption: string	Sets the text for the forward search button
FindPrevCaption: string	Sets the text for the backward search button
Font: TFont	Sets the search panel font
HighlightCaption: string	Sets the text for the highlight button
HintClose: string	Sets the hint text for the close button
HintFindNext: string	Sets the hint text for the forward search button
HintFindPrev: string	Sets the hint text for the backward search button
HintHighlight: string	Sets the hint text for the highlight
MatchCaseCaption: string	Sets the text of the checkbox caption that selects case sensitivity

SearchActiveColumnOnly: boolean	When true, search is limited to the column that has the focused cell
SearchColumn: integer	Sets the column index where search should happen. When SearchColumn is -1, all columns are searched
SearchFixedCells: boolean	When true, a search is also performed in fixed cells of the grid.
SearchMatchStart: boolean	When true, match must start from beginning of a word
ShowClose: boolean	When true, the close button is shown
ShowFindNext: boolean	When true, the forward search button is shown
ShowFindPrev: boolean	When true, the backward search button is shown
ShowHighlight: boolean	When true, the highlight button is shown
ShowMatchCase: boolean	When true, the case sensitive selection checkbox is shown
Visible: boolean	Sets the SearchFooter visible or hidden

The grid exposes following search footer events:

OnSearchEditChange: event is triggered when text changes in the search footer edit control

OnSearchFooterAction: event is triggered during the search, action indicates saFindFirst, saFindPrevious, saFindNext

OnSearchFooterClose: event is triggered when the search footer is closed by clicking the close button

OnCreatedSearchFooter: event is triggered after the search footer was internally created.

The search footer in the grid can also be directly accessed, for example to preset the search edit control text or to directly change properties of the controls in the search footer. This can be done using:

```
grid.SearchPanel.EditControl: TEdit; exposes the search edit control
grid.SearchPanel.MatchCase: TCheckBox; exposes the case sensitivity checkbox
grid.SearchPanel.HiliteButton: TAdvGridButton; exposes the highlight button
grid.SearchPanel.ForwardButton: TAdvGridButton; exposes the forward search button
grid.SearchPanel.BackwardButton: TAdvGridButton; exposes the backward search button
grid.SearchPanel.ExitButton: TAdvGridButton; exposes the search footer close button
```

In following sample code snippet, the search footer is programmatically made visible, the search edit control is preset with a value and focus is set on this edit control:

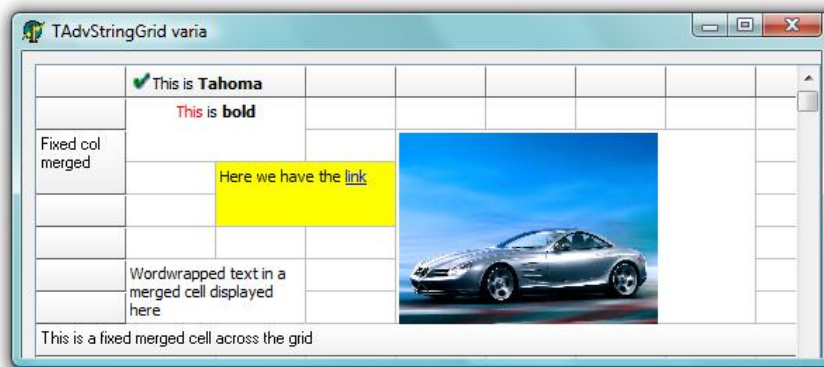
```
AdvStringGrid1.SearchFooter.Visible := true;
AdvStringGrid1.SearchPanel.EditControl.Text := 'Preset';
AdvStringGrid1.SearchPanel.EditControl.SetFocus;
AdvStringGrid1.SearchPanel.EditControl.SelStart := 0;
```

```
AdvStringGrid1.SearchPanel.EditControl.SelLength :=  
    Length(AdvStringGrid1.SearchPanel.EditControl.Text);
```

## TAdvStringGrid cell merging

TAdvStringGrid supports cell merging. This means that multiple cells can be merged and appear as if they are only one cell in the grid. The contents and properties of a merged cells are always controlled by the top left cell, ie. to set the text and properties such as cell color, cell font, set the text via `grid.Cells[leftcell,topcell]` or `grid.Colors[leftcell, topcell]`. An important note is that in the current version hidden cells cannot be combined with merged cells. If hidden cells are required, allocate these outside the merged cell area in the rightmost cells.

Example: a grid with a merged cell



Following methods are available to handle cell merging:

```
function IsBaseCell (ACol,ARow: Integer): Boolean;
```

Returns true if the cell is the topleft cell of a merged cell. For a cell that is not merged, IsBaseCell always returns true.

```
function IsMergedCell (ACol,ARow: Integer): Boolean;
```

Returns true if the cell is part of a merged cell

```
function IsXMergedCell (ACol,ARow: Integer): Boolean;
```

Returns true if the cell is part of a horizontally merged cell

```
function IsYMergedCell (ACol,ARow: Integer): Boolean;
```

Returns true if the cell is part of a vertically merged cell

```
function BaseCell (ACol,ARow: Integer): TPoint;
```

Returns the cell coordinates of the topleft cell of a merged cell

```
function FullCell (c,r: Integer): TRect;
```

Returns the rectangle a merged cell is using

```
function CellSpan (ACol,ARow: Integer): TPoint;
```

Returns the number of horizontal and vertical cells a merged cell is using

```
procedure MergeCells (c,r,spanx,spany: Integer);
```

Merges cell c,r with spanx number of horizontal cells and spany of vertical cells

```
procedure SplitCells (c,r: Integer);
```

Splits cells again merged with cell c,r

```
procedure MergeColumnCells (ColIndex: Integer; MainMerge: Boolean);
```

Automatically merges all cells with identical cell contents in the column ColIndex. If MainMerge is false, cells are not merged if cells on left of the ColIndex column are not merged.

```
procedure SplitColumnCells (ColIndex: Integer);
```

Splits all cells in column ColIndex

```
procedure MergeRowCells (RowIndex: Integer; MainMerge: Boolean);
```

Automatically merges all cells with identical cell contents in the row RowIndex. If MainMerge is false, cells are not merged if cells on top of the RowIndex row are not merged.

```
procedure SplitRowCells (RowIndex: Integer);
```

Splits all cells in row RowIndex

```
procedure SplitAllCells;
```

Splits all cells in the grid

Example: cell merging and setting properties for merged cells

To set a long text in 10 horizontally merged cells you can :

```
AdvStringGrid1.MergeCells (1,6,10,1);  
AdvStringGrid1.Cells [1,6] := 'This another one that is long too';
```

The background color of this merged cell can be set by changing the background color of the base cell, ie :

```
AdvStringGrid.Colors [1,6] := clLime;
```

To reapply the default color, use :

```
AdvStringGrid.Colors [1,6] := clNone;
```

If you want to use the OnGetCellColor event to set colors, it is sufficient to handle the base cell color setting, for example in this way :

```
procedure AdvStringGrid1GetCellColor (Sender: TObject; ACol,ARow: Integer;  
AState: TGridDrawState; ABrush: TBrush; AFont: TFont);  
  
begin  
  if ACol = 1 then  
    begin  
      AFont.Color := clBlue  
      AFont.Style := [fsBold];  
    end;  
end;
```



## TAdvStringGrid OLE drag & drop

Extensive support for automatic drag & drop is included in TAdvStringGrid. Because drag & drop conforms to OLE based drag & drop, this makes drag & drop possible not only within your application but also between applications that conform to this standard such as Excel, Word or even other applications with TAdvStringGrid.

Making use of these capabilities is done through several properties and events :

### *Properties under grid.DragDropSettings:*

OleAcceptFiles: when true, files can be dropped on the grid

OleAcceptText: when true, text from an OLE drag & drop source (such as Microsoft Word, Microsoft Excel) can be dropped on the grid.

OleAcceptURLs: when true, a hyperlink from an OLE drag & drop source can be dropped on the grid

OleColumnDragDrop: when true, the grid can drag & drop entire columns by dragging from the column header.

OleCopyAlways: when true, drag & drop always performs a copy as otherwise a Ctrl-drag performs a copy and a simple drag performs a move.

OleDropRTF: when true, the grid can accept richt text formatted text

OleDropSource: make the grid act as a source for drag & drop

OleDropTarget : make the grid act as a target for drag & drop

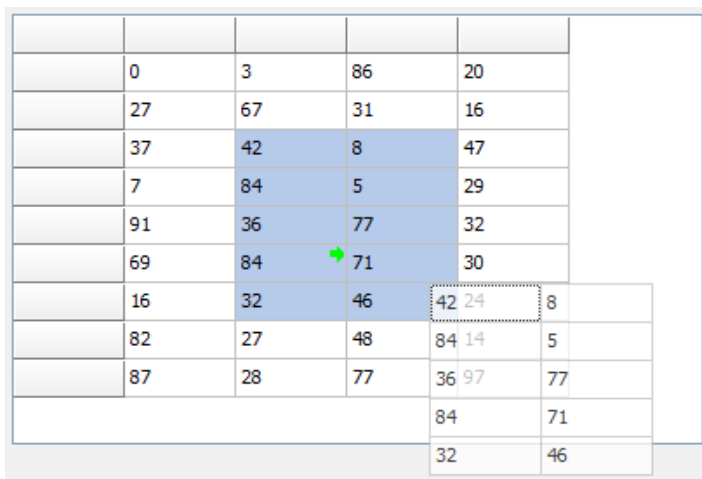
OleEntireRows : make sure that entire row (including fixed row) is handled during drag & drop in RowSelect mode

OleInsertRows : perform automatic row insertion when rows are dropped on the grid

OleRemoveRows : perform automatic row removal if drag & drop move operation is done, otherwise the move will result in empty rows

ShowCells: when true, a semi transparent image of cells dragged is shown during drag & drop.

Screenshot of drag & drop with image showing cells being dragged. The little green arrow indicates in what cell the drop will occur.



	0	3	86	20
	27	67	31	16
	37	42	8	47
	7	84	5	29
	91	36	77	32
	69	84	71	30
	16	32	46	42 24
	82	27	48	84 14
	87	28	77	36 97
			84	71
			32	46

Some other properties that are relevant for drag & drop are :

### *In Navigation:*

Navigation.AllowClipboardAlways : will allow drop on a grid where editing is disabled. Otherwise, only editable cells could change through the drop operation.

Navigation.AllowClipboardRowGrow : will allow automatic adding of rows if more rows are dropped on the grid than present

Navigation.AllowClipboardColGrow : will allow automatic adding of columns if more columns are dropped on the grid than present

*Public property:*

ExcelClipboardFormat:boolean : use clipboard format compatible with Excel

*Events:*

OnOleDrag : event triggered when drag starts. Through the Allow parameter, the drag can be enabled or not.

OnOleDragOver : event triggered during the drag operation when the mouse is over the grid. Through the Allow parameter, the place where data can be dropped can be set.

OnOleDragStart : event triggered when drag has started.

OnOleDragStop : event triggered when drag has stopped. Indicates whether it was a move, copy or cancelled drag & drop operation.

OnOleDrop : event triggered when succesfull drop of cells was performed on the grid.

OnOleDropCol : event triggered when succesfull drop of a column was performed on the grid.

*Row drag & drop*

Enabling row drag and drop is simple. OleDropSource and OleDropTarget properties are set true. In addition OleEntireRows, OleRemoveRows and OleInsertRows are set true to enable full row drag & drop. The only event used further is OnOleDrag where Allow is set true whenever the origin row of the drag operation is not a fixed row. This is necessary, as drag & drop from a fixed row starts a column drag & drop. Notice that drag & drop between grids as well as in the grid itself (to allow row rearranging is possible)

To allow only drag & drop between grids, use the OnOleDragStart event to set the source grid in a variable. In the OnOleDragOver event, set Allow to false if the Sender is equal to this source. Finally reset the source on the OnOleDragStop event.

*Example: row drag & drop*

```
ddsouce: TObject;

procedure Form1.OnOleDragStart(Sender:TObject; Arow,Acol: integer);
begin
    ddsouce := Sender;
end;

procedure Form1.OnOleDragOver(Sender:TObject; Arow,Acol: integer;
    var Allow: boolean);
begin
    Allow := ddsouce <> Sender;
end;

procedure Form1.OnOleDragStop(Sender:TObject; Arow,Acol: integer; var
    Allow: boolean);
begin
    ddsouce := nil;
end;
```

*Cell drag & drop*

Everything under row drag & drop applies to cell drag & drop, except that OleEntireRows, OleRemoveRows and OleInsertRows are set false here.

*Column drag & drop*

Column drag & drop is a little more involved. This is because the interface allows for more than just inter grid column drag & drop but allows the implementation for something like a field chooser (see [example project 29](#)) as well.

Where the previous examples disabled column drag & drop by setting Allow=false when the drag started from the fixed row, this example only enables drag & drop when the drag starts from the fixed row. (Nothing prevents enabling both in the same grid though)

The OnOleDragOver event is used to allow a drop of a column only when the mouse cursor is over a fixed row. Except when the grid has no columns, a drop on the fixed column is not allowed:

```
procedure TForm1.OnOleDragOver(Sender: TObject; Arow, Acol: integer; var
    Allow: boolean);
begin
    with Sender as TAdvStringGrid do
        Allow := (Sender<>ColSource) and (Arow=0) and ((Acol>0) or
            (ColCount=1));
end;
```

The event OnOleDropCol is triggered when a column is dropped. It indicates the index of the original column dropped as well as the index of the column where it is dropped. It is in this event that the column data of the source grid is inserted in the target grid:

```
procedure TForm1.AdvStringGrid5OleDropCol(Sender: TObject; Arow, Acol,
    DropCol: Integer);
var
    sl: TStringList;
begin
    coltarget := Sender as TAdvStringGrid;
    sl := TStringList.Create;
    sl.Assign(colsource.Cols[DropCol]);

    if (acol = 0) then inc(acol);

    coltarget.insertcols(acol,1);
    coltarget.Cols[acol].Assign(sl);
    sl.Free;
end;
```

Finally the OnOleDragStop event is used to remove the column from the source grid if the drag & drop was a move operation:

```
procedure TForm1.AdvStringGrid5OleDragStop(Sender: TObject;
    OLEEffect: Integer);
begin
    if OLEEffect = DROPEFFECT_MOVE then
        begin
            colsource.RemoveCols(colsourceidx,1);
        end;
end;
```

## TAdvStringGrid hidden columns and rows

It can be convenient to put data in cells that are not visible for the user but accessible by the application. TAdvStringGrid therefore supports hidden columns or hidden rows. Great care must be taken into account when using both at the same time. The recommended way is to first apply all row hiding and then apply column hiding and unhide the columns again before unhiding the rows.

Methods available for handling columns hiding are:

```
procedure HideColumn(ColIndex: Integer);
procedure UnHideColumn(ColIndex: Integer);
procedure HideColumns(FromCol, ToCol: Integer);
procedure UnHideColumns(FromCol, ToCol: Integer);
procedure UnHideColumnsAll;
function IsHiddenColumn(Colindex: Integer): Boolean;
function NumHiddenColumns: Integer;
```

Methods available for handling row hiding are:

```
procedure HideRow(Rowindex: Integer);
procedure HideRows(FromRow, ToRow: Integer);
procedure HideRowList(RowList: TIntList);
procedure UnHideRow(Rowindex: Integer);
procedure UnHideRows(FromRow, ToRow: Integer);
procedure UnHideRowsAll;
procedure UnHideRowsList;
procedure HideSelectedRows;
procedure HideUnSelectedRows;
function IsHiddenRow(Rowindex: Integer): Boolean;
function NumHiddenRows: Integer;
```

The use of these methods is straightforward as the name of the method implies with the exception of HideRowList & UnHideRowList. With HideRowList, it is possible to hide multiple consecutive or non consecutive rows with one call. This will be much faster than calling HideRow multiple times. To use HideRowList, build a TIntList with the indexes of rows to hide (TIntList is defined in the AdvObj unit). Make sure to call UnHideRowList after calling HideRowList.

Example: hiding multiple non consecutive rows with HideRowList

```
var
    il: TIntList;

begin
    il := TIntList.Create(-1, -1);
    il.Add(5);
    il.Add(6);
    il.Add(7);
    il.Add(15);
    il.Add(16);
    il.Add(17);
    AdvStringGrid.HideRowList(il);  // hides rows 5,6,7,15,16,17
```

```
end;
```

When cells are hidden, it is still possible to access these hidden cells. Two cell addressing schemes are available: one with visible column and row indexes and one with real column and row indexes. With real column or row indexes, cells can be accessed as if these were not hidden. With visible column or row indexes cells are accessed with the index as appearing on the screen.

The property `grid.Cells[Col,Row]`: string is using the visible column and row indexes while the property `grid.AllCells[Col,Row]`: string provides access to cells with real coordinates.

Example: mixing visible and real column index access

```
// initializing the grid
Grid.Cells[1,1] := 'Col 1';
Grid.Cells[2,1] := 'Col 2';
Grid.Cells[3,1] := 'Col 3';
// hiding column 2
Grid.HideColumn(2);
Grid.AllCells[2,1] := 'A'; // updates cell "Col 2";
Grid.UnHideColumn(2);
```

The result is : "Col 1", "A", "Col 3"

TAdvStringGrid also provides a set of functions to allow performing the mapping of real cell indexes to visible cells indexes and vice versa. This is provided through:

```
function RealRowIndex(ARow: Integer): Integer;
function RealColIndex(ACol: Integer): Integer;
Returns the real column or row index for a given visible column or row index
function DisplRowIndex(ARow: Integer): Integer;
function DisplColIndex(ACol: Integer): Integer;
```

Returns the visible column or row index for a given real column or row index

In the example above, changing the code in:

```
// initializing the grid
Grid.Cells[1,1] := 'Col 1';
Grid.Cells[2,1] := 'Col 2';
Grid.Cells[3,1] := 'Col 3';
// hiding column 2
Grid.HideColumn(2);
Grid.AllCells[2,1] := IntToStr(Grid.DisplColIndex(3));
Grid.UnHideColumn(2);
```

Results in : "Col 1", "2", "Col 3"

as the visible column index of the real column index 3 is now 2.

The same logic applies to hidden rows.

### TAdvStringGrid cell formatting

Two types of cell formatting are available. The first method is format at the time of adding information to a cell, the second method is by applying a format when a cell is being displayed.

The first method is the most simple. The format is set with the property `grid.FloatFormat` and is string specifier that is also used for the `Borland Format()` function.

Example:

```
grid.FloatFormat := '%.3m';
```

selects a money type floating point format with currency symbol, thousand separator and three decimals. When assigning a float to the grid with:

```
var d: double;  
begin  
    d := 1234567,8912;  
    advstringgrid1.Floats[1,1] := d;  
end;
```

this will be displayed in the grid as:

1,234,567.891 \$

When the `FloatFormat` property is changed, a new float format will be applied for all new assignments to `grid.Floats[col,row]`

### Dynamic float formatting

Dynamic float formatting is done through the event `OnGetFloatFormat`. This example event handler specifies that the first 3 columns have float data and sets a different format for the three columns.

```
procedure TForm1.AdvStringGrid1GetFloatFormat(Sender: TObject; ACol,  
    ARow: Integer; var IsFloat: Boolean; var FloatFormat: String);  
begin  
    IsFloat := ACol in [1,2,3];  
  
    case ACol of  
        1: FloatFormat := '%.0n';  
        2: FloatFormat := '%.2m';  
        3: FloatFormat := '%d';  
    end;  
end;
```

An important difference between static & dynamic float formatting is that for static formatting, the precision of the cell data is determined by the `FloatFormat` property at the time of assigning the `grid.Floats[col,row]` property. For dynamic float formatting, the float can be set with full precision in the grid and only for display purposes have a lower precision.

For completeness, the full capabilities of a float format specifier can be found [here](#):

Format specifiers have the following form:

"%" [index ":"] ["-"] [width] ["." prec] type

A format specifier begins with a % character. After the % come the following, in this order:

An optional argument zero-offset index specifier (that is, the first item has index 0), [index ":"]

An optional left justification indicator, ["-"]

An optional width specifier, [width]

An optional precision specifier, ["." prec]

The conversion type character, type

The following table summarizes the possible values for type:

<b>d</b>	Decimal. The argument must be an integer value. The value is converted to a string of decimal digits. If the format string contains a precision specifier, it indicates that the resulting string must contain at least the specified number of digits; if the value has less digits, the resulting string is left-padded with zeros.
<b>u</b>	Unsigned decimal. Similar to 'd' but no sign is output.
<b>e</b>	Scientific. The argument must be a floating-point value. The value is converted to a string of the form "-d.ddd...E+ddd". The resulting string starts with a minus sign if the number is negative. One digit always precedes the decimal point. The total number of digits in the resulting string (including the one before the decimal point) is given by the precision specifier in the format string—a default precision of 15 is assumed if no precision specifier is present. The "E" exponent character in the resulting string is always followed by a plus or minus sign and at least three digits.
<b>f</b>	Fixed. The argument must be a floating-point value. The value is converted to a string of the form "-ddd.ddd...". The resulting string starts with a minus sign if the number is negative. The number of digits after the decimal point is given by the precision specifier in the format string—a default of 2 decimal digits is assumed if no precision specifier is present.
<b>g</b>	General. The argument must be a floating-point value. The value is converted to the shortest possible decimal string using fixed or scientific format. The number of significant digits in the resulting string is given by the precision specifier in the format string—a default precision of 15 is assumed if no precision specifier is present. Trailing zeros are removed from the resulting string, and a decimal point appears only if necessary. The resulting string uses fixed point format if the number of digits to the left of the decimal point in the value is less than or equal to the specified precision, and if the value is greater than or equal to 0.00001. Otherwise the resulting string uses scientific format.
<b>n</b>	Number. The argument must be a floating-point value. The value is converted to a string of the form "-d,ddd,ddd.ddd...". The "n" format corresponds to the "f" format, except that the resulting string contains thousand separators.
<b>m</b>	Money. The argument must be a floating-point value. The value is converted to a string that represents a currency amount. The conversion is controlled by the CurrencyString, CurrencyFormat, NegCurrFormat, ThousandSeparator, DecimalSeparator, and CurrencyDecimals global variables or their equivalent in a TFormatSettings data

structure. If the format string contains a precision specifier, it overrides the value given by the CurrencyDecimals global variable or its TFormatSettings equivalent.

- p** Pointer. The argument must be a pointer value. The value is converted to an 8 character string that represents the pointers value in hexadecimal.
- s** String. The argument must be a character, a string, or a PChar value. The string or character is inserted in place of the format specifier. The precision specifier, if present in the format string, specifies the maximum length of the resulting string. If the argument is a string that is longer than this maximum, the string is truncated.
- x** Hexadecimal. The argument must be an integer value. The value is converted to a string of hexadecimal digits. If the format string contains a precision specifier, it indicates that the resulting string must contain at least the specified number of digits; if the value has fewer digits, the resulting string is left-padded with zeros.

Conversion characters may be specified in uppercase as well as in lowercase—both produce the same results.

For all floating-point formats, the actual characters used as decimal and thousand separators are obtained from the DecimalSeparator and ThousandSeparator global variables or their TFormatSettings equivalent.

Index, width, and precision specifiers can be specified directly using decimal digit string (for example "%10d"), or indirectly using an asterisk character (for example "%\*.\*f"). When using an asterisk, the next argument in the argument list (which must be an integer value) becomes the value that is actually used.



## TAdvStringGrid virtual cells

Through virtual cells, the grid can not only display content that does not have to be stored in grid Cells but can also apply dynamic transformations of cell contents for display. Virtual cells are achieved through the OnGetDisplText event that is triggered just before a cell needs to be displayed or its contents need to be retrieved (like during a print or export) As the cell text is only requested when it is needed, virtual cells are very fast and efficient. The OnGetDisplText is declared as:

```
TGetDisplTextEvent = procedure(Sender: TObject; ACol, ARow: Integer; var  
Value: string) of object;
```

The text that needs to be displayed in a cell with coordinates ACol, ARow is set in the Value parameter.

Example: dynamic HTML formatting of cell text

As it is often inconvenient to set text with HTML tags in the grid itself (for later editing / saving etc...), the OnGetDisplText is an ideal way for setting only the desired text in the grid cell and apply formatting only separately for displaying. In this simple example, text is set bold for the first column by :

```
procedure TForm1.AdvStringGrid1GetDisplText(Sender: TObject; ACol, ARow:  
Integer; var Value: string);  
begin  
    if ACol = 1 then  
        Value := '<B>' + Value + '</B>';  
end;
```

Example: dynamic number formatting

Suppose that numeric info is stored in the grid cells with a higher precision than required to display. In this case, the data can be reformatted dynamically with a routine such as :

```
procedure TForm1.AdvStringGrid1GetDisplText(Sender: TObject; ACol, ARow:  
Integer; var Value: string);  
var  
    f: Double;  
    Err: Integer;  
begin  
    Val(Value, f, Err);  
    Value := Format('%0.2f', [f]);  
end;
```

To display virtual Unicode text in the grid, an equivalent event OnGetDisplWideText is available. This works identical to OnGetDisplText except that its value parameter is a widestring.

## TAdvStringGrid cell access with column moving

When the option `goColMoving` is set to `true` in `grid.Options`, the user is able to move columns around at runtime via drag & drop. If programmatic access to cells is necessary in the application, this can get complex to know in what column a cell can be accessed. Therefore, the grid has built-in facilities to know the position of a column at any time or to access cells irrespective of the moving of columns. It is assumed that at startup of the application, the grid has a reference column ordering. This is the column ordering before a user could have moved columns. Whenever at some point the grid is reconfigured and a new reference column order should be set, the method `grid.SetColumnOrder` can be called. Two functions are provided to find at any time what the position is of a column or what the original column index is of some column:

`Grid.ColumnPosition(OriginalColumnIndex: integer): integer`

This function returns the visual column position index of a column that was at startup at index `OriginalColumnIndex`.

`Grid.ColumnAtPosition(VisualColumnIndex: integer): integer`

Returns the original column index of a column found at position `VisualColumnIndex`.

To access cells irrespective of column moving, the property `grid.OriginalCells[Col,Row]: string` can be used. Assuming that the code needs to access information in column 1 and row 1, you can use at any time `grid.OriginalCells[1,1]`, even when the user moved column 1 to another position in the grid, the value of the cell can always be set or retrieved with `grid.OriginalCells[1,1]`.

## TAdvStringGrid hints

TAdvStringGrid features a lot of built-in capabilities to display various types of hints.

**Regular hints**

The hints are enabled by the property `grid.ShowHint` set to `true`. The color of the hint window can be set with the property `grid.HintColor`. The main hint text is set through the `grid.Hint` property and behaves like all hints for VCL components. In addition to this, following hint properties exist:

AnchorHint	When true, the event <code>OnAnchorHint</code> is triggered when the mouse is over a hyperlink in HTML formatted text. Unless the <code>OnAnchorHint</code> specifies another hint text, the hint text is by default the value of the anchor.
HintShowCells	When true, a hint is displayed for each cell showing the cell contents. For each cell, the event <code>OnGridHint</code> is triggered with which a hint text can be set for the grid cell which coordinates are in the <code>OnGridHint</code> parameter list
HintShowLargeText	When true, a hint is displayed for cells containing text that is wider than the cell width. The hint displays the full text when the mouse is over the cell
HintShowSizing	When true, a hint is displayed during column or row sizing in the grid, showing the size in pixels of the column or row
ScrollHints	When true, the row index or column index of the scroll position is displayed in a hint over the scrollbar

For all hints used in the grid, the `HTMLHint` property setting determines whether HTML tags are rendered in the hint window or not. By default this is false meaning that any HTML tags in a hint text are stripped before being displayed.

Example: using hidden cell data to add to a HTML formatted hint text

The grid is filled with flight information in separate cells and in the `OnGridHint` event, the full flight information is displayed in the hint whenever the mouse is over the row:

```
Grid.Cells[0,1] := 'AA709';
Grid.Cells[1,1] := 'American Airlines';
Grid.Cells[2,1] := 'New York';
Grid.Cells[3,1] := 'USA';
Grid.Cells[4,1] := '2:00 AM';
Grid.HideColumn(4);
Grid.ShowHint := True;
Grid.HTMLHint := True;
```

```
procedure TForm1.AdvStringGrid1GridHint(Sender: TObject; ARow,
  ACol: Integer; var hintstr: String);
begin
  hintstr := '<B>' + Grid.Cells[0,ARow] + '</B> : ' + Grid.Cells[1,ARow] + ',
  (' + Grid.Cells[2,ARow] + ' - ' + Grid.Cells[3,ARow] + ') ' + '<FONT
  color="clred"><B>' + Grid.Cells[4,ARow] + '</B></FONT>';
```

```
end;
```

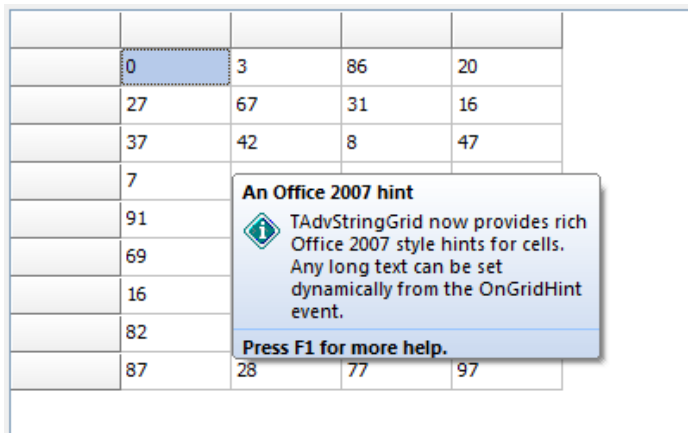
To display a hint with Unicode text, an equivalent event `OnGridWideHint` is available. This works identical to `OnGridHint` except that its `hintstr` parameter is a `widestring`.

Important note: in order to have the hint with HTML tags rendered as HTML, it is required to put the `THTMLHint` component on the form. The `THTMLHint` component is included in the TMS Component Pack Pro and is responsible for the actual HTML formatted rendering of hints.

### Office 2007 hints

The grid can also display the richer Office 2007 style hints. This hint consists of a hint title, a hint picture, multiline hint text and optionally hint help information. The settings for the OfficeHint are found under `grid.OfficeHint`. Note that in order to have Office hints with `TAdvStringGrid`, the `TAdvOfficeHint` (available separately or in TMS Component Pack) must be added on the form. The hint title can be set at design-time via `grid.OfficeHint.Title` or it can be set dynamically from the `OnGridHint` event. In this code snippet, a generic long text is set to show an Office hint like in the screenshot below:

```
procedure TForm1.AdvStringGrid1GridHint(Sender: TObject; ARow, ACol:
Integer; var hintstr: string);
begin
  AdvStringGrid1.OfficeHint.Title := 'An Office 2007 hint';
  hintstr := 'TAdvStringGrid now provides rich Office 2007 style hints for
    cells. Any long text can be set dynamically from the OnGridHint
    event.';
end;
```



## TAdvStringGrid search &amp; replace text

Locating in which cell some text can be found is done with the method Find:

```
function Find(StartCell:TPoint; s:string; FindParams: TFindParams): TPoint;
```

StartCell contains the cell coordinates where to start the search for the text. If StartCell is equal to -1,-1 this means the search should start in the first cell of the grid. The parameter s contains the text to search for and the options for the search are set in the FindParams. When text is found, the Find function returns the grid coordinates of the cell found, if not the function returns (-1,-1)

FindParams is a set of options that can include:

```
TFindParameters = (fnMatchCase,fnMatchFull,fnMatchRegular,fnDirectionLeftRight,  
fnMatchStart,fnFindInCurrentRow,fnFindInCurrentCol,fnIncludeFixed,fnAutoGoto,
```

```
fnIgnoreHTMLTags,fnBackward,fnIncludeHiddenColumns,fnFindInPresetCol,fnFindInPresetRow,fnSelectedCells,fnIncludeHiddenRows);
```

fnAutoGoto	When included, the Find method automatically focuses the cell where the text is found
fnBackward	When included, search is backwards, i.e. from right to left or from bottom to top
fnDirectionLeftRight	When included, search is going from left to right cells instead of going from top to bottom cells first
fnFindInCurrentCol	When included, search happens only in current selected column
fnFindInCurrentRow	When included, search happens only in current selected row
fnFindInPresetCol	When included, search is limited to the column set by public property grid.FindCol
fnFindInPresetRow	When included, search is limited to the row set by public property grid.FindRow
fnIgnoreHTMLTags	When included, HTML tags are ignored during the search
fnIncludeFixed	When included, search is also done in the fixed columns
fnIncludeHiddenColumns	When included, search is performed in hidden columns as well
fnIncludeHiddenRows	When included, search is performed in rows hidden by closed nodes as well. When text is found in a row in a closed node and fnAutoGoto is set, the node will be opened automatically
fnMatchCase	When included, the search is case sensitive
fnMatchFull	When included, the full cell text must be equal to the text searched for
fnMatchRegular	When included, a match expression can be used containing *, ? as well as greater than or less than specifiers and multiple expressions can be

	combined with AND, OR, NOT  Example: A* ^ >M : Searches for text starting with A or greater than M !A : Text does not have a letter A on second position
fnMatchStart	When included, text searched for needs to match from first character
fnSelectedCells	When included, search is limited to selected cells

Example: searching for all occurrences of a text in the grid

```
var
  Loc: TPoint;
  Fp: TFindParams;
begin
  Loc := Point(-1, -1);
  Fp := [fnMatchRegular, fnAutoGoto];
  repeat
    Loc := Grid.Find(Loc, 'A*', fp);
    if not ((Loc.X = -1) or (Loc.Y = -1)) then
      ShowMessage('Text found at : '+IntToStr(Loc.X)+' ':' '+IntToStr(Loc.Y));
  until (Loc.X = -1) or (Loc.Y = -1);

  ShowMessage('No more occurrences of text found');
end;
```

Note 1:

For searching an empty cell in the grid, the search string that can be used is "".

Note 2:

For searching a Unicode string, the equivalent method FindWide() is available. In the FindWide method, the option fnMatchRegular is not supported.

Replacing text can be done in a similar way. The grid provides the method Replace for this with:

```
grid.Replace(origStr, newStr, FindParams: TFindParams);
```

The same parameters as for the Find() function are available for the replace. This code snippet will perform a replace of any cell starting with '3' by 'A' in column 2:

```
AdvStringGrid1.Col := 2;
AdvStringgrid1.Replace('3', 'A', [fnFindInCurrentCol, fnMatchStart]);
```

## TAdvStringGrid disjunct row, column and cell selection

In normal circumstances, setting goRangeSelect to true in grid.Options enables selecting multiple cells in the grid but all selected cells are within a rectangle. With TAdvStringGrid, it is possible to select disjunct rows, columns or cells. This is enabled by setting either DisjunctRowSelect, DisjunctColSelect or DisjunctCellSelect in grid.MouseActions to true. Note that the use of these selection methods is mutually exclusive. Where the selected cells can normally be retrieved using the grid.Selection: TGridRect property, new properties are introduced to get or set the disjunct selected rows, columns or cells.

### Disjunct row selection

To enable disjunct row selection, set grid.MouseActions.DisjunctRowSelect to true as well as goRowSelect in grid.Options. Disjunct row selection is done by Ctrl + left mouse click on the rows to toggle the selection.

Programmatical row selection control is done with following methods:

procedure ClearRowSelect;	Removes selection from all rows
procedure SelectRows(RowIndex, RCount: Integer);	Selects RCount rows starting from RowIndex
property RowSelect[RowIndex]: Boolean;	Property with which row selection can be get or set for row RowIndex
property RowSelectCount: Integer;	Retrieves the total number of selected rows
procedure RemoveSelectedRows	Removes all selected rows in the grid
procedure RemoveUnSelectedRows	Removes all not selected rows in the grid

### Disjunct column selection

To enable disjunct column selection, set grid.MouseActions.DisjunctColSelect to true. Disjunct column selection is done by Ctrl + left mouse click on the columns to toggle the selection.

Programmatical column selection control is done with following methods:

procedure ClearColSelect;	Removes selection from all columns
procedure SelectCols(ColIndex, CCount: Integer);	Selects CCount rows starting from ColIndex
property ColSelect[ColIndex]: Boolean;	Property with which column selection can be get or set for column ColIndex
property ColSelectCount: Integer;	Retrieves the total number of selected columns
procedure RemoveSelectedCols	Removes all selected columns in the grid
Procedure RemoveUnselectedCols	Removes all unselected columns in the grid

### Disjunct cell selection

The methods and properties to be used for this are:

Grid.MouseActions.DisjunctCellSelect: Boolean; Setting this true enables disjunct cell selection with Ctrl mouse clicks

Grid.SelectedCells[col,row: Integer]: Boolean; Property to allow setting or clearing selection on a single cell

Grid.SelectedCellsCount: Integer; Returns the number of disjunct selected cells (read-only)

Grid.SelectedCell[i: Integer]: TGridCoord; Returns the i'th selected cell grid coordinates (read-only)

Grid.ClearSelectedCells; Clears all disjunct selected cells in the grid

Example: checkerboard cell selection

To make a checkerboard disjunct cell selection, following code was written :

```
var
  i,j: Integer;
begin
  AdvStringGrid1.ClearSelectedCells;
  with AdvStringGrid1 do
    for i := 1 to ColCount - 1 do
      for j := 1 to RowCount - 1 do
        SelectedCells[i,j] := (odd(i) and odd(j)) or (not odd(i) and not
odd(j));
      end;
    end;
```

This is the method to show a list of selected cells in a listbox :

```
var
  i: Integer;
  gc: TGridCoord;
begin
  listbox1.Items.Clear;
  listbox1.Items.Add('Nr. of cells : ' +
IntToStr(AdvStringGrid1.SelectedCellsCount));
  for i := 1 to AdvStringGrid1.SelectedCellsCount do
    begin
      gc := AdvStringGrid1.SelectedCell[i - 1];
      listbox1.Items.Add(IntToStr(gc.X) + ':' + IntToStr(gc.Y));
    end;
  end;
```



## TAdvStringGrid cell check architecture

A mechanism is available to provide cell value checking, error marking and cell autocorrecting components with TAdvStringGrid. This opens the capability to add spell checking components to TAdvStringGrid as in this case an interface is provided to use the [Addict Spell Checking](#) product with TAdvStringGrid.

The main concept is that a TAdvStringGridCheck derived component can be attached to the CellChecker property of TAdvStringGrid. When a Checker component is attached, TAdvStringGrid will call its base methods MarkError and Correct at the right time to make checking and correcting possible after inplace editing is finished or when a programmatic call to the various new Check methods is made.

This is the base class for the Checker component from which all custom checker components must be derived :

```
TAdvStringGridCheck = class(TComponent)
public
    function MarkError(ACol,ARow: Integer; s:string):string; virtual;
    function Correct(ACol,ARow: Integer; s:string):string; virtual;
    procedure StartCheck; virtual;
    procedure StopCheck; virtual;
published
    property AutoCorrect: Boolean read FAutoCorrect write FAutoCorrect;
    property AutoMarkError: Boolean read FAutoMarkError write FAutoMarkError;
    property GotoCell: Boolean read FGotoCell write FGotoCell;
    property UseCorrect: Boolean read FUseCorrect write FUseCorrect;
    property UseMarkError: Boolean read FUseMarkError write FUseMarkError;
end;
```

The purpose of the properties AutoCorrect and AutoMarkError is to set whether the Checker component should be used to perform auto correction or auto error marking after editing each cell. The UseCorrect and UseMarkError properties control whether the correction or error marking is used when calling the grid's various Check methods, ie. CheckCell, CheckCells, CheckCol, CheckRow and CheckGrid. Optionally, the GotoCell is used to activate each cell when doing multiple cell checks with the various Check methods to give a visual indication to the user which cell is being checked.

In this base class, the methods Correct and MarkError do nothing. They simply return the cell content as is. With a real checker, these methods should either return the corrected cell's value or the cell's value with markers for words with errors. Error Markers (ie. red line under words with errors) can be applied by using the built-in HiLight function in the base TAdvStringGridCheck component.

As a sample implementation, a Checker component has been provided that does nothing more than capitalize each first letter of a string. The TCapitalCheck component is thus derived from TAdvStringGridCheck and implements only one method, ie. the Correct method in following way:

```
function TCapitalCheck.Correct(ACol,ARow: Integer;s: string): string;
var
    Prev,PrevPrev:Char;
    i: Integer;
begin
    Prev := ' ';
    PrevPrev := ' ';
    for i := 1 to Length(s) do
    begin
```

```

    if (Prev = ' ') and (PrevPrev in ['!', '?', '.']) and (s[i] <>
UpCase(s[i])) then
    s[i] := UpCase(s[i]);
    PrevPrev := Prev;
    Prev := s[i];
end;

Result := s;
end;

```

It will auto-correct an entered value of "this is a test. i should start with a capital" to "This is a test. I should start with a capital"

Based on this architecture, a component TAddictCheck is provided that uses the Addict Spell Checker to perform spell checking in TAdvStringGrid or other TAdvStringGrid based products. Again this is all possible without writing any code, just drop the Addict Spell Checker components on your form, set all Addict properties to your preferences, add a TAddictCheck component on the form and assign the TAddictSpell component to the TAddictCheck's AddictSpell property. Next, assign the TAddictSpell component to the TAdvStringGrid's CellChecker property. Control with the AutoCorrect, AutoMarkError, GotoCell, UseCorrect, UseMarkError and ShowDialog properties how the Addict Spell Checker should be used with TAdvStringGrid.

## TAdvStringGrid add-on dialogs

TAdvStringGrid comes with a number of add-on dialogs:

TAdvGridPrintSettingsDialog: dialog to configure the various printsettings of the grid

TAdvGridHTMLSettingsDialog: dialog to configure the various HTML export settings of the grid

TAdvPreviewDialog: dialog to show a print preview

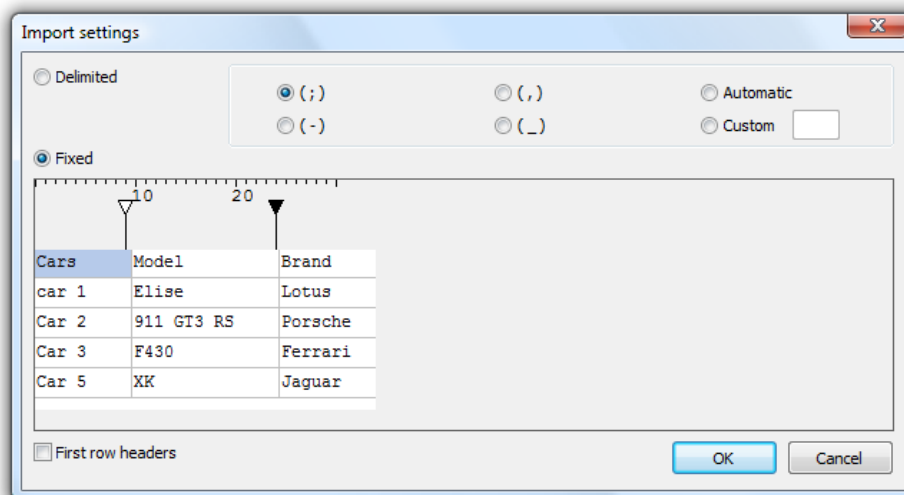
TAdvGridReplaceDialog: find & replace dialog

TAdvGridFindDialog: find dialog

TAdvGridImportDialog: CSV/text file import dialog

The concept of the add-on dialogs is simple. The dialog components can be dropped on the form and their Grid property is assigned to the TAdvStringGrid instance on the form. The dialogs are displayed with the Execute method.

The TAdvGridImportDialog has two methods : OpenAndExecute and Execute. When calling OpenAndExecute, it will first show a file open dialog to pick a .TXT or .CSV file and preview the file in the dialog. From there, the delimiter or column positions can be set. Choosing OK will load the file in the associated grid.



## TAdvStringGrid Unicode support

TAdvStringGrid has built-in support to display, print, edit and sort Unicode strings on Windows NT, 2000, XP and Vista on Delphi versions prior to Delphi 2009. From Delphi 2009 all strings in TAdvStringGrid are by default Unicode and the specific Unicode support is therefore deprecated in Delphi 2009. Note that in order to use Unicode, a font that supports the full Unicode character set is required. The Microsoft “Arial Unicode MS” is such a font. The interface to put Unicode strings in a grid cell is done through the property:

```
Grid.WideCells[Col,Row]: widestring;
```

### Unicode editing

TAdvStringGrid has support for inplace editing of Unicode cells with a normal edit control and a dropdown combobox and dropdownlist combobox. The inplace editors are specified with the OnGetEditorType event where these 3 types are defined:

edUniEdit: Unicode inplace editor  
edUniEditBtn: Unicode inplace editor with attached button  
edUniComboEdit: Unicode dropdown combobox  
edUniComboList: Unicode dropdownlist combobox  
edUniMemo: Unicode memo editor

The Unicode inplace editors can be directly accessed with

Grid.UniEdit : the instance of the inplace Unicode edit control  
Grid.UniCombo : the instance of the inplace Unicode combobox control  
Grid.UniMemo: the instance of the inplace Unicode memo control

Example: using 3 different Unicode inplace editors in TAdvStringGrid

```
procedure TForm1.AdvStringGrid1GetEditorType(Sender: TObject; ACol,
  ARow: Integer; var AEditor: TEditorType);
begin
  case ACol of
    1:AEditor := edUniEdit;
    2:begin
      AEditor := edUniComboEdit;
      AdvStringGrid1.UniCombo.Items.Clear;
      AdvStringGrid1.UniCombo.Items.Add('London');
      AdvStringGrid1.UniCombo.Items.Add('New York');
      AdvStringGrid1.UniCombo.Items.Add('Paris');
    end;
    3:begin
      AEditor := edUniComboList;
      AdvStringGrid1.UniCombo.Items.Clear;
      AdvStringGrid1.UniCombo.Items.Add('United Kingdom');
      AdvStringGrid1.UniCombo.Items.Add('United States');
      AdvStringGrid1.UniCombo.Items.Add('France');
    end;
  end;
end;
```

### Unicode sorting

Enabling sorting in TAdvStringGrid that takes Unicode into account is done by instructing the sort function to use Unicode for the selected columns. This is done through the OnGetFormat event with the Unicode sort style: ssUnicode

Example: setting sort style for selected columns to Unicode

```
procedure TForm1.AdvStringGrid1GetFormat(Sender: TObject; ACol: Integer;  
    var AStyle: TSortStyle; var aPrefix, aSuffix: String);  
begin  
    if (ACol in [2,4]) then  
        AStyle := ssUnicode;  
end;
```

### Unicode virtual cell text

The event OnGetDisplWideText can be used to set virtual cell Unicode text in grid cells.

### Unicode hints

The event OnGridWideHint can be used to set a Unicode hint text for a cell

#### TAdvStringGrid Undo/Redo add-on component

To facilitate Undo/Redo handling of editing in cells, the TAdvGridUndoRedo component can be used. Drop this component on the form and assign it to the TAdvStringGrid UndoRedo property. If the property MaxLevel of the Undo/Redo component is 0, this means it will store all values for an unlimited Undo/Redo otherwise it will only remind the latest changes for Undo/Redo.

To perform the undo and redo actions, the methods

TAdvGridUndoRedo.Undo

and

TAdvGridUndoRedo.Redo

are available.

The public property TAdvGridUndoRedo.Level normally points to the latest performed editing action in the grid. Upon calling Undo, the Level property is decremented to point to the previous action. With a Redo, the Level is incremented again until it has reached the last action.

Note: Undo/Redo applies to cell editing only. Other changes like setting cell properties for example is not maintained in the TadvGridUndoRedo component.

## TAdvStringGrid column state persistence

Often it is desirable to allow that the user can resize columns, move columns, hide columns of a grid. After a user customizes the view of the grid this way, it is convenient to persist this setting and when the application is restarted, these customizations of the user are restored exactly as the user left the application. TAdvStringGrid offers saving column sizes with grid.SaveColSizes and offers saving positions of columns with grid.SaveColPositions. With these 2 methods, it is possible to save column widths & column positions either to registry or to an INI file. The location where the settings are persisted is defined in grid.ColumnSize.

An even easier and more convenient method to persist column size, column position and column visibility is available through two methods: grid.ColumnStatesToString:string and grid.StringToColumnStates(s: string). This way, the full column state can be persisted in a registry key, INI file value or database field. One key function for persisting column order is to set a reference column order. The method ColumnStatesToString saves the column ordering relative to the reference order so it is important that during grid initialization, the reference order is set by calling grid.SetColumnOrder.

Example: grid with column sizing & moving enabled and two buttons to save & restore state

```
procedure TForm1.FormCreate(Sender: TObject);
var
  i: integer;
begin
  {no fixed columns in grid}
  advstringgrid1.FixedCols := 0;
  advstringgrid1.ColCount := 10;
  advstringgrid1.RowCount := 50;
  {fill grid with easy to recognize data for this demo}
  advstringgrid1.LinearFill(false);
  advstringgrid1.AutoNumberRow(0);
  {enable column moving & column sizing}
  advstringgrid1.Options := advstringgrid1.Options + [goColSizing,
goColMoving];

  {add buttons in the column header cells that will allow column hiding}
  for i := 0 to AdvStringGrid1.ColCount - 1 do
    advstringgrid1.AddButton(i, 0, 16, 16, 'X', haRight, vaTop);

  {make sure that buttons on a readonly cell are not disabled}
  advstringgrid1.ControlLook.NoDisabledButtonLook := true;

  {important call to set the reference column order of the grid}
  advstringgrid1.SetColumnOrder;
end;
procedure TForm1.SaveBtnClick(Sender: TObject);
var
  inifile: TInifile;
begin
  inifile := TIniFile.Create('.\grid.ini');

  inifile.WriteString('GRID', 'SETTINGS', advstringgrid1.ColumnStatesToString);
  inifile.Free;
end;

procedure TForm1.LoadBtnClick(Sender: TObject);
var
  inifile: TInifile;
  s: string;
```

```
begin
  inifile := TIniFile.Create('.\grid.ini');
  s := inifile.ReadString('GRID','SETTINGS','');
  inifile.Free;

  if s <> '' then
    AdvStringGrid1.StringToColumnStates(s);
end;
```

Note: the grid has methods `SetColumnOrder` and `ResetColumnOrder`. As explained, a reference column order can be set by calling `grid.SetColumnOrder`, for example during grid initialization. If column moving is allowed (by setting `goColMoving = true` in `grid.Options`) you can automatically reset the column to the original reference column order by calling `grid.ResetColumnOrder`.



## TAdvStringGrid import/export to XLS files via TAdvGridExcellIO

With the component TAdvGridExcellIO directly reading and writing Excel 97, 2000, 2003 files without the need to have Excel installed on the machine is possible.

With these quick steps, you are up and running:

- 1) drop TAdvStringGrid on a form as well as the component TAdvGridExcellIO
- 2) Assign the instance of TAdvStringGrid to the AdvStringGrid property of the TAdvGridExcellIO component
- 3) You can set TAdvGridExcellIO properties to control the Excel file read / write behaviour but in most cases default settings will be ok.
- 4) To read Excel files, use

```
advgridexcelio.XLSImport (FileName);
```

or

```
advgridexcleio.XLSImport (FileName, SheetName);
```

- 5) To write the contents of TAdvStringGrid to an XLS file use

```
advgridexcelio.XLSExport (filename);
```

### Properties of TAdvGridExcellIO

Many properties are available in TAdvGridExcellIO to customize importing & exporting of Excel files in the grid.

```
AutoResizeGrid: Boolean;
```

When true, the dimensions of the grid (ColCount, RowCount) will adapt to the number of imported cells.

```
DateFormat: string;
```

Sets the format of dates to use for imported dates from the Excel file. When empty, the default system date formatting is applied.

```
GridStartCol, GridStartRow: integer;
```

Specifies from which top/left column/row the import/export happens

```
Options.ExportCellFormats: Boolean;
```

When true, cell format (string, integer, date, float) is exported, otherwise all cells are exported as strings.

```
Options.ExportCellMargins: Boolean;
```

When true, the margins of the cell are exported

```
Options.ExportCellProperties: Boolean;
```

When true, cell properties such as color, font, alignment are exported

```
Options.ExportCellSizes: Boolean;
```

When true, the size of the cells is exported

```
Options.ExportFormulas: Boolean;
```

When true, the formula is exported, otherwise the formula result is exported

```
Options.ExportHardBorders: Boolean;
```

When true, cell borders are exported as hard borders for the Excel sheet

```
Options.ExportHiddenColumns: Boolean;
```

When true, hidden columns are also exported

```
Options.ExportHTMLTags: Boolean;
```

When true, HTML tags are also exported, otherwise all HTML tags are stripped during export

```
Options.ExportOverwrite: Boolean;
```

Controls if existing files should be overwritten or not during export

```
Options.ExportOverwriteMessage: Boolean;
```

Sets the message to show warning to overwrite existing files during export

```
Options.ExportPrintOptions: Boolean;
```

When true, the print options are exported to the XLS file

```
Options.ExportShowGridLines: Boolean;
```

When true, grid line setting as set in TAdvStringGrid is exported to the XLS sheet

```
Options.ExportShowInExcel: Boolean;
```

When true, the exported file is automatically shown in the default installed spreadsheet after export.

```
Options.ExportSummaryRowBelowDetail: Boolean;
```

When true, summary rows are shown below detail rows in the exported XLS sheet

```
Options.ExportWordWrapped: Boolean;
```

When true, cells are exported as wordwrapped cells

```
Options.ImportCellFormats: Boolean;
```

When true, cells are imported with formatting as applied in the XLS sheet

```
Options.ImportCellProperties: Boolean;
```

When true, cell properties such as color, font, alignment are imported

```
Options.ImportCellSizes: Boolean;
```

When true, the size of cells is imported

```
Options.ImportFormulas: Boolean;
```

When true, the formula is imported, otherwise only a formula result is imported

```
Options.ImportImages: Boolean;
```

When true, images from the XLS sheet are imported

```
Options.ImportLockedCellsAsReadOnly: Boolean;
```

When true, cells that are locked in the XLS sheet will be imported as read-only cells

```
Options.ImportPrintOptions: Boolean;
```

When true, print settings as defined in the XLS sheet will be imported as grid.PrintSettings

```
Options.UseExcelStandardColorPalette: Boolean;
```

When true, colors will be mapped using the standard Excel color palette, otherwise a custom palette will be included in the XLS sheet.

```
TimeFormat: string;
```

Sets the format of cells with a time. When no format is specified, the default system time format is applied.

```
UseUnicode: Boolean;
```

When true, cells will be exported / imported as Unicode cells (for versions older than Delphi 2009, from Delphi 2009, all cells are Unicode by default)

```
XlsStartCol, XlsStartRow: integer;
```

Sets the top/left cell from where the import/export should start

```
Zoom: integer;
```

Sets the zoom level to set for the exported XLS file

```
ZoomSaved: Boolean;
```

When true, the zoom factor set with AdvGridExcel.Zoom is saved to the XLS file.

## **Formatting Excel cells when exporting from with TAdvGridExcelIO**

By default there is no automatic conversion between the numeric formats in AdvStringGrid and Excel since they use different notations.

Imagine you have the number 1200 in the grid, formatted as "\$1,200" . If you set TAdvGridExcelIO.Options.ExportCellFormat to true, the cell will be exported as the string "\$1,200" to Excel. It will look fine, but it will not be a "real" number, and can not be used in Excel formulas.

If you set TAdvGridExcelIO.Options.ExportCellFormat to false, the cell will be exported as the number 1200. It will be a real number, that can be added later in Excel, but it will look like "1200" and not "\$1,200"

To get a real number that is also formatted in Excel you need to set ExportCellFormat := false, and use the OnCellFormat event in AdvGridExcelIO, and set the desired format for the cell there.

For example, to have 1200 look like "\$1,200" for the numbers in the third column, you could use this event:

```
procedure TMainForm.AdvGridExcelIO1CellFormat(Sender: TAdvStringGrid;
  const GridCol, GridRow, XlsCol, XlsRow: Integer; const Value: WideString;
  var Format: TFlxFormat);
begin
  if (GridCol = 3) then Format.Format:='$ #,##0';
end;
```

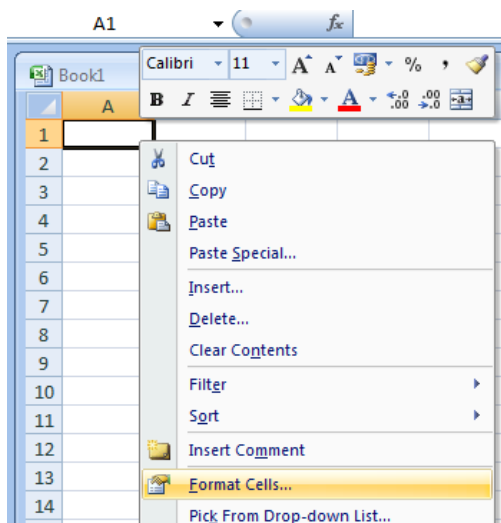
The string you need to write in "Format.Format" is a standard Excel formatting string. It is **important to note that this string must be in ENGLISH format, even if your Windows or Excel is not in English.**

This means that you must use "." as decimal separator and "," as thousands separator, even if they are not the ones in your language.

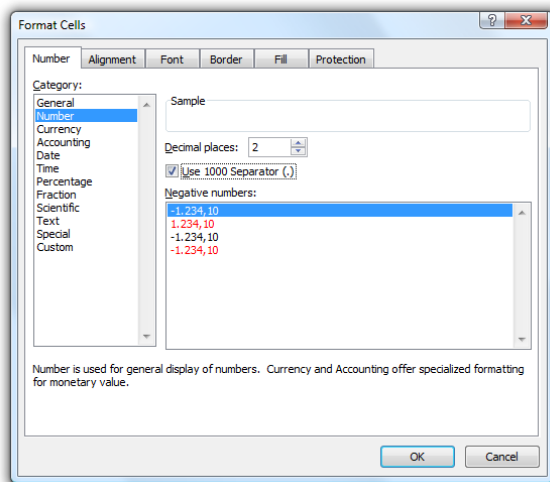
For information on the available Formatting string in Excel you can consult the Excel documentation, but there is normally a simple way to find out:

Let's imagine that we want to find out the string for a number with thousands separator and 2 decimal places. So the steps are:

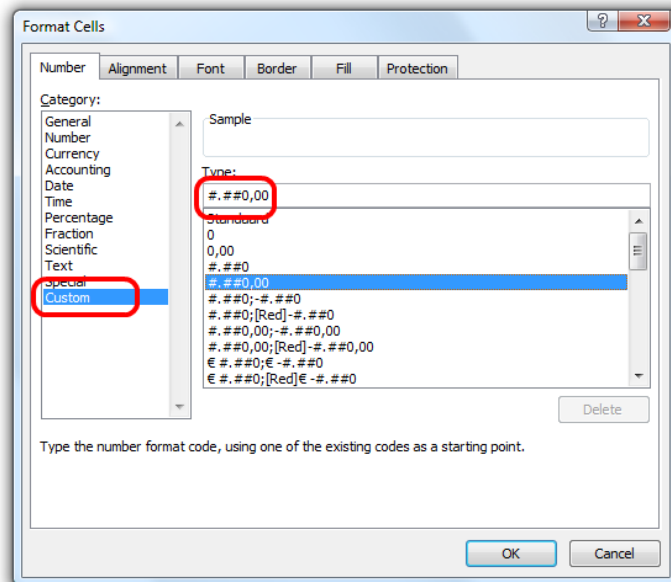
1) Open an empty Excel file, right click a cell and choose "Format Cells"



Once the window opens, choose the numeric format you want. Here we will choose a numeric format with 2 decimal places and a thousands separator



Once we have the format we want, we choose "Custom" in the left listbox. There is no need to close the dialog.



The string that shows in the "Type:" editbox is the one we need to use, converted to English notation. In this example, since our decimal separator is "," and the thousands "." we need to switch them in the final string.

So, the string showing is "#,##0,00", and we need to switch "," and ".", so the final string is "#,##0.00" and the event is:

```
procedure TMainForm.AdvGridExcelIO1CellFormat(Sender: TAdvStringGrid;
  const GridCol, GridRow, XlsCol, XlsRow: Integer; const Value: WideString;
  var Format: TFlxFormat);
begin
  if (GridCol = 3) then
    Format.Format := '#,##0.00';
end;
```

## TAdvStringGrid export to RTF files via TAdvGridRTFIO

With the TAdvGridRTFIO component it is possible to export a grid to a RTF file without the need to have any other software installed such as MS Word. TAdvGridRTFIO is an add-on component that is included with TAdvStringGrid. It is a separate component and as such, when not used, the RTF capabilities do not increase your application executable size unnecessarily.

Using TAdvGridRTFIO is very simple. Drop the component on the form and assign your TAdvStringGrid or descendent component to the TAdvGridRTFIO.AdvStringGrid property. Call TAdvGridRTFIO.ExportRTF(FileName) to do the actual export.

Options for the export are controlled by various TAdvGridRTFIO properties:

GridStartCol, GridStartRow: sets the top left row from where the export should start. With this property you can control whether fixed cells are exported or not.

Options:

ConvertHTML	When true, HTML formatted cell text is automatically converted to rich text formatting otherwise the cell text is exported without any attributes
ExportBackground	When true, grid cell background colors are exported
ExportCellProperties	When true, grid cell properties such as font style, name, size & alignment are exported
ExportHiddenColumns	When true, hidden cells are also exported
ExportImages	When true, images are exported
ExportMSWordFeatures	When true, MS Word specific rich text features are exported such as column merging
ExportOverwrite	Sets the mode for
ExportOverwriteMessage	Sets the message to be displayed as warning to overwrite a file
ExportRTFCell	When true, grid cells with rich text are also exported as rich text, otherwise the cell text is exported without the rich text attributes.
ExportShowInWord	When true, MS Word is automatically opened with the exported RTF file

## Using the ICellGraphic interface for cells

Interfaces are a powerful way to remove code dependencies and as a result allow to better tailor code size to feature use. In TAdvStringGrid it is possible to add an interfaced object to a cell and have the interface paint the cell. This way, all kinds of small or large code can be used to paint a cell without forcing any user who is not interested in a particular graphical feature in the grid to link the code.

To achieve this, the interface ICellGraphic was created. This interface currently has only four methods:

```
ICellGraphic = Interface
  procedure Draw(Canvas: TCanvas; R: TRect; Col, Row: integer; Selected:
boolean; Grid: TAdvStringGrid);
  function CellWidth: integer;
  function CellHeight: integer;
  function IsBackground: boolean;
end;
```

The first method Draw() is called to draw the cell Col,Row within rectangle R on the canvas Canvas. An extra parameter Selected indicates the selection state of the cell. Two functions return the desired size of the graphic in the cell. These functions are used for autosizing in the grid to adapt the cell size automatically to the size of the graphic. A function IsBackground is used to inform the grid whether text still needs to be drawn on top of the graphic or not.

To start using this interface, we need to create a class that implements the interface. In this sample, we propose 3 classes that implement the interface: TSimpleGraphicCell, TComplexGradientCell and TImageCell. TSimpleGraphicCell just demonstrates the concept. TComplexGradient & TImageCell allow to use specific GDI+ features in the grid. Note that by implementing the GDI+ features in the interfaced class, TAdvStringGrid remains completely independent of GDI+ code. So, users who prefer not to include a GDI+ dependency can keep using TAdvStringGrid as-is while users who want to exploit the extra GDI+ features can benefit from this now.

The TSimpleGraphicCell class code is:

```
TSimpleGraphicCell = class(TInterfacedPersistent, ICellGraphic)
  procedure Draw(Canvas: TCanvas; R: TRect; Col, Row: integer; Selected:
boolean; Grid: TAdvStringGrid);
  function CellWidth: integer;
  function CellHeight: integer;
end;

function TSimpleGraphicCell.CellHeight: integer;
begin
  Result := 0; // by returning zero, this graphic cell has no minimum cell
height requirement
end;

function TSimpleGraphicCell.CellWidth: integer;
begin
  Result := 0; // by returning zero, this graphic cell has no minimum cell
width requirement
end;

procedure TSimpleGraphicCell.Draw(Canvas: TCanvas; R: TRect; Col, Row:
integer;
```

```

    Selected: boolean; Grid: TAdvStringGrid);
begin
    Canvas.Pen.Color := clRed;    // draw a simple diagonal line in the cell
    Canvas.Pen.Width := 2;
    Canvas.MoveTo(R.Left, R.Top);
    Canvas.LineTo(R.Right, R.Bottom);
end;

function TSimpleGraphicCell.IsBackground: boolean;
begin
    Result := true;
end;

```

To use the interface in a cell, this can be done with the code:

```

var
    sg: TSimpleGraphicCell;

begin
    sg := TSimpleGraphicCell.Create;
    AdvStringGrid1.AddInterfacedCell(2, 2, sg);
end;

```

We have created two additional interfaced classes that now open up GDI+ capabilities for use in the grid, ie. adding complex diagonal gradients for example or draw antialiased PNG images in cells (this uses TGDIPicture & AdvGDIP, two units available in the [TMS Component Pack](#)):

```

TComplexGradientCell = class(TInterfacedPersistent, ICellGraphic)
private
    FStartColor, FEndColor: TColor;
    FGradientMode: TLinearGradientMode;
public
    procedure Draw(Canvas: TCanvas; R: TRect; Col, Row: integer; Selected:
boolean; Grid: TAdvStringGrid);
    function CellWidth: integer;
    function CellHeight: integer;

    property StartColor: TColor read FStartColor write FStartColor;
    property EndColor: TColor read FEndColor write FEndColor;
    property GradientMode: TLinearGradientMode read FGradientMode write
FGradientMode;
end;

```

```

TImageCell = class(TInterfacedPersistent, ICellGraphic)
private
    FPicture: TGDIPPicture;
    procedure SetPicture(const Value: TGDIPPicture);
public
    { Interface }
    procedure Draw(Canvas: TCanvas; R: TRect; Col, Row: integer; Selected:
boolean; Grid: TAdvStringGrid);
    function CellWidth: integer;
    function CellHeight: integer;

    constructor Create;
    destructor Destroy; override;
    property Picture: TGDIPPicture read FPicture write SetPicture;
end;

```



```

{ TComplexGradientCell }

function TComplexGradientCell.CellHeight: integer;
begin
    Result := 0;
end;

function TComplexGradientCell.CellWidth: integer;
begin
    Result := 0;
end;

procedure TComplexGradientCell.Draw(Canvas: TCanvas; R: TRect; Col,
Row: integer; Selected: boolean; Grid: TAdvStringGrid);
var
    graphics : TGPGraphics;
    linGrBrush: TGPLinearGradientBrush;
begin
    // Create GDI+ canvas
    graphics := TGPGraphics.Create(Canvas.Handle);
    linGrBrush := TGPLinearGradientBrush.Create(MakeRect(r.Left, r.Top, r.Right
- r.Left, r.Bottom - r.Top), ColorToARGB(FStartColor), ColorToARGB(FEndColor),
FGradientMode);
    graphics.FillRectangle(linGrBrush, MakeRect(r.Left , r.Top, r.Right -
r.Left , r.Bottom - r.Top));
    linGrBrush.Free;
    graphics.Free;
end;

function TComplexGradientCell.IsBackground: boolean;
begin
    Result := true;
end;

{ TImageCell }

function TImageCell.CellHeight: integer;
begin
    Result := FPicture.Height;
end;

function TImageCell.CellWidth: integer;
begin
    Result := FPicture.Width;
end;

constructor TImageCell.Create;
begin
    inherited Create;
    FPicture := TGDIPPicture.Create;
end;

destructor TImageCell.Destroy;
begin
    FPicture.Free;
    inherited;
end;

procedure TImageCell.Draw(Canvas: TCanvas; R: TRect; Col, Row: integer;

```

```

Selected: boolean; Grid: TAdvStringGrid);
begin
    Canvas.Draw(R.Left, R.Top, FPicture);
end;

function TImageCell.IsBackground: boolean;
begin
    Result := false;
end;

procedure TImageCell.SetPicture(const Value: TGDIPPicture);
begin
    FPicture.Assign(Value);
end;

```

The use of the TImageCell and TComplexGradientCell is done with following code:

```

cg := TComplexGradientCell.Create;
cg.StartColor := clBlue;
cg.EndColor := clAqua;
cg.GradientMode := LinearGradientModeHorizontal;
AdvStringGrid1.AddInterfacedCell(1,3,cg);
ig := TImageCell.Create;
ig.Picture.LoadFromFile('.\personal.png');
AdvStringGrid1.AddInterfacedCell(2,4,ig);

```

## TAdvStringGrid tips and FAQ

**Delphi can't find definition for TFlxFormat when using TAdvGridExcellIO**

This type is defined in the unit tmsUFlxFormats. Add the unit tmsUFlxFormats to the uses clause and the problem should be solved.

**Using TAdvStringGrid printer settings dialog combined with printer selection.**

This code snippet shows how you can show the print setup dialog for users after which the printer selection is done.

```
procedure TForm1.PrintGrid;
begin
  AdvGridPrintSettings.Form.Caption := 'Print overview';
  AdvStringGrid.PrintSettings.FitToPage := fpAlways;
  AdvStringGrid.PrintSettings.Orientation := poLandscape; // initialize to
default poLandscape
  if AdvGridPrintSettings.Execute then
  begin
    Printer.Orientation := AdvStringGrid.PrintSettings.Orientation;
    if PrinterSetupDialog.Execute then
    begin
      AdvStringGrid.PrintSettings.Orientation := Printer.Orientation;
      AdvStringgrid.Print;
    end;
  end;
end;
```

**Vertical bottom or center alignment in the grid**

Vertical alignment and wordwrap are mutually exclusive. This is due to a limitation in the Microsoft Windows text drawing API that does not allow to have wordwrapped text with other vertical alignment than top alignment. To enable vertically centered or bottom alignment, make sure to set grid.WordWrap to false.

**Using TAdvStringGrid with Multilizer**

In order to automatically translate applications that use TAdvStringGrid with Multilizer, exclude the class TAdvRichEdit in Multilizer. TAdvRichEdit is an internal class only used in TAdvStringGrid as inplace editor for rich text editing.

**Copying a grid as image on the clipboard**

Following code copies TAdvStringGrid as an image on the clipboard:

```
var
  bmp: TBitmap;
```

```

clip: TClipboard;
begin
  bmp := tbitmap.create;
  bmp.Width := advstringgrid1.Width;
  bmp.Height := advstringgrid1.Height;
  AdvStringGrid1.PaintTo (bmp.Canvas, 0, 0);
  clip := TClipboard.Create;
  clip.Assign (bmp);
  bmp.Free;
  clip.Free;
end;

```

### Saving TAdvStringGrid to a JPEG file

With code below, the output of TAdvStringGrid is sent to a JPEG file:

```

var
  pBitmap: TBitmap;
  jp: TJPEGImage;
  R: TRect;
begin
  pBitmap := TBitmap.Create; //create a new instance of a bitmap
  jp := TJPEGImage.Create; //create new instance of a jpg file
  R := Rect(0, 0, 950, 760); //parameters for rectangle
  pBitmap.Height := 622; //set bmp height
  pBitmap.Width := 812; //set bmp width
  AdvStringGrid1.PrintPreview (pBitmap.Canvas, R); //call Preview to paint to
BMP canvas
  jp.Assign (pBitmap); //get picture from bitmap for JPG Image
  jp.SaveToFile ('c:\temp\Grid.jpg'); //save picture as JPG File
  pBitmap.Free;
  jp.Free;
end;

```

### Setting different max. edit lengths for the inplace editor

If the max. number of characters for editing should be limited, this can be done with then LengthLimit property of the inplace editor. When LengthLimit is 0, there is no limitation to the nr. of characters that can be typed in the editor. To set a different max. nr of characters per column, following code can be used in the OnGetCellEditor event :

```

procedure TForm1.AdvStringGrid1GetEditorType (Sender: TObject; ACol,
ARow: Integer; var AEditor: TEditorType);
begin
  if Assigned (AdvStringGrid1.NormalEdit) then
  begin
    case acol of
      1: AdvStringGrid1.NormalEdit.LengthLimit := 4;
      2: AdvStringGrid1.NormalEdit.LengthLimit := 8;
    else
      AdvStringGrid1.NormalEdit.LengthLimit := 0
    end;
  end;
end;

```

```
end;
end;
```

This sets the max. edit length for column 1 to 4 characters, for column 2 to 8 eight characters and unlimited for all other columns.

### Printing only selected rows in disjunct row select mode

The disjunct row select mode is flexible to let the user select several non contiguous rows in a grid. When you want to print only the selected rows, the Print functions do not provide a possibility these rows. Thanks to the grid's row hiding capabilities this can be easily done by temporarily hide the non-selected rows, print the grid and then unhide these rows again. The code to hide only the not selected rows is :

```
var
  i,j: Integer;
begin
  i := 1;
  with AdvStringGrid do
  begin
    j := RowCount;
    while (i < j) do
      if not RowSelect[DisplRowIndex(i)] then
        HideRow(i);
        Inc(i);
      end;
    end;
  end;
```

To unhide the rows again after the print, the method UnHideRowsAll can be called.

### Setting an hourglass cursor during lengthy sort operations

Before the sort starts, the OnCanSort event is called. In this event, the crHourGlass cursor can specified either for the grid or for your application.

When sorting is completed, the OnClickSort event is called, where you can set the cursor back to normal.

### Forcing a visible cell editor when the form is displayed in the grid

In the FormShow event, add these 2 methods :

```
grid.SetFocus;
grid.ShowInplaceEdit;
```

### Problems with FILECTRL.OBJ when installing in C++Builder

In C++Builder 6 : Add following line to the package CPP file : USEPACKAGE("vclx.bpi");

In C++Builder 5 : Add following line to the package CPP file : USEPACKAGE("vclx50.bpi");

Also, never choose a package filename equal to any of the component filenames used.

**When using RowSelect, the first cell of the row is not highlighted as the other cells.**

This can be easily solved by setting the option goDrawFocusSelect to true in the Options property.

### Use a different inplace editor color than the cell color

Normally, the inplace edit control gets the same color as the cell color. Sometimes this behaviour is not wanted, especially when the cell that is edited must be highlighted. This can be down in the following way :

```
procedure TForm1.FormCreate(Sender: TObject);
begin
    AdvStringGrid1.Color := clSilver;
end;

procedure TForm1.AdvStringGrid1GetCellColor(Sender: TObject; ARow,
ACol: Integer; AState: TGridDrawState; ABrush: TBrush; AFont: TFont);
begin
    if (acol = AdvStringGrid1.Col) and
        (arow = AdvStringGrid1.Row) then
    begin
        if Assigned(AdvStringGrid1.NormalEdit) then
            if (AdvStringGrid1.NormalEdit.Visible) then
                ABrush.Color := clWhite;
        end;
    end;
end;
```

### Still using the 3D style inplace combobox editor

Use following code in the OnGetCellEditor :

```
grid.ComboBox.Flat := false;
```

### I use OnGetEditorType to specify a checkbox but it only displays when editing

Use a permanently visible checkbox that can be added with the AddCheckBox method

### I use row selection, but the first column has a different color

Set goDrawFocusSelected = true in the Options property

**Why do rotated fonts do not print correct ?**

Toggle the value of the public property PrinterDriverFix: Boolean

**I want to use rotated font but the font does not show rotated**

Make sure to use a truetype font. Only truetype font can be rotated.

**Why do my printouts do not have colors or fonts set as displayed ?**

Assign the OnGetCellColor event to the OnGetCellPrintColor event as well.

**Copy and paste does not seem to work ?**

Make sure that Navigation.AllowClipboardShortCuts is true and the grid is either editable or Navigation.AllowClipboardAlways is true.

**I want to select multiple rows with Ctrl - mouseclick and Shift - mouse click**

In the Options property set goRowSelect = true and set MouseActions.DisjunctRowSelect = true. The desired selection capabilities are enabled now.

**How can the copyright notice be removed from the grid ?**

The registered version of TAdvStringGrid does not show this copyright notice.

**I am not sure if the latest version of TAdvStringGrid is installed. How can I check this ?**

At design time, right click on the grid and select About. At runtime, show the version with :  
`ShowMessage(Grid.GetVersionString);`

**When I try to install the trial version of TAdvStringGrid in a trial version of Delphi or C++Builder, it asks for ADVGRID.PAS ?**

The Delphi or C++Builder trial edition does not allow to install binary component distributions. The registered source version of TAdvStringGrid will work with the full Delphi or C++Builder versions.

**With the registered version of TAdvStringGrid, do we need to pay additional royalties for application distribution ?**

With license for commercial use of the registered version, no additional royalties need to be paid.

**How can I set text in a cell ? How do I programmatically change a column width or row height ?**

Setting text in a cell is done with the `grid.Cells[col,row]: string` property. Setting the column width is done with `grid.ColWidths[col]: Integer` and setting a row height with `grid.RowHeights[row]: Integer`. Note that `TAdvStringGrid` inherits ALL methods and properties of `TStringGrid`. As such, refer to the Borland documentation for `TStringGrid` for help on the basic grid functions.

**How can I get the state of a checkbox added with `grid.AddCheckBox` ?**

```
var
    state: Boolean;

grid.GetCheckBoxState(col, row, state);
if state then
    ShowMessage('CheckBox is checked')
else
    ShowMessage('CheckBox is not checked');
```

**I get an exception 'invalid column' during export to Excel**

The maximum number of columns supported in Excel itself is 255. As such, it is not possible to export more columns than the Excel limit.

**I have added a button on the grid with `AddButton` but the `OnButtonClick` event is not triggered ?**

If you add a button to a non-editable cell (or grid without editing enabled) the button is treated as disabled by default. To override this behaviour, set `grid.ControlLook.NoDisabledButtonLook = true`

**I try to set `VAAlignment` to `vtaCenter` or `vtaBottom` but this is not working**

By default, wordwrap is enabled in the grid and it is a limitation of the Microsoft text drawing API's that wordwrapped text is always top aligned. To use the `VAAlignment` capability, set `WordWrap = false`

**Can I load a gallery file programmatically at runtime ?**

Yes, call `grid.LoadVisualProps(GalleryFileName);`

**I am having problems with `grid.SortByColumn`, it is slow or behaves incorrect**

`SortByColumn` is a deprecated method, use `grid.QSort` instead with settings as defined under `grid.SortSettings`



**Users of older operating systems have an error message on application startup related to a missing gdiplus.dll**

Either redistribute the Microsoft GDIPLUS.DLL (explained in README.TXT) or remove the gdiplus.dll dependency by commenting the line {\$DEFINE TMSGDIPLUS} in TMSDEFS.INC  
All operating systems from Windows XP have GDIPLUS.DLL by default installed.

**When exporting to Excel file with the method grid.SaveToXLS() I get the error : "Excel OLE server not found"**

The method grid.SaveToXLS() uses OLE automation to export to Excel file and thus requires Excel to be installed on the machine. To avoid this requirement, you can use the component TAdvGridExcellIO to export to Excel.

**When try to install TAdvStringGrid, I get an error that TAdvStringGrid is compiled with a different version of PictureContainer**

Most likely another TMS component has been installed that is also using the PictureContainer. Due to strict binary compatibility checks of Delphi & C++Builder, it is causing problems to install multiple binary distributed components that share a unit. For using the binary versions, the only workaround is to install the packages alternatingly for evaluation. Registered versions that come with full source do not have this problem.

**When I run my application I get an error "property does not exist"**

An older version of ADVGRID.DCU might be in your library path. When upgrading from an older version, make sure to first open all forms in your application that use the grid, ignore property errors on opening, save form files and then rebuild your application.

**When I try to install the package, it asks for AdvGrid.pas**

Make sure the correct version of ADVGRID.DCU and other DCU files are in your library path, that your library path contains the directory where ADVGRID.DCU is installed and that no other versions of ADVGRID.DCU are in your library path. Note that the binary version of TAdvStringGrid cannot be used with Delphi or C++Builder trial versions.

## TAdvSpreadGrid

### TAdvSpreadGrid description

	A	B	C	
1	1.00			
2	2.00			
3	3.00			
4	Sum of sheet 1	6.00		
5	Sum of sheet 2	=SUM(Sheet2!A1:A3) I		
6	Sum	21.00		
7				
Sheet1 Sheet2				

Powerful spreadsheet function calculation support added to the full TAdvStringGrid feature set.

## TAdvSpreadGrid features

TAdvSpreadGrid extends the full power of TAdvStringGrid with formulas.

- simple formula editing interface
- auto recalculation
- native XLS file import and export\*
- single cell recalculation, full recalculation
- extensive range of mathematical functions
- save with formulas or formula results only
- single cell references in formulas
- cell range formulas
- formula precision for grid on cell basis
- display formulas or formula results
- date / time functions
- intelligent formula aware copy and paste
- can be extended with custom functions
- cell names
- cell name mode can be RxCy style or A1-style
- can reference cells from other TAdvSpreadGrids
- math library infrastructure to allow easy extending
- TAdvSpreadGrid with custom functions
- Includes the free ESBMaths library with 46 scientific constants and 19 mathematical functions from ESB Consultancy
- ESBPCS maths library available for even more statistical functions
- Intelligent and customizable hints while editing formulas
- available as separate add-on for TAdvStringGrid (not included in the TMS component pack)

## TAdvSpreadGrid cell acces and function overview

This is an overview of using cell references and built-in functions in TAdvSpreadGrid. Formulas can contain cell references, constants, single parameter functions, multi parameters functions, cell name references and cell range functions.

### Cell references

If CellNameMode is nmRC then cell references are in RxCx format, where x is the row number and y is the column number. If CellNameMode is nmA1 then a cell reference consists of 2 parts : the column identifier and the row identifier. The column identifier is a character, starting from A for the first column, B for the second column, etc.. After column 26, the column identifier is a double character string AA, AB, etc... The row identifier starts at 1 for the first editable row.

#### Example

cell 1,1 is A1, cell 2,2 is B2, cell 27,27 is AA27

Cell ranges are specified by the top left cell and bottom right cell. As such, the first 15 cells in column 1, can be specified as A1:A15.

Cell formulas are by default relative. That means that when cell formulas are involved in copy & paste operations or row/column insert and delete, TAdvSpreadGrid will automatically adapt the formulas to address the proper relative cells. Absolute cell addresses will not be modified during clipboard copy & paste operations or during row/column insert and delete. Prefix the cell address row or column part with '\$' to indicate an absolute cell address.

#### Example

A\$1 : A is a relative column address, 1 is an absolute row address

\$B\$2 : B is an absolute column address, 2 is an absolute row address

### Cell ranges

Cell ranges are identified by topleft cell & bottomright cell split by ':'

#### Example

A1:B3 : specifies the range of cells from cell 1,1 to cell 2,3

\$A\$1:\$B\$3 : specifies an absolute cell range from cell 1,1 to cell 2,3

### Constants

PI, E,True,False

### Single parameter functions

ABS(parameter) : absolute value

ROUND(parameter) : rounds value

TRUNC(parameter) : truncates value

CEILING(parameter; significance) : rounds the parameter to the nearest multiple of significance

FRAC(parameter) : returns fractional part of value

FACT(parameter) : factorial of value

INT(parameter) : int part of value

SIN(parameter) : sine of value

COS(parameter) : cosine of value

TAN(parameter) : tangens of value

COTAN(parameter) : cotangens of value

SINH(parameter) : hyperbolic sine of value

COSH(parameter) : hyperbolic cosine of value

TANH(parameter) : hyperbolic tangens of value

COTANH(parameter) : hyperbolic cotangens of value

ASIN(parameter) : arcsin of value

ACOS(parameter) : arccos of value

ATAN(parameter) : arctangens of value

ACOTAN(parameter) : arccotangens of value

LN(parameter) : natural logarithm of value

LOG2(parameter) : base 2 logarithm of value

LOG10(parameter) : base 10 logarithm of value

EXP(parameter) : exponential of value

RAND(parameter) : random between 0 and value

RADIANS(parameter) : converts degrees to radians

DEGREES(parameter) : converts radians to degrees

SQR(parameter) : square of value

SQRT(parameter) : square root of value

CUBE(parameter) : cubic square of value

CHS(parameter) : change sign

POWER(parameter,exp) : parameter to exponent exp

Multi parameter functions :

LT(param1;param2) : larger than : returns 1 of param1>param2

ST(param1;param2) : smaller than : returns 1 of param1<param2

EQ(param1;param2) : equal : returns 1 of param1=param2 else 0

CHOOSE(sel;param1;param2) : returns param1 if sel>0 else param2

#### Cell range functions

SUM(range) : sum of all cell values in range

PRODUCT(range) : product of all cell values in range

AVERAGE(range) : average of all cell values in range

MIN(range) : min. cell value in range

MAX(range) : max. cell value in range

COUNT(range) : nr. of cells in range

COUNTA(range) : nr of non blank cells in range

COUNTIF(range;condition) : nr of cells meeting condition in range

STDEV(range) : standard deviation of range

STDEVP(range) : standard deviation of total population of range

DEVSQ(range) : sum of squares of deviations of range

VAR(range) : variance of range

#### Date & Time functions

HOUR(parameter) : gets the hour from a cell containing a valid time string

MIN(parameter) : gets the minute from a cell containing a valid time string

SECOND(parameter) : gets the second from a cell containing a valid time string

DAY(parameter) : gets the day from a cell containing a valid time string

MONTH(parameter) : gets the month from a cell containing a valid time string

YEAR(parameter) : gets the year from a cell containing a valid time string

WEEKDAY(parameter) : gets the day of the week from a cell containing a valid time string

TODAY : gets the current day

NOW : gets the current time

#### Logical functions

AND(parameters) : logical AND function

OR(parameters) : logical OR function

NAND(parameters) : logical NAND function

NOR(parameters) : logical NOR function

XOR(parameters) : logical XOR function

NOT(parameter) : logical NOT function

TRUE : constant returning true

FALSE: constant returning false

#### String functions

LEN(parameter) : returns the length of a string value

LOWER(parameter) : returns string in lowercase

UPPER(parameter) : returns string in uppercase

CONCATENATE(parameter list) : returns concatenated string of parameters

SUBSTITUTE(param text; param oldtext; param new text) : returns string with oldtext replaced by newtext

LEFT(param string;len integer) : returns first len characters of string

RIGHT(param string;len integer) : returns last len characters of string

MID(param string; pos; len: integer): returns len characters starting from position pos in string

TRIM(param) : removes all spaces from text except spaces between words

SEARCH(find text; text) : returns position of string find text in text

LOOKUP(param; range1, range2) : returns the value of the element in range2 that has the index of the matching element in range1 for param

MATCH(lookup; range) : returns the index of the element param in the range

INDEX(range; val1, val2) : returns the value of element at index val1,val2 in the range

## TAdvSpreadGrid custom function libraries

TAdvSpreadGrid allows to use libraries that extend the built-in functions. A function library is a class that descends from TMathLib defined in the unit AdvPars. In order to be able to use multiple different function libraries simultaneously, a TLibBinder component can be assigned to TAdvSpreadGrid. Multiple TMathLib components can be assigned to the TLibBinder.

### Anatomy of TMathLib

TMathLib implements a number of public virtual functions that can be overridden to implement custom functions:

```
function HandlesFunction (FuncName:string) :Boolean;

function HandlesStrFunction (FuncName:string) :Boolean;

function CalcFunction (FuncName:string; Params:TParamList; var
ErrType, ErrParam: Integer) :Double;

function CalcStrFunction (FuncName:string; Params:TStringList; var
ErrType, ErrParam: Integer) :string;

function GetEditHint (FuncName:string; ParamIndex: Integer) :string;
```

### Implemented functions

The methods HandlesFunction and HandlesStrFunction are simple methods being called by the TLibBinder and assumed to return true when the library implements the function with the name 'FuncName'.

#### Example

```
function TMiscMathLib.HandlesFunction (FuncName: string) : boolean;

begin

    Result := (FuncName = 'HARMEAN') or

              (FuncName = 'GEOMEAN');

end;
```

This shows a library implementing 2 statistical functions HARMEAN and GEOMEAN. HandlesFunction should return true for functions that return a floating point result type. If a library implements a function with a string result, the HandlesStrFunction should be used.

### Function calculation

The method CalcFunction implements the actual calculation of the function. The first parameter is the function name that should be calculated, the second parameter is a list of function parameters. The 2 last parameters can be set if an incorrect parameter is specified and the index of this incorrect parameter.



## Example

```
function TMiscMathLib.CalcFunction(FuncName: string; Params: TParamList;
    var ErrType, ErrParam: Integer): Double;
var
    k: Integer;
    d: Double;

begin
    Result := 0.0;

    ErrType := Error_NoError;

    if FuncName = 'HARMEAN' then
    begin
        d := 0;
        for k := 1 to Params.Count do
        begin
            if Params.Items[k - 1] <> 0 then
            begin
                d := d + (1 / Params.Items[k - 1]);
            end
            else
            begin
                ErrType := Error_DivisionByZero;
                ErrParam := k - 1;
            end;
        end;
        Result := 1/d * Params.Count;
    end;
    Exit;
end;
```

```

if FuncName = 'GEOMEAN' then
begin
    d := 1;
    for k := 1 to Params.Count do
    begin
        d := d * Params.Items[k - 1];
    end;
    if Params.Count > 0 then
    begin
        Result := exp(1/Params.Count * ln(d));
    end
    else
    begin
        ErrType := Error_DivisionByZero;
        ErrParam := 0;
    end;
end;
end;

```

In this example, the functions HARMEAN and GEOMEAN are implemented. This shows how the method loops through the number of parameters passed to the function and calculates the result. As shown here in the code, a parameter of these functions cannot be zero. If a zero parameter is found, the method sets the error type to Error\_DivisionByZero and if needed the index of the parameter that caused the actual error. The supported types of errors are:

```

Error_NoError = 0;
Error_NoFormula = 1;
Error_DivisionByZero = 2;
Error_InvalidValue = 3;
Error_InvalidCellRef = 4;
Error_InvalidRangeRef = 5;
Error_InvalidGridRef = 6;
Error_InvalidNrOfParams = 7;

```

Error\_CircularReference = 8;

Error\_NoOpenParenthesis = 9;

Error\_NoCloseParenthesis = 10;

Error\_PrematureEndOfFormula = 11;

Error\_UnknownError = 12;

Error\_InvalidQualifier = 13;

Error\_InvalidTokenAtPosition= 14;

Error\_Overflow = 15;

Error\_Underflow = 16;

Error\_CircularRange = 17;

The string function handling is equivalent, as shown in this sample code:

```
function TStringMathLib.CalcStrFunction(FuncName: string;
    Params: TStringList; var ErrType, ErrParam: Integer): String;
var
    i: Integer;
    s: string;
begin
    Result := '';
    ErrType := 0;

    if Params.Count = 0 then
    begin
        ErrType := Error_InvalidNrOfParams;
        Exit;
    end;

    Result := '';

    if FuncName = 'REVERSE' then
    begin
```

```

    s := Params.Strings[0];

    for i := 1 to Length(s) do

        Result := Result + s[Length(s)- i + 1];

    end;

    if FuncName = 'CAPITALIZE' then
    begin
        s := Params.Strings[0];

        for i := 1 to Length(s) do

            if (i = 1) or ( (i > 1) and (s[i - 1]=' ')) then

                Result := Result + upcase(s[i])

            else

                Result := Result + s[i];

        end;

    end;

function TStringMathLib.HandlesStrFunction(FuncName: string): Boolean;
begin
    Result := (FuncName = 'REVERSE') or

               (FuncName = 'CAPITALIZE');

end;

```

### Function parameter hints

An additional feature of a function library is the capability to provide parameter hints while entering the function in TAdvSpreadGrid. This capability is enabled with the method : GetEditHint. This method is called during editing when entering parameters for a function that the library implements. The library should return a string that contains the hint text. This hint text can contain HTML formatting tags. The ParamIndex parameter of the method GetEditHint indicates the index of the parameter being entered. This can be used to highlight with a tag, the parameter being entered.

### Example

```

function TMyMathLib.GetEditHint(FuncName: string;

```

```

ParamIndex: Integer): string;

begin
    if FuncName = 'MYPROC' then
        begin
            case ParamIndex of
                1: Result := 'MyProc(<b>n: Integer Value: string)<HR>Returns the
n''character from string Value';
                2: Result := 'MyProc(n: Integer;<b> Value: string)<HR>Returns the
n''character from string Value';
            end;
        end;
    end;
end;

```

In this example, the first parameter is bold, when the user is entering the first parameter and the 2nd parameter is bold when the user is entering the 2nd parameter.

## TAdvSpreadGrid tips and FAQ

## Using custom functions directly

The OnIsCustomFunction and OnCalcCustomFunction events can be used to implement custom functions for TAdvSpreadGrid. Via the event OnIsCustomFunction event, the grid is informed what names should be treated as custom functions and the OnCalcCustomFunction performs the actual calculation of the function. With the example code presented, the MYTEST function is added that returns as a result parameter \* 2:

```
procedure TForm2.AdvSpreadGrid1CalcCustomFunction(sender: TObject;
    var func: string; var param: Double);

begin
    if func='MYTEST' then
        param := param *2;
end;

procedure TForm2.AdvSpreadGrid1IsCustomFunction(sender: TObject;
    var func: string; var match: Boolean);

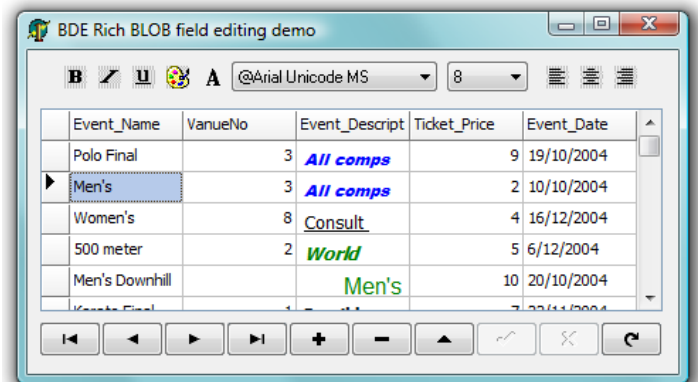
begin
    match := func='MYTEST';
end;

procedure TForm2.FormCreate(Sender: TObject);

begin
    advspreadgrid1.Cells[1,1] := '1';
    advspreadgrid1.Cells[1,2] := '=MYTEST(A1)';
    advspreadgrid1.Recalc;
end;
```

## TDBAdvGrid

### TDBAdvGrid description



Data-aware version of TAdvStringGrid.

#### TDBAdvGrid features

- Adds a Datasource & Columns property to TAdvStringGrid to load or edit any datasource into the grid
- Allows DB-aware mini HTML formatting to combine multiple formatted datafields per cell



## TDBAdvGrid use

The TMS TDBAdvGrid component is designed to be used in the most broad types of applications needing to display or handle data in rows and columns. TDBAdvGrid descends from TAdvStringGrid and as such inherits a lot of functionality of TAdvStringGrid. Please refer to the TAdvStringGrid developers guide, help file and samples for information specifically about the base grid features.

## TDBAdvGrid architecture

TDBAdvGrid descends from TAdvStringGrid. TAdvStringGrid is a grid designed to show & edit data that is either stored in cells or virtual cells. The number of cells displayed (rows x columns) in the grid always reflects the number of cells or virtual cells in the grid. Through a Columns collection, property `grid.Columns[ColumnIndex].FieldName`, it can be configured what DB fields to display in each column. With this Columns property it is possible to define things like color, font, editor type, formatting, etc... for a column in the grid. TDBAdvGrid adds data-awareness to TAdvStringGrid in two distinct ways:

### TDBAdvGrid with PageMode property set true

This is the default mode for TDBAdvGrid. With `PageMode = true`, the behaviour of TDBAdvGrid most closely resembles the behaviour of the Borland TDBGrid. This means that TDBAdvGrid only loads the rows from the connected dataset that are visible. The grid will load a new page of rows when it is scrolled to a previous or next page. As the grid loads the minimum number of rows that is simultaneously required for display, this is the fastest mode. A disadvantage of this mode is that not all rows are simultaneously available for operations like searching, grouping, filtering, sorting, export, printing.

### TDBAdvGrid with PageMode property set false

When `PageMode` is false, all rows of the dataset are loaded in the grid when the dataset is activated. This can have an initial performance hit for large datasets. After all data is loaded from the dataset, the grid is disconnected from the dataset. The full base class TAdvStringGrid operations on the data can now be directly executed. A disadvantage is that the grid will not operate synchronously with the dataset cursor and cannot edit the dataset.

It will depend on the requirements of your applications what mode is recommended. For typical reporting scenarios where user just needs to view, sort, print, export data the grid with `PageMode` set to false is adequate and operates with minimum amount of code to add.

For scenarios where data should be editable, where a dataset cursor is important, where a very large dataset is used, ... it is recommended to use TDBAdvGrid with `PageMode` set to true.

## TDBAdvGrid setup

To get started with TDBAdvGrid, the easiest way is to drop a TDataSource on the form and connect it to a TDataSet of choice. Activate the dataset and connect the TDataSource to TDBAdvGrid. With the default setting of TDBAdvGrid.AutoCreateColumns as true, the grid will automatically create TDBGridColumnItem instances for every DB field in the dataset and add it to the Columns collection. The TDBGridColumnItem.FieldName will be initialized with the fieldnames found in the dataset Fields collection. When TDBAdvGrid.AutoRemoveColumns is set to true, deactivating the dataset will automatically remove all columns from the grid.

The TDBGridColumn further offers following customizations for the grid:

Alignment	Sets
AutoMaxSize	Sets the maximum size of a column width during calls to grid.AutoColumnSize()
AutoMinSize	Sets the minimum size of a column width during calls to grid.AutoColumnSize()
BorderPen	Sets the pen for the cell borders in the column
Borders	Defines what borders of the cell to draw
CheckBoxField	When true, the field is treated as a Boolean field represented by a checkbox
CheckFalse	Sets the value of the DB field that corresponds with an unchecked checkbox
CheckTrue	Sets the value of the DB field that corresponds with an checked checkbox
Color	Sets the column background color
ColumnPopup	Sets the popup menu that is used for the column
ColumnPopupType	Defines when the popup menu should be displayed, ie. on left or right mouse click, for normal, fixed or all cells.
Comboltems	Holds possible values for a combobox inplace editor for the column
DataImageField	When true, the field value is used as index to display an image of the connected ImageList
EditLength	Sets the max. edit length for the inplace editor
EditLink	Sets the TEditLink component that is used to bind external editors as inplace editors for the grid.
EditMask	Sets the editmask for an inplace mask editor
Editor	Sets the editor type to be used for the column
FieldName	Sets the fieldname for the dataset field that is displayed in the column
Filter	Sets a list of filter values for a column in the grid
FilterCaseSensitive	When true, a filter specified for the column is treated as case sensitive
Fixed	When true, the column's cells are displayed as fixed cells
FloatFormat	Sets the format specifier for DB fields that are floating point data. For a list of possible format specifiers, see TAdvStringGrid developers guide or in the Borland Help file under the Format() function
Font	Sets the font of the column
Header	Sets the column header text. When empty, the FieldName.DisplayLabel is used as column header text
HeaderAlignment	Sets the alignment of the header text
HeaderFont	Sets the font of the header text
HTMLTemplate	Sets the HTML template of the column. This allows to display multiple DB fields in one column. See paragraph on using the HTMLTemplate
MaxSize	When different from zero, this is the max. width a column can have when columnsizing by user is enabled (with goColSizing = true in grid.Options)
MinSize	When different from zero, this is the min. width a column can have when columnsizing by user is enabled (with goColSizing = true in grid.Options)
Name	Sets the name of the TDBGridColumnItem instance
Password	When true, a password inplace editor is used and the field is displayed with the asterix character.
PictureField	When true and a blob field is connected to the column, the blob data is treated as an image and displayed

PrintBorderPen	Sets the pen used for printing the cell border
PrintBorders	Sets what borders of a cell to print
PrintColor	Sets the column background cell color for printing
PrintFont	Sets the column font for printing
ProgressBKColor	Sets the background color for a progressbar
ProgressColor	Sets the foreground color for a progressbar
ProgressField	When true, the field value in the column is treated as a value to set the progressbar. Note that this requires that the field value is between 0 and 100. If this is not available in the dataset, a calculated field could be used to generate a value between 0 and 100.
ProgressTextBKColor	Sets the text color on a progressbar for the background coloured part
ProgressTextColor	Sets the text color on a progressbar for the foreground coloured part
ReadOnly	When true, the column cannot be edited
ShowBands	When true, the column will display the bands as defined by the property grid.Bands
ShowUnicode	When true, the grid will try to display the blob field data as Unicode text
SortPrefix	Sets the prefix text part to ignore for internal sorting. If text has a currency specifier as prefix for example, this prefix can be ignored for sorting on the value.
SortSuffix	Sets the suffix text part to ignore for internal sorting. If text has a currency specifier as suffix for example, this suffix can be ignored for sorting on the value.
SpinMax	Sets the maximum value for a spinedit inplace editor
SpinMin	Sets the minimum value for a spinedit inplace editor
SpinStep	Sets the step value for a spinedit inplace editor
Tag	Integer value for custom use
Width	Sets the width of the column

Other than the column properties, some other settings need to be considered. With PageMode set to true, some datasets maintain internally an order for returning the pages of displayed rows to the grid and some not. This depends on the implementation of the TDataSet component that is used to connect to the database of choice. In general, when there is a problem with scrolling in the grid, it is recommended to set the property DataSetType to dtNonSequenced.

TDBAdvGrid also tries to know the number of rows in the dataset internally. To be database implementation independent, this is done by getting the result of the operation

```
Dataset.First  
  
rowcount := DataSet.MoveBy($FFFFFFFF);
```

Some dataset implementations have a slow MoveBy operation that causes in turn that TDBAdvGrid is slow. A solution for this is to use a SQL 'SELECT COUNT' operation to supply the number of rows in the dataset to TDBAdvGrid via the event OnGetRecordCount. Most datasets have a fast implementation of the 'SELECT COUNT' command. With TDBAdvGrid.PageMode set to true and OnGetRecordCount implemented via a 'SELECT COUNT'. The sample application BDERecordCount in the TDBAdvGrid samples distribution shows how this can be done. In this sample, OnGetRecordCount is implemented as:

```
procedure TForm1.DBAdvGrid1GetRecordCount(Sender: TObject;  
  
    var Count: Integer);
```

**begin**

```
Query2.SQL.Text := 'select Count(*) from Country.db';
```

```
Query2.Active := True;
```

```
Count := Query2.Fields[0].AsInteger;
```

```
Query2.Active := False;
```

**end;**

## TDBAdvGrid sorting

TAdvStringGrid offers built-in automatic sorting by a click on the column header. This is an often required feature that can be used with TDBAdvGrid too. When the PageMode property is set to false, all data is available in the grid and it is ready to be sorted by the internal sorting mechanism of the grid. Other than setting SortSettings.Show to true, there is nothing to do to enable the sorting. When PageMode is set to true though, only visible records are loaded in the grid. The internal sorting of the grid can as such not be applied to sort a full dataset. It is required to perform a sort through the dataset itself. TDBAdvGrid has built-in code that detects whether a TQuery or TADOQuery dataset is connected and will automatically generate the property SQL ORDER BY clause to perform the sorting on the dataset. For other dataset types, it is required though to implement the grid OnCanSort event. In the TDBAdvGrid samples distribution, the demo BDESort shows how this can be done. The implementation of this OnCanSort event is:

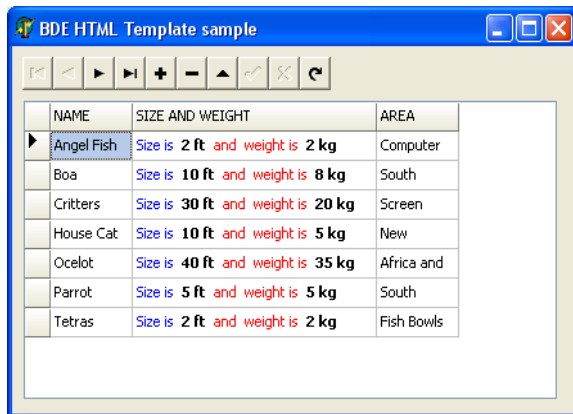
```
procedure TForm1.DBAdvGrid1CanSort(Sender: TObject; ACol: Integer;
    var DoSort: Boolean);
var
    fldname:string;
begin
    DoSort := False; // disable internal sort
    // toggle sort order
    if dbadvgrid1.SortSettings.Direction = sdAscending then
        dbadvgrid1.SortSettings.Direction := sdDescending
    else
        dbadvgrid1.SortSettings.Direction := sdAscending;
    // get field name of the column clicked
    fldname := query1.FieldList.Fields[ACol - 1].FieldName;
    if pos(' ',fldname) > 0 then
        fldname := 'biolife.db.'+fldname+'';
    // add ORDER BY clause to the query
    query1.SQL.Text := 'select * from biolife.db ORDER BY '+fldname;
    if dbadvgrid1.SortSettings.Direction = sdDescending then
        query1.SQL.Text := query1.SQL.Text + ' DESC';
    query1.Active := true;
    DBAdvGrid1.SortSettings.Column := ACol;
end;
```

## TDBAdvGrid HTML templates

Through a HTML template, it is possible to put multiple fields in a single cell with optionally HTML formatting. This is done by specifying a HTML template via the property `TDBAdvGrid.Columns[Index].HTMLTemplate`. The HTML template is a string where a DB field reference set by `<#DBFIELDNAME>` will be replaced by the DB field value for each record for display. For example, when a table has a field `SIZE` and `WEIGHT`, the following HTML template creates a single cell with text in blue, red & bold:

```
TDBAdvGrid.Columns[2].HTMLTemplate := '<FONT color="clBlue">Size is </FONT> <B><#SIZE> ft</B>  
<FONT color="clRed"> and weight is </FONT> <B><#Weight> kg</B>';
```

The resulting grid looks like:



NAME	SIZE AND WEIGHT	AREA
Angel Fish	Size is 2 ft and weight is 2 kg	Computer
Boa	Size is 10 ft and weight is 8 kg	South
Critters	Size is 30 ft and weight is 20 kg	Screen
House Cat	Size is 10 ft and weight is 5 kg	New
Ocelot	Size is 40 ft and weight is 35 kg	Africa and
Parrot	Size is 5 ft and weight is 5 kg	South
Tetras	Size is 2 ft and weight is 2 kg	Fish Bowls

## TDBAdvGrid memo fields, Boolean fields & image blobs

TDBAdvGrid can automatically display memo fields, can show Boolean fields as checkboxes in the grid and can display images stored in blob fields. By default, a memo field is displayed as '(MEMO)' and an image blob is displayed as '(GRAPHIC)' just like in the Borland TDBGrid.

To show real contents of memo fields, set global property DBAdvGrid.ShowMemoFields = true. To have the cell sizes automatically sized according to the text in memo fields, it is sufficient to call Grid.AutoSizeRows(false,4) after activating the dataset.

By default, a DB field of the type ftBoolean is displayed as value 'true' or 'false'. TDBAdvGrid can also automatically show such ftBoolean field type as a checkbox. To do this, set DBAdvGrid.ShowBooleanFields = true. One step further is that TDBAdvGrid can also show checkboxes for DB fields that do not have the type ftBoolean but that can have two values. This can be used with databases that do not support Boolean field types for example where a true condition is stored in a field as one value and false condition is stored as another value. To show checkboxes for such fields, set DBAdvGrid.Columns[columnindex].CheckBoxField = true and set via the properties DBAdvGrid.Columns[columnindex].CheckTrue, DBAdvGrid.Columns[columnindex].CheckFalse the values for a true condition and false condition.






Example:

Assume that an Interbase numeric field stores 1 as true condition and 0 as false condition. We want to display & edit this field with a checkbox. As the DB field type is ftNumeric, setting DBAdvGrid.ShowBooleanFields will not show this field as checkboxes. Setting DBAdvGrid.Columns[numericfieldindex].CheckBoxField = true will show checkboxes and the checked state of the checkbox is controlled with DBAdvGrid.Columns[numericfieldindex].CheckTrue = '1' and DBAdvGrid.Columns[numericfieldindex].CheckFalse = '0'.

	City	State	Zip	Country	Phone	FAX	Preferred
▶	Southfield	OH	60093	<input checked="" type="checkbox"/>	708-555-95	708-555-75	<input checked="" type="checkbox"/>
	Indianapolis	IN	46208	<input checked="" type="checkbox"/>	317-555-45		<input checked="" type="checkbox"/>
	Berkely	MA	02779	<input checked="" type="checkbox"/>	800-555-47	508-555-89	<input type="checkbox"/>
	Rancho	CA	90221	<input checked="" type="checkbox"/>	213-555-78		<input checked="" type="checkbox"/>
	Macon	GA	20865	<input checked="" type="checkbox"/>	912-555-67	912-555-84	<input type="checkbox"/>
	Redwood	CA	94065-1086	<input checked="" type="checkbox"/>	415-555-14	415-555-12	<input type="checkbox"/>
	Hapeville	GA	30354	<input checked="" type="checkbox"/>	800-555-62	404-555-82	<input checked="" type="checkbox"/>

TDBAdvGrid can also show BMP, GIF, JPEG images that are stored in BLOB fields. By default, such fields are displayed as '(GRAPHIC)'. When setting DBAdvGrid.ShowPictureFields = true, all fields with the type ftGraphic will be displayed as images. In some databases, the field type for an image field will not be ftGraphic but just ftBlob for example. The grid cannot automatically know that the BLOB data should be interpreted as an image though. If a DB field of the type ftBlob holds images, DBAdvGrid.Columns[columnindex].PictureField can be set to true and for this column, the grid will try to display the BLOB data as BMP, GIF or JPEG image.



	Length (cm)	Length_In	Notes	Graphic	
▶	50	19.6850393 700787	Also known as the big spotted triggerfish. Inhabits outer reef areas and feeds upon crustaceans and		▲
	60	23.6220472 440945	Called seaperch in Australia. Inhabits the areas around lagoon coral reefs and sandy bottoms.		☰
	229	90.1574803 149606	This is the largest of all the wrasse. It is found in dense reef areas, feeding on a wide variety of		
	30	11.8110236 220472	Habitat is around boulders, caves, coral ledges and crevices in shallow waters. Swims alone or in groups.		
	80	31.4960629 92126	Also known as the coronation trout. It is found around coral reefs from shallow to very deep		▼
◀					☰ ▶

## TDBAdvGrid editing

TDBAdvGrid supports various inplace editors as well as the capability to use external controls as inplace editor for the grid. The TAdvStringGrid documentation has an overview of all possible inplace editors that are included and how to use external editors as well.

To enable editing in the grid, it is required that

- the database table is editable
- the database field is editable
- DBAdvGrid.PageMode = true
- the option goEditing is set to true in DBAdvGrid.Options

TDBAdvGrid can perform editing in two modes. This is selected by the property DBAdvGrid.EditPostMode. When this is set to epCell, this means that the value that has been edited is posted immediately to the database when a cell leaves inplace editing. When DBAdvGrid.EditPostMode is set to epRow, this means that a Post will only happen when all cells in a row have been edited and the user moves to another row. Typically, for tables with various required fields, the epRow setting is the preferred setting.

When a selected cell is clicked, the inplace editing starts. The inplace editing can also be programmatically started and stopped with methods DBAdvGrid.ShowInplaceEdit, DBAdvGrid.HideInplaceEdit. It is important to know that editing of a cell or row stops when the inplace editor loses focus. Only when it loses focus, the edited value is either directly posted (epCell mode) or internally stored (epRow mode) to post when the row changes. In some circumstances, it is possible that a non focusable control performs an operation on the dataset that expected the editing to be finished. This is the case with the TDBNavigator. The grid cannot know that a TDBNavigator or other non focusable control is clicked. To avoid that the grid remains in editing mode when a database operation assumes editing has stopped, programmatically call DBAdvGrid.HideInplaceEdit. In case of the TDBNavigator, this could be done for example from the event DBNavigator.BeforeAction. Note that it is harmless that DBAdvGrid.HideInplaceEdit is called even when it is not in editing mode.

## TDBAdvGrid Unicode support

TDBAdvGrid has built-in support to edit Unicode DB fields. Following Unicode inplace editors are available:

edUniComboEdit : Unicode editable combobox  
edUniComboList : Unicode combobox  
edUniEdit : regular Unicode inplace editor  
edUniEditBtn : regular Unicode inplace editor with embedded button  
edUniMemo : multiline Unicode memo editor

When the DB field type, returned by `TDBField.DataType` is `ftWideString`, TDBAdvGrid will automatically show the field as Unicode. Make sure though that a TrueType font is used that includes the Unicode charactersets that are being used. A very complete and recommend font is Arial Unicode MS.

In some databases that do not really support Unicode, it is possible that the Unicode is stored in a BLOB field. To show the Unicode properly in the grid, set `DBAdvGrid.Columns[columnindex].ShowUnicode = true`. This setting will treat the binary data in the BLOB field as Unicode text.

Some additional helper events are available that can be used for Unicode editing:

`OnGetEditWideText` : this event is triggered just before inplace editing starts and allows to override the default text with which the inplace editor will be started.

`OnSetEditWideText` : this event is triggered when the inplace editing ends and returns the new text

`OnCellValidateWide` : this event is triggered when editing is about to end, it returns the new edited text and allows to modify, accept or cancel the edited text.

## TDBAdvGrid tips and FAQ

### Sorting a DB grid by clicking a column header

It is demonstrated in the sample applications ADOSort & BDESort how sorting can be performed by clicking a column header. See sample applications from TDBAdvGrid at the TMS Grid Pack page.