Chapter 1

Reference for unit 'uPlotAxis'

1.1 Used units

Table 1.1: Used units by unit 'uPlotAxis'

Name	Page
Classes	??
Dialogs	??
FPimage	??
Graphics	??
GraphMath	??
GraphUtil	??
IntfGraphics	??
math	??
System	??
sysutils	??
Types	??
uPlotClass	??
uPlotStyles	??

1.2 Constants, types and variables

1.2.1 Constants

```
TNumberFormatName : Array[nfPlain..nfEngineeringPrefix] of string =
   ('Plain Number', 'float (1.10e4)', 'engineering (11.0e3)', 'engineering prefix (11k)')
```

1.2.2 Types

```
PAxisVisualParams = ^TAxisVisualParams
```

```
PCloneAxisParams = ^TCloneAxisParams
```

```
TAutoLengthMode = (lmRelToSmallSide,lmRelToLargeSide,lmRelToHeight,
                   lmRelToWidth,lmRelToBorder)
```

Table 1.2: Enumeration values for type TAutoLengthMode

Value	Explanation
lmRelToBorder	axis length relative to remaining length until border is reached
lmRelToHeight	axis length relative to height of plotrect
lmRelToLargeSide	axis length relative to large side of plotrect
lmRelToSmallSide	axis length relative to small side of plotrect
lmRelToWidth	axis length relative to width of plotrect

```
TAxisMode = (amPixelPerValue,amValuePerPixel)
```

Table 1.3: Enumeration values for type TAxisMode

Value	Explanation
amPixelPerValue	
amValuePerPixel	

```
TAxisVisualParams = packed record
  ptA : TPoint;
  ptB : TPoint;
  PixelsPerValue : Extended;
  DrawAngle : Extended;
  DrawLength : Extended;
  DrawCanvas : TCanvas;
  TickLength : Integer;
  SubTickLength : Integer;
  Style : TAxisStyle;
  TickStyle : TAxisStyle;
  SubTickStyle : TAxisStyle;
  TickAngle : TTickAngle;
  Ticks : Boolean;
  SubTicks : Boolean;
  Marks : Boolean;
  SubMarks : Boolean;
  Visible : Boolean;
  TickInfo : TTickInfo;
end
```

```
TCloneAxisParams = packed record
  ShiftAxis : TPlotAxisBase;
  ShiftLengthRel : Integer;
  VisualParams : TAxisVisualParams;
end
```

```
TNumberFormat = (nfPlain,nfFloat,nfEngineering,nfEngineeringPrefix)
```

Table 1.4: Enumeration values for type TNumberFormat

Value	Explanation
nfEngineering	72.2 e3
nfEngineeringPrefix	72.2 k
nfFloat	7.22 e4
nfPlain	72200

```
TOriginMode = (omAbs,omRel)
```

Table 1.5: Enumeration values for type TOriginMode

Value	Explanation
omAbs	axis origin in pixels
omRel	axis origin in percent

```
TTickAngle = (taPositive,taNegative)
```

Table 1.6: Enumeration values for type TTickAngle

Value	Explanation
taNegative	
taPositive	

```
TTickInfo = record
  mainlow : Extended;
  mainhigh : Extended;
  maininterval : Extended;
  maincount : Integer;
  SubNumbers : Set of Byte;
end
```

1.3 TPlotAxis

1.3.1 Description

Axes for the plot

1.3.2 Method overview

Page	Property	Description
9	AddCloneAxis	Draw a visible axis for indication only
8	AddInnerGridAxis	neighbour axis for inner grid
7	CheckSize	check the drawing size
7	Create	
7	Destroy	
9	DrawCloneAxis	drawing routine for cloneaxes
9	DrawIndicatorAxis	drawing routine for axes
6	DrawInnerTicks	
6	DrawLabel	
6	DrawUnits	
8	Get3DGridAxis	Axis index for drawing 3D grids
6	GetPixelsPerValue	
5	GetViewRange	
9	PanPixel	pan
7	ReCalcValue	Transform to log
7	ReCalcValueInverse	Retransform log to linear
6	ReDraw	
8	Remove3DGridAxis	
8	RemoveInnerGridAxis	
8	Set3DGridAxis	Axis index for drawing 3D grids
5	SetViewRange	
9	ZoomPixel	zoom

1.3.3 Property overview

Page	Property	Access	Description
11	AutoLength	rw	automatic drawing length
10	AutoMode	rw	automatic mode for axis length
16	AutoPlacedLength	rw	
16	AutoPlacedOriginRel	rw	
14	AxisLabel	rw	Label of the axis
15	AxisMode	rw	mode
10	DrawAngle	rw	axis angle in degrees
11	DrawLength	rw	drawing length
10	DrawOrigin	r	get the draworigin in screen coordinates
10	DrawOriginRel	rw	set the drawing origin relative to the plotrect clientrect
13	Inner3DTicks	rw	enable 3D ticks
13	InnerSubTicks	rw	enable inner subticks
12	InnerTicks	rw	enable inner ticks
11	LogBase	rw	LOG base
11	LogScale	rw	LOG scaling of the axis
13	Marks	rw	enable marks
16	NumberFormat	rw	how to format the numbers
10	OriginMode	rw	Originmode
11	PixelsPerValue	r	pixels per axis value
16	RotateLabelText	rw	
16	RotateUnitText	rw	
15	SeriesUnits	r	Text for units
13	SubMarks	rw	enable submarks
14	SubTickGrain	rw	number of subticks in one main tick
12	SubTickLength	rw	length of subtick lines
12	SubTicks	rw	enable axis ticks
15	SubTickStyle	rw	a TAxisStyle
13	TickAngle	rw	drawing angle of axis ticks
12	TickLength	rw	lewngth of ticklines
12	Ticks	rw	enable axis ticks
14	TickStyle	rw	a TAxisStyle
14	ValueColor	r	map a value to a color
14	ValueFPColor	r	map a value to a FPcolor
15	ValuePerPixel	rw	values per pixel
15	VisualParams	r	customize drawing

1.3.4 TPlotAxis.GetViewRange

Synopsis:

Declaration: `function GetViewRange : TValueRange;  Override`

Visibility: protected

Description:

1.3.5 TPlotAxis.SetViewRange

Synopsis:

Declaration: `procedure SetViewRange(AValue: TValueRange);  Override`

Visibility: protected

Description:

1.3.6 TPlotAxis.GetPixelsPerValue

Synopsis:

Declaration: `function GetPixelsPerValue : Extended;  Override`

Visibility: protected

Description:

1.3.7 TPlotAxis.ReDraw

Synopsis:

Declaration: `function ReDraw(ADrawVisible: Boolean) : TRect;  Override`

Visibility: protected

Description:

1.3.8 TPlotAxis.DrawInnerTicks

Synopsis:

Declaration: `procedure DrawInnerTicks`

Visibility: protected

Description:

1.3.9 TPlotAxis.DrawLabel

Synopsis:

Declaration:
```
function DrawLabel(ACenterPt: TPoint;AVisualParams: TAxisVisualParams;
                   ADrawvisible: Boolean) : TRect
```

Visibility: protected

Description:

1.3.10 TPlotAxis.DrawUnits

Synopsis:

Declaration:
```
function DrawUnits(ACenterPt: TPoint;AVisualParams: TAxisVisualParams;
                   ADrawvisible: Boolean) : TRect
```

Visibility: protected

Description:

1.3.11 TPlotAxis.Create

Synopsis:

Declaration: `constructor Create(AOwnerPlot: TPlot);  Override`

Visibility: public

Description:

1.3.12 TPlotAxis.Destroy

Synopsis:

Declaration: `destructor Destroy;  Override`

Visibility: public

Description:

1.3.13 TPlotAxis.CheckSize

Synopsis: check the drawing size

Declaration: `function CheckSize(out ANetAxisRect: TRect) : TRect;  Override`

Visibility: public

Description: usually called before redraw by the plotrect. Delivers the rect used by the axis itself and a rect used by the axis including all captions, units and other text.

1.3.14 TPlotAxis.ReCalcValue

Synopsis: Transform to log

Declaration: `function ReCalcValue(AValue: Extended) : Extended`

Visibility: public

Description: resoecting LogBase

1.3.15 TPlotAxis.ReCalcValueInverse

Synopsis: Retransform log to linear

Declaration: `function ReCalcValueInverse(AValue: Extended) : Extended`

Visibility: public

Description: Retransform log to linear

1.3.16 TPlotAxis.AddInnerGridAxis

Synopsis: neighbour axis for inner grid

Declaration: `procedure AddInnerGridAxis(AAxisIndex: Integer)`

Visibility: public

Description: By default axis ticks are drawn only next to the axis itself. If you want to have ticks within the plotting surface (in the area spanned by two axes), use this property.
Example: You have TPlotAxis(Xaxis) with index 0 and TPlotAxis(Yaxis) with index 1 and you want ticklines in the whole area spanned by these two axes you use:
XAxis.AddInnerGridAxis(1) - 1 is the index of the Y axis this draws X ticks in parallel to the Y axis YAxis.
AddInnerGridAxis(0) - 0 is the index of the Y axis this draws Y ticks in parallel to the X axis also

1.3.17 TPlotAxis.RemoveInnerGridAxis

Synopsis:

Declaration: `procedure RemoveInnerGridAxis(AAxisIndex: Integer)`

Visibility: public

Description:

1.3.18 TPlotAxis.Set3DGridAxis

Synopsis: Axis index for drawing 3D grids

Declaration: `procedure Set3DGridAxis(AAxisIndex: Integer)`

Visibility: public

Description: Like AddinnerGridAxis draws a 2D grid between 2 axes, Add3DGridAxis additionally enables a 3D grid. Note: This clutters the plotting area with inner gridlines and is therefore rarely meaningful.

1.3.19 TPlotAxis.Get3DGridAxis

Synopsis: Axis index for drawing 3D grids

Declaration: `function Get3DGridAxis : Integer`

Visibility: public

1.3.20 TPlotAxis.Remove3DGridAxis

Synopsis:

Declaration: `procedure Remove3DGridAxis`

Visibility: public

Description:

1.3.21 TPlotAxis.AddCloneAxis

Synopsis: Draw a visible axis for indication only

Declaration:
```
procedure AddCloneAxis(AParams: TCloneAxisParams)
```

Visibility: public

Description: A CloneAxis is drawn at a specific coordinate shifted along another axis. The Cloneaxis is used for indication only - the calculations are based on the TPLotAxis as defined.

1.3.22 TPlotAxis.PanPixel

Synopsis: pan

Declaration:
```
procedure PanPixel(dX: Integer;dY: Integer)
```

Visibility: public

Description: pan

1.3.23 TPlotAxis.ZoomPixel

Synopsis: zoom

Declaration:
```
procedure ZoomPixel(X: Integer;Y: Integer;AFactor: Extended)
```

Visibility: public

Description: zoom

1.3.24 TPlotAxis.DrawIndicatorAxis

Synopsis: drawing routine for axes

Declaration:
```
function DrawIndicatorAxis(AParams: TAxisVisualParams;
                           ADrawVisible: Boolean) : Integer
```

Visibility: public

Description: drawing routine for axes

1.3.25 TPlotAxis.DrawCloneAxis

Synopsis: drawing routine for cloneaxes

Declaration:
```
function DrawCloneAxis(AParams: TCloneAxisParams;ADrawVisible: Boolean;
                       out AUsedRect: TRect) : Integer
```

Visibility: public

Description: drawing routine for cloneaxes

1.3.26 TPlotAxis.OriginMode

Synopsis: Originmode

Declaration: `Property OriginMode : TOriginMode`

Visibility: public

Access: Read,Write

Description: absolute or relative. During redraw the plotrect determines the remaining space for the dataplot (plotrect property ClientRect). The axes draw themselves into the plotrects ClientRect respecting a origin and a length. omAbs: in pixels relative to the bottomleft point of the ClientRect omRel: in percent relative to the bottomleft point of the ClientRect

1.3.27 TPlotAxis.DrawOriginRel

Synopsis: set the drawing origin relative to the plotrect clientrect

Declaration: `Property DrawOriginRel : TPoint`

Visibility: public

Access: Read,Write

Description: either in pixels or in percent depending on OriginMode

1.3.28 TPlotAxis.DrawOrigin

Synopsis: get the draworigin in screen coordinates

Declaration: `Property DrawOrigin : TPoint`

Visibility: public

Access: Read

Description: internal use only

1.3.29 TPlotAxis.DrawAngle

Synopsis: axis angle in degrees

Declaration: `Property DrawAngle : Extended`

Visibility: public

Access: Read,Write

Description: axis angle in degrees

1.3.30 TPlotAxis.AutoMode

Synopsis: automatic mode for axis length

Declaration: `Property AutoMode : TAutoLengthMode`

Visibility: public

Access: Read,Write

Description: see TAutoLengthMode

1.3.31 TPlotAxis.DrawLength

Synopsis: drawing length

Declaration: `Property DrawLength : Extended`

Visibility: public

Access: Read,Write

Description: getter used internally Set to a percentage between 1..100 in mode autolength=true. If autolength=false, this is a value in pixels

1.3.32 TPlotAxis.AutoLength

Synopsis: automatic drawing length

Declaration: `Property AutoLength : Boolean`

Visibility: public

Access: Read,Write

Description: AutoLength=false is historic and currently untested.

1.3.33 TPlotAxis.PixelsPerValue

Synopsis: pixels per axis value

Declaration: `Property PixelsPerValue : Extended`

Visibility: public

Access: Read

Description: Determined according to actual drawlength and actual viewrange

1.3.34 TPlotAxis.LogScale

Synopsis: LOG scaling of the axis

Declaration: `Property LogScale : Boolean`

Visibility: public

Access: Read,Write

Description: LOG scaling of the axis

1.3.35 TPlotAxis.LogBase

Synopsis: LOG base

Declaration: `Property LogBase : Extended`

Visibility: public

Access: Read,Write

Description: Axis ticks are adjusted according to the logbase.

1.3.36 TPlotAxis.Ticks

Synopsis: enable axis ticks

Declaration: `Property Ticks : Boolean`

Visibility: public

Access: Read,Write

Description: show ticklines

1.3.37 TPlotAxis.SubTicks

Synopsis: enable axis ticks

Declaration: `Property SubTicks : Boolean`

Visibility: public

Access: Read,Write

Description: Show subticks

1.3.38 TPlotAxis.TickLength

Synopsis: lewngth of ticklines

Declaration: `Property TickLength : Integer`

Visibility: public

Access: Read,Write

Description: lewngth of ticklines

1.3.39 TPlotAxis.SubTickLength

Synopsis: length of subtick lines

Declaration: `Property SubTickLength : Integer`

Visibility: public

Access: Read,Write

Description: length of subtick lines

1.3.40 TPlotAxis.InnerTicks

Synopsis: enable inner ticks

Declaration: `Property InnerTicks : Boolean`

Visibility: public

Access: Read,Write

Description: Axes for drawing inner ticks must be set. see AddInnerGridAxis

1.3.41 TPlotAxis.InnerSubTicks

Synopsis: enable inner subticks

Declaration: `Property InnerSubTicks : Boolean`

Visibility: public

Access: Read,Write

Description: see AddInnerGridAxis

1.3.42 TPlotAxis.Inner3DTicks

Synopsis: enable 3D ticks

Declaration: `Property Inner3DTicks : Boolean`

Visibility: public

Access: Read,Write

Description: Axis for 3D ticks must be set. see Set3DGridAxis

1.3.43 TPlotAxis.Marks

Synopsis: enable marks

Declaration: `Property Marks : Boolean`

Visibility: public

Access: Read,Write

Description: Show axis marks - show text with values

1.3.44 TPlotAxis.SubMarks

Synopsis: enable submarks

Declaration: `Property SubMarks : Boolean`

Visibility: public

Access: Read,Write

Description: Show text with values. Marks and Submarks are reduced to a meaningful number in order to have all values readable.

1.3.45 TPlotAxis.TickAngle

Synopsis: drawing angle of axis ticks

Declaration: `Property TickAngle : TTickAngle`

Visibility: public

Access: Read,Write

Description: drawing angle of axis ticks

1.3.46 TPlotAxis.SubTickGrain

Synopsis: number of subticks in one main tick

Declaration: `Property SubTickGrain : Integer`

Visibility: public

Access: Read,Write

Description: usually a number of 10 or equal to the logbase.

1.3.47 TPlotAxis.AxisLabel

Synopsis: Label of the axis

Declaration: `Property AxisLabel : string`

Visibility: public

Access: Read,Write

Description: Label of the axis

1.3.48 TPlotAxis.ValueColor

Synopsis: map a value to a color

Declaration: `Property ValueColor[AValue: Extended]: TColor`

Visibility: public

Access: Read

Description: internal use

1.3.49 TPlotAxis.ValueFPColor

Synopsis: map a value to a FPcolor

Declaration: `Property ValueFPColor[AValue: Extended]: TFPColor`

Visibility: public

Access: Read

Description: internal use

1.3.50 TPlotAxis.TickStyle

Synopsis: a TAxisStyle

Declaration: `Property TickStyle : TAxisStyle`

Visibility: public

Access: Read,Write

Description: customize the visible properties of ticks

1.3.51 TPlotAxis.SubTickStyle

Synopsis: a TAxisStyle

Declaration: `Property SubTickStyle : TAxisStyle`

Visibility: public

Access: Read,Write

Description: customize the visible properties of subticks

1.3.52 TPlotAxis.ValuePerPixel

Synopsis: values per pixel

Declaration: `Property ValuePerPixel : Extended`

Visibility: public

Access: Read,Write

Description: used for axismode amValuePerPixel; see also PixelsPerValue

1.3.53 TPlotAxis.AxisMode

Synopsis: mode

Declaration: `Property AxisMode : TAxisMode`

Visibility: public

Access: Read,Write

Description: pixelspervalue or valueperpixel

1.3.54 TPlotAxis.SeriesUnits

Synopsis: Text for units

Declaration: `Property SeriesUnits : TStrings`

Visibility: public

Access: Read

Description: Delivers all units for this axis. Example You have 2 series One has Voltage over Currect (Current is X axis) The other shows Voltage over flux desitiy (flux is X axis also). In this case the Axis will deliver [A],[H] as units

1.3.55 TPlotAxis.VisualParams

Synopsis: customize drawing

Declaration: `Property VisualParams : TAxisVisualParams`

Visibility: public

Access: Read

Description: TODO: VisualParams should replace the older Tick, Mark... properties at a central point

1.3.56 TPlotAxis.RotateLabelText

Synopsis:

Declaration: `Property RotateLabelText : Boolean`

Visibility: public

Access: Read,Write

Description:

1.3.57 TPlotAxis.RotateUnitText

Synopsis:

Declaration: `Property RotateUnitText : Boolean`

Visibility: public

Access: Read,Write

Description:

1.3.58 TPlotAxis.NumberFormat

Synopsis: how to format the numbers

Declaration: `Property NumberFormat : TNumberFormat`

Visibility: public

Access: Read,Write

Description: see TNumberFormat enum

1.3.59 TPlotAxis.AutoPlacedLength

Synopsis:

Declaration: `Property AutoPlacedLength : Extended`

Visibility: public

Access: Read,Write

Description: When axis placement is done by the plotrect the plotrect shall set this property to the appropriate length

1.3.60 TPlotAxis.AutoPlacedOriginRel

Synopsis:

Declaration: `Property AutoPlacedOriginRel : TPoint`

Visibility: public

Access: Read,Write

Description: When axis placement is done by the plotrect the plotrect shall set this property to the appropriate axis origin