# Qwt User's Guide

6.1.1

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# Contents

# 1 Qwt - Qt Widgets for Technical Applications

The Qwt library contains GUI Components and utility classes which are primarily useful for programs with a technical background. Beside a framework for 2D plots it provides scales, sliders, dials, compasses, thermometers, wheels and knobs to control or display values, arrays, or ranges of type double.

## 1.1 License

Qwt is distributed under the terms of the Qwt License, Version 1.0.

## 1.2 Platforms

Qwt 6.1 might be usable in all environments where you find `Qt`. It is compatible with Qt4 ( >= 4.4 ) and Qt5.

## 1.3 What's new

Read the summary of the most important changes.

## 1.4 Screenshots

- Curve Plots
- Scatter Plot
- Spectrogram, Contour Plot
- Histogram
- Dials, Compasses, Knobs, Wheels, Sliders, Thermos
  Screenshots are only available in the HTML docs.

## 1.5 Downloads

Stable releases or prereleases are available at the Qwt `project page`.

For getting a snapshot with all bugfixes for the latest 5.2 release:

```
svn checkout svn://svn.code.sf.net/p/qwt/code/branches/qwt-5.2
```

For getting a snapshot with all bugfixes for the latest 6.1 release:

```
svn checkout svn://svn.code.sf.net/p/qwt/code/branches/qwt-6.1
```

For getting a development snapshot from the SVN repository:

```
svn checkout svn://svn.code.sf.net/p/qwt/code/trunk/qwt
```

## 1.6 Installation

Qwt doesn't distribute binary packages, but today all major Linux distributors offer one. Note, that these packages often don't include the examples.

When no binary packages are available ( f.e. on Windows ) Qwt needs to be compiled and installed on the target system.

## 1.7 Support

- Mailing list

  For all kind of Qwt related questions use the Qwt `mailing list`.

  If you prefer newsgroups use the mail to news gateway of `Gmane`.

- Forum

  `Qt Centre` is a great resource for Qt related questions. It has a sub forum, that is dedicated to Qwt related questions.

- Individual support

  If you are looking for individual support, or need someone who implements your Qwt component/application contact `support@qwt-project.org`. Sending requests to this address without a good reason for not using public support channels might be silently ignored.

## 1.8 Related Projects

`QwtPolar`, a polar plot widget.

`QwtPlot3D`, an OpenGL 3D plot widget.

## 1.9 Donations

Sourceforge offers a `Donation System` via PayPal. You can use it, if you like to `support` the development of Qwt.

## 1.10 Credits:

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**Project admin:**

Uwe Rathmann <`rathmann@users.sourceforge.net`>

# 2 What's new in Qwt 6.1

## 2.1 New plot items

- QwtPlotBarChart

  Bar chart, see "examples/distrowatch"

- QwtPlotMultiBarChart

  Chart of grouped bars - stacked or aligned side by side. See "examples/barchart"

- QwtPlotTradingCurve

  Candlestick or OHLC charts typically used to describe price movements over time. See "examples/stockchart"

- QwtPlotShapeItem

  A plot item to display rectangles, circles, polygons and all other type of shapes ( built from intersections or unifications ), that can be expressed by a QPainterPath. See "examples/itemeditor"

- QwtPlotLegendItem

  A legend on the plot canvas. See "examples/legends"

- QwtPlotZoneItem

  A horizontal or vertical section

- QwtPlotTextLabel

  In opposite to a QwtPlotMarker the text is not aligned to a plot coordinate but according to the geometry of the canvas ( f.e top/centered for a title ). See "playground/curvetracker".

## 2.2 Scales beyond linear and logarithmic transformations

QwtScaleTransformation has been replaced by QwtTransform and its derived classes:

- QwtTransform
- QwtNullTransform
- QwtLogTransform
- QwtPowerTransform

Individual transformations ( f.e. different scaling for special sections ) can be implemented by overloading Qwt-Transform ( see playground/scaleengine ).

QwtLinearScaleEngine and QwtLogScaleEngine are not limited to base 10 anymore.

### 2.2.1 Datetime scales

A set of a new classes for displaying datetime values:

- QwtDate

  A collection of methods to convert between QDateTime and doubles

- QwtDateScaleEngine

  A scale engine that aligns and finds ticks in terms of datetime units.

- QwtDateScaleDraw

  A scale draw mapping values to datetime strings.

Scales for Qt::UTC and Qt::LocalTime are supported.

## 2.3 Redesign of the dial and meter widgets

Many parts of the class design of the dial and meter widgets were left over from the 90s ( Qwt 0.2, Qt 1.1 ).

The derivation tree is simpler and more logical:

- QwtAbstractScale is a QWidget
- QwtAbstractSlider is a QwtAbstractScale. ( for sliders without scales QAbstractSlider should be the base class )
- QwtThermo is also a QwtAbstractScale
- QwtDial, QwtKnob, QwtSlider are derived from QwtAbstractSlider
- QwtCounter is derived from QWidget

QwtDoubleRange has been removed.

All classes use the terminology known from QAbstractSlider - as far as possible. The extended system for scales is completely supported.

## 2.4 Basic support for an OpenGL plot canvas

QwtPlotGLCanvas offers the option to draw plot items using an OpenGL paint engine ( QPaintEngine::OpenG-L/OpenGL2 ), This is not what could be implemented with native OpenGL, but it offers hardware acceleration in environments, where the raster paint engine is the only option. ( f.e Qt4/Windows, or Qt5 on all platforms ).

QwtPlotGLCanvas is in an experimental state and is not recommended for average use cases.

## 2.5 A new system for plot legends

QwtLegend has been decoupled from QwtPlot and can be replaced by application specific implementations. Plot items and the legend exchange the information using QwtLegendData.

QwtPlotLegendItem is a new plot item that displays a legend on the plot canvas.

The following examples demonstrate how to use the new system:

- examples/legends

  shows how to use the new legend system

- examples/stockchart

  implementats a QTreeView with checkable items as legend

## 2.6 Off-screen paint device for vector graphics

QwtGraphic can be copied like QImage or QPixmap but is scalable like QSvgGenerator. It is implemented as a record/replay paint device like QPicture.

## 2.7 QwtWidgetOverlay

QwtWidgetOverlay is a base class for implementing widget overlays - primarily used for use cases like graphical editors or running cursors for the plot canvas.

The following examples show how to use overlays:

- examples/itemeditor
- examples/curvetracker

QwtPicker ( -> QwtPlotPicker, QwtPlotZoomer ) internally uses QwtWidgetOverlay now, making it easier to implement individual rubber bands.

## 2.8 QwtSymbol

New symbol types have been introduced:

- QwtSymbol::Path
- QwtSymbol::Pixmap
- QwtSymbol::Graphic
- QwtSymbol::SvgDocument

QwtSymbol autodetect the most performant paint strategy for a paint device what is in most situations using a QPixmap cache.

QwtSymbol::setPinPoint() allows to align the symbol individually, f.e to the position of the peak of an arrow.

## 2.9 QwtPlotCurve

Some optimizations that got lost with introducing the floating point based render code with Qwt 6.0 have been reenabled. Other specific optimizations have been added.

New paint attributes:

- QwtPlotCurve::FilterPoints
- QwtPlotCurve::MinimizeMemory
- QwtPlotCurve::ImageBuffer

QwtPlotCurve::CacheSymbols has been removed, as caching is implemented in QwtSymbol now.

QwtPlotCurve::drawLines(), QwtPlotCurve::drawDots(), QwtPlotCurve::drawSteps() and QwtPlotCurve::drawSticks() are virtual now.

## 2.10 QwtPlot

A footer similar to a title has been added.

QwtPlot::ExternalLegend is obsolete with the new system for legends. The signals QwtPlot::legendClicked(), QwtPlot::legendChecked() have been removed. Applications need to connect to QwtLegend::clicked() and QwtLegend::checked().

To support using an OpenGL canvas QwtPlot::setCanvas has been added. This has 2 important implications for the application code:

- QwtPlot::canvas() returns QWidget and needs to be casted, when using methods of QwtPlotCanvas.
- QwtPlotCanvas can be created and assigned in application code, what makes it possible to derive and overload methods.

The initialization of a plot canvas with Qwt 6.1 will probably look like this:

```
QwtPlotCanvas* canvas = new QwtPlotCanvas();
canvas->setXY( ... );
...

plot->setCanvas( canvas );
```

To have a consistent API QwtPlot::setPlotLayout() has been added,

## 2.11 Other

### 2.11.1 QwtScaleDiv

The following methods have been added:

- QwtScaleDiv::inverted()
- QwtScaleDiv::bounded()
- QwtScaleDiv::isEmpty()
- QwtScaleDiv::isIncreasing()
- QDebug operator

The following methods have been removed:

- QwtScaleDiv::isValid(), QwtScaleDiv::invalidate()
  The valid state was left over from early Qwt versions indicating a state of the autoscaler.

#### 2.11.2 QwtScaleEngine

The following methods have been added:

- QwtScaleEngine::setBase()
- QwtScaleEngine::setTransformation()

#### 2.11.3 QwtPlotLayout

The following flags have been added:

- QwtPlotLayout::IgnoreTitle
- QwtPlotLayout::IgnoreFooter
- QwtPlotLayout::setAlignCanvasToScale()

#### 2.11.4 QwtPlotCanvas

Rounded borders ( like with style sheets ) can configured using QwtPlotCanvas::setBorderRadius();

#### 2.11.5 Other changes

- QwtWeedingCurveFitter

  QwtWeedingCurveFitter::setChunkSize() has been added, with drastic performance improvements for huge sets of points.
- QwtPlotRenderer The frame of the plot canvas can be rendered, what makes the result even closer to WYSWYG. QwtPlotRenderer::exportTo() has been added.
- QwtSystemClock For Qt >= 4.9 QwtSystemClock uses QElapsedTimer internally. As it doesn't support a similar feature, QwtSystemClock::precision() has been removed.
- QwtPlotAbstractSeriesItem

  QwtPlotAbstractSeriesItem has been split into QwtPlotSeriesItem and QwtPlotAbstractSeriesStore.
- QwtText

  A metatype declaration has been added, so that QwtText can be used with QVariant.
- QwtEventPattern, QwtPanner, QwtMagnifier

  Forgotten Qt3 leftovers have been fixed: int -> Qt::KeyboardModifiers
- QPen Qt5/Qt4 incompatibility The default pen width for Qt5 is 1, what makes it a non cosmetic. To hide this nasty incompatibility several setPen() methods have been added the build pens with a width 0. See QPen::isCosmetic(),
- qwtUpperSampleIndex()

  A binary search algorithm for sorted samples
- QwtMatrixRasterData QwtMatrixRasterData::setValue() has been added
- QwtPicker QwtPicker::rubberBandWidget(), QwtPicker::trackerWidget() have been replaced by QwtPicker::rubberBandOverlay(), QwtPicker::trackerOverlay(). QwtPicker::rubberBandMask() has been added. QwtPicker::pickRect() has been replaced by QwtPicker::pickArea()
- QwtPlotItem QwtPlotItem::ItemInterest has been added. QwtPlotItem::setRenderThreadCount() was shifted from QwtPlotRasterItem.
- ...

### 2.12 Summary of the new classes

- QwtAbstractLegend
- QwtDate
- QwtDateScaleDraw
- QwtDateScaleEngine
- QwtGraphic
- QwtLegendData
- QwtLegendLabel
- QwtPainterCommand
- QwtPixelMatrix
- QwtPlotAbstractBarChart
- QwtPlotBarChart
- QwtPlotMultiBarChart
- QwtPlotGLCanvas
- QwtPlotLegendItem
- QwtPlotShapeItem
- QwtPlotTextLabel
- QwtPlotTradingCurve
- QwtPlotZoneItem
- QwtPointData
- QwtPointMapper
- QwtTransform, QwtNullTransform, QwtLogTransform, QwtPowerTransform
- QwtWidgetOverlay

# 3 Installing Qwt

## 3.1 Download

Stable Qwt releases are available from the Qwt `project page`.

Qwt-6.1.1 consists of 4 files:

- qwt-6.1.1.zip
  Zip file with the Qwt sources and the html documentation for Windows
- qwt-6.1.1.tar.bz2
  Compressed tar file with the Qwt sources and the html documentation for UNIX systems ( Linux, Mac, ... )
- qwt-6.1.1.pdf
  Qwt documentation as PDF document.

- qwt-6.1.1.qch

  Qwt documentation as Qt Compressed Help document, that can be loaded into the Qt Assistant or Creator. In the Qt Creator context sensitive help will be available like for Qt classes.

Precompiled Qwt Designer plugins, that are compatible with some binary packages of the Qt Creator:

- qwtdesigner-6.1.1-∗.zip

## 3.2 Installing Qwt

Beside headers, libraries and the html version of the class documentation a proper Qwt installation contains a Designer plugin and a Qwt features file for building applications using Qwt.

All files will be copied to an installation directory, that is configurable by editing qwtconfig.pri. Its default settings is:

- Windows

  C:\Qwt-6.1.1
- Unix like systems

  /usr/local/qwt-6.1.1

For the rest of the document this install path will be written as *${QWT_ROOT}* and needs to be replaced by the real path in all commands below.

It is not unlikely, to have more than one installation of Qwt on the same system. F.e for using the Qwt Designer plugin in the Qt Creator a version of Qwt is necessary with the same Qt and compiler combination, that had been used for building the Qt Creator ( see "Help->About Qt Creator ..." ).

Installing Qwt is done in 3 steps, that are quite common on UNIX systems.

1. Configuration

   In the configuration step all parameters are set to control how to build and install Qwt
2. Build

   In the build step binaries are built from the source files.
3. Installation

   The installation copies and rearranges all files that are necessary to build Qwt applications to a target directory.

The installation doesn't modify the system beside copying files to a directory in a proper way. After removing build and installation directories the system is in the same state as it was before.

### 3.2.1 Configuration

Configuring Qwt has to be done by editing the Project files used for building:

- qwtbuild.pri

  qwtbuild.pri contains settings for how to build Qwt. All settings of this file are only for building Qwt itself and doesn't have an impact on how an application using Qwt is built. Usually its default settings doesn't need to be modified.
- qwtconfig.pri

  qwtconfig.pri defines what modules of Qwt will be built and where to install them. qwtconfig.pri gets installed together with the Qwt features file qwt.prf and all its settings are known to project files for building Qwt applications.

In qwtconfig.pri the meaning of each option is explained in detail - it's worth reading it before running into problems later.

### 3.2.2 Build and installation

The Qt Creator is a graphical frontend for calling qmake/make and - technically - it could be used for building and installing Qwt. But as this way requires a lot more understanding of details the following step by step instructions are for the easier way using the command line.

#### 3.2.2.1 Unix-like systems

The first step before creating the Makefile is to check that the correct version of qmake is used. F.e. on older Linux distribution you often find a Qt3 qmake and in the path.

The default setting of qmake is to generate a makefile that builds Qwt for the same environment where the version of qmake has been built for. So creating a makefile usually means something like:

```
cd qwt-6.1.1
/usr/local/Qt-5.0.1/bin/qmake qwt.pro
```

The generated Makefile includes all paths related to the chosen Qt version and the next step is:

```
make
```

( On multicore systems you can speed up building the Qwt libraries with running several jobs simultaneously: f.e. "make -j4" on a dual core. )

Finally you have to install everything below the directories you have specified in qwtconfig.pri. Usually this is one of the system directories ( /usr/local, /opt, ... ) where you don’t have write permission and then the installation needs to be done as root:

```
sudo make install
```

( On systems where sudo is not supported you can do the same with: su -c "make install" )

#### 3.2.2.2 Windows

Qt packages offer a command line interface, that can be found in the Qt application menu: f.e "All Programs -> Qt -> Command Prompt". It is not mandatory to use it, but probably the easiest way as it offers an environment, where everything is initialized for a version of Qt ( f.e qmake is in the PATH ).

Creating a makefile usually means something like:

```
cd qwt-6.1.1
qmake qwt.pro
```

The generated makefile includes all paths related to the chosen Qt version.

##### 3.2.2.2.1 MinGW

For MinGW builds the name of the make tool is "mingw32-make"

```
mingw32-make
```

( On multicore systems you can speed up building the Qwt libraries with running several jobs simultaneously: "mingw32-make -j" )

Finally you have to install everything below the directories you have specified in qwtconfig.pri.

```
mingw32-make install
```

##### 3.2.2.2.2 MSVC

For MSVC builds the name of the make tool is "nmake". Alternatively it is possible to use "jom" ( http://qt-project.org/wiki/jom ), that is usually included in a Qt Creator package.

```
nmake
```

Finally you have to install everything below the directories you have specified in qwtconfig.pri.

```
nmake install
```

## 3.3 Qwt and the Qt tool chain

### 3.3.1 Designer plugin

The Designer plugin and the corresponding Qwt library ( if the plugin has not been built self containing ) have to be compatible with Qt version of the application loading it ( usually the Qt Creator ) - what is often a different version of the Qt libraries you want to build your application with. F.e on Windows the Qt Creator is usually built with a MSVC compiler - even if included in a MinGW package !

To help Qt Designer/Creator with locating the Qwt Designer plugin you have to set the environment variable QT_PLUGIN_PATH, modify qt.conf - or install the plugin to one of the application default paths.

The Qt documentation explains all options in detail:

- http://qt-project.org/doc/qt-5.0/qtdoc/deployment-plugins.html
- http://qt-project.org/doc/qtcreator-2.7/adding-plugins.html.

F.e. on a Linux system you could add the following lines to .bashrc:

```
QT_PLUGIN_PATH="${QWT_ROOT}/plugins:$QT_PLUGIN_PATH"
export QT_PLUGIN_PATH
```

When the plugin has not been built including the Qwt library ( see QwtDesignerSelfContained in qwtconfig.pri ) the Qt Designer/Creator also needs to locate the Qwt libraries. On Unix systems the path to the installed library is compiled into the plugin ( see rpath, ldd ), but on Windows the Qt Creator needs to be configured ( ( Running a Qwt application ) in the same way as for any application using Qwt.

In case of problems the diagnostics of Qt Creator and Designer are very limited ( usually none ), but setting the environment variable QT_DEBUG_PLUGINS might help. In the Qt Creator it is possible to check which plugins were loaded successfully and for certain problems it also lists those that were recognized but failed ( *Tools > Form Editor > About Qt Designer Plugins* ).

### 3.3.2 Online Help

The Qwt class documentation can be loaded into the Qt Creator:

- open the settings dialog from the *Tools->Options* menu
- raise the tab "Help->Documentation".
- press the *Add* button and select qwt-6.1.1.qch.

Now the context sensitive help ( *F1* ) works for Qwt classes.

For browsing the documentation in the Qt Assistant:

- open the settings dialog from the *Edit->Preferences* menu
- raise the tab *Documentation*.
- press the *Add* button and select qwt-6.1.1.qch.

### 3.4 Building a Qwt application

All flags and settings that are necessary to compile and link an application using Qwt can be found in the file ${QWT_ROOT}/features/qwt.prf.

When using qmake it can included from the application project file in 2 different ways:

- Adding Qwt as qmake feature

  When using the qmake feature mechanism you can bind a special version of qmake to a special installation of Qwt without having to add this dependency to the application project. How to add Qwt as feature is documented in the `qmake docs`.

  After adding Qwt as a feature f.e on Linux as a persistent property ....

  ```
  qmake -set QMAKEFEATURES ${QWT_ROOT}/features
  ```

  .. the following line can be added to the application project file:

  ```
  CONFIG += qwt
  ```

- Including qwt.prf in the application project file

  Instead of using qwt.prf as qmake feature it can be included from the application project file:

  ```
  include ( ${QWT_ROOT}/features/qwt.prf )
  ```

  The advantage of using a direct include is, that all settings of qwt.prf are known to the application project file ( qmake features are included after the application project file has been parsed ) and it can be implemented depending on - f.e. settings made in qwtconfig.pri.

On Unix platforms it is possible to link a runtime path into the executable, so that the location of the Qwt libraries can be found without having to configure a runtime environment:

- `QMAKE_LFLAGS_RPATH`
- `QMAKE_RPATH`
- `QMAKE_RPATHDIR`

### 3.5 Running a Qwt application

When using Qwt as shared library ( DLL ) the `dynamic linker` has to find it according to the rules of the operating system.

#### 3.5.1 Windows

The only reasonable way to configure the runtime environment - without having to copy the Qwt libraries around - is to modify the PATH variable. F.e. this could be done by adding the following line to some batch file:

```
set PATH=%PATH%;${QWT_ROOT}\lib
```

#### 3.5.2 GNU/Linux

Read the documentation about:

- *ldconfig*
- */etc/ld.so.conf*
- *LD_LIBRARY_PATH*

Using the *ldd* command a configuration can be tested.

# 4 Qwt License, Version 1.0

```
                             Qwt License
                           Version 1.0, January 1, 2003

The Qwt library and included programs are provided under the terms
of the GNU LESSER GENERAL PUBLIC LICENSE (LGPL) with the following
exceptions:

    1. Widgets that are subclassed from Qwt widgets do not
       constitute a derivative work.

    2. Static linking of applications and widgets to the
       Qwt library does not constitute a derivative work
       and does not require the author to provide source
       code for the application or widget, use the shared
       Qwt libraries, or link their applications or
       widgets against a user-supplied version of Qwt.

       If you link the application or widget to a modified
       version of Qwt, then the changes to Qwt must be
       provided under the terms of the LGPL in sections
       1, 2, and 4.

    3. You do not have to provide a copy of the Qwt license
       with programs that are linked to the Qwt library, nor
       do you have to identify the Qwt license in your
       program or documentation as required by section 6
       of the LGPL.


       However, programs must still identify their use of Qwt.
       The following example statement can be included in user
       documentation to satisfy this requirement:

           [program/widget] is based in part on the work of
           the Qwt project (http://qwt.sf.net).

----------------------------------------------------------------------


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               Version 2.1, February 1999

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[This is the first released version of the Lesser GPL.  It also counts
 as the successor of the GNU Library Public License, version 2, hence
 the version number 2.1.]

                Preamble

  The licenses for most software are designed to take away your
freedom to share and change it.  By contrast, the GNU General Public
Licenses are intended to guarantee your freedom to share and change
free software--to make sure the software is free for all its users.

  This license, the Lesser General Public License, applies to some
specially designated software packages--typically libraries--of the
Free Software Foundation and other authors who decide to use it.  You
can use it too, but we suggest you first think carefully about whether
this license or the ordinary General Public License is the better
strategy to use in any particular case, based on the explanations below.

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not price.  Our General Public Licenses are designed to make sure that
you have the freedom to distribute copies of free software (and charge
for this service if you wish); that you receive source code or can get
it if you want it; that you can change the software and use pieces of
it in new free programs; and that you are informed that you can do
these things.

  To protect your rights, we need to make restrictions that forbid
distributors to deny you these rights or to ask you to surrender these
rights.  These restrictions translate to certain responsibilities for
you if you distribute copies of the library or if you modify it.

  For example, if you distribute copies of the library, whether gratis
or for a fee, you must give the recipients all the rights that we gave
you.  You must make sure that they, too, receive or can get the source
code.  If you link other code with the library, you must provide
complete object files to the recipients, so that they can relink them
with the library after making changes to the library and recompiling
```

```
  Once this change is made in a given copy, it is irreversible for
that copy, so the ordinary GNU General Public License applies to all
subsequent copies and derivative works made from that copy.

  This option is useful when you wish to copy part of the code of
the Library into a program that is not a library.

  4. You may copy and distribute the Library (or a portion or
derivative of it, under Section 2) in object code or executable form
under the terms of Sections 1 and 2 above provided that you accompany
it with the complete corresponding machine-readable source code, which
must be distributed under the terms of Sections 1 and 2 above on a
medium customarily used for software interchange.

  If distribution of object code is made by offering access to copy
from a designated place, then offering equivalent access to copy the
source code from the same place satisfies the requirement to
distribute the source code, even though third parties are not
compelled to copy the source along with the object code.

  5. A program that contains no derivative of any portion of the
Library, but is designed to work with the Library by being compiled or
linked with it, is called a "work that uses the Library".  Such a
work, in isolation, is not a derivative work of the Library, and
therefore falls outside the scope of this License.

  However, linking a "work that uses the Library" with the Library
creates an executable that is a derivative of the Library (because it
contains portions of the Library), rather than a "work that uses the
library".  The executable is therefore covered by this License.
Section 6 states terms for distribution of such executables.

  When a "work that uses the Library" uses material from a header file
that is part of the Library, the object code for the work may be a
derivative work of the Library even though the source code is not.
Whether this is true is especially significant if the work can be
linked without the Library, or if the work is itself a library.  The
threshold for this to be true is not precisely defined by law.

  If such an object file uses only numerical parameters, data
structure layouts and accessors, and small macros and small inline
functions (ten lines or less in length), then the use of the object
file is unrestricted, regardless of whether it is legally a derivative
work.  (Executables containing this object code plus portions of the
Library will still fall under Section 6.)

  Otherwise, if the work is a derivative of the Library, you may
distribute the object code for the work under the terms of Section 6.
Any executables containing that work also fall under Section 6,
whether or not they are linked directly with the Library itself.

  6. As an exception to the Sections above, you may also combine or
link a "work that uses the Library" with the Library to produce a
work containing portions of the Library, and distribute that work
under terms of your choice, provided that the terms permit
modification of the work for the customer's own use and reverse
engineering for debugging such modifications.

  You must give prominent notice with each copy of the work that the
Library is used in it and that the Library and its use are covered by
this License.  You must supply a copy of this License.  If the work
during execution displays copyright notices, you must include the
copyright notice for the Library among them, as well as a reference
directing the user to the copy of this License.  Also, you must do one
of these things:

    a) Accompany the work with the complete corresponding
    machine-readable source code for the Library including whatever
    changes were used in the work (which must be distributed under
    Sections 1 and 2 above); and, if the work is an executable linked
    with the Library, with the complete machine-readable "work that
    uses the Library", as object code and/or source code, so that the
    user can modify the Library and then relink to produce a modified
    executable containing the modified Library.  (It is understood
    that the user who changes the contents of definitions files in the
    Library will not necessarily be able to recompile the application
    to use the modified definitions.)

    b) Use a suitable shared library mechanism for linking with the
    Library.  A suitable mechanism is one that (1) uses at run time a
    copy of the library already present on the user's computer system,
    rather than copying library functions into the executable, and (2)
    will operate properly with a modified version of the library, if
    the user installs one, as long as the modified version is
    interface-compatible with the version that the work was made with.

    c) Accompany the work with a written offer, valid for at
    least three years, to give the same user the materials
    specified in Subsection 6a, above, for a charge no more
    than the cost of performing this distribution.

    d) If distribution of the work is made by offering access to copy
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components (compiler, kernel, and so on) of the operating system on
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such claims; this section has the sole purpose of protecting the
```

# 5 Curve Plots

# 6 Scatter Plot

# 7 Spectrogram, Contour Plot

/*!

# 8 Histogram

# 9 Dials, Compasses, Knobs, Wheels, Sliders, Thermos

# 10 Hierarchical Index

## 10.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

# 11 Class Index

## 11.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

# 12 Class Documentation

## 12.1 QwtEventPattern::KeyPattern Class Reference

A pattern for key events.

`#include <qwt_event_pattern.h>`

### Public Member Functions

- KeyPattern (int keyCode=Qt::Key_unknown, Qt::KeyboardModifiers modifierCodes=Qt::NoModifier)

  *Constructor.*

### Public Attributes

- int key

  *Key code.*
- Qt::KeyboardModifiers modifiers

  *Modifiers.*

### 12.1.1 Detailed Description

A pattern for key events.

## 12.2 QwtEventPattern::MousePattern Class Reference

A pattern for mouse events.

`#include <qwt_event_pattern.h>`

### Public Member Functions

- MousePattern (Qt::MouseButton btn=Qt::NoButton, Qt::KeyboardModifiers modifierCodes=Qt::NoModifier)

    *Constructor.*

### Public Attributes

- Qt::MouseButton button

    *Button.*
- Qt::KeyboardModifiers modifiers

    *Keyboard modifier.*

### 12.2.1 Detailed Description

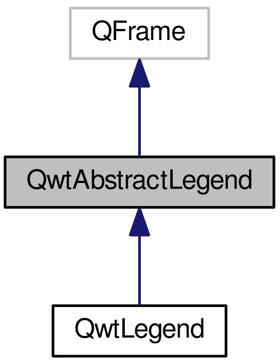
A pattern for mouse events.

## 12.3 QwtAbstractLegend Class Reference

Abstract base class for legend widgets.

`#include <qwt_abstract_legend.h>`

Inheritance diagram for QwtAbstractLegend:



### Public Slots

- virtual void updateLegend (const QVariant &itemInfo, const QList< QwtLegendData > &data)=0

    *Update the entries for a plot item.*

### Public Member Functions

- QwtAbstractLegend (QWidget ∗parent=NULL)
- virtual ∼QwtAbstractLegend ()

    *Destructor.*
- virtual void renderLegend (QPainter ∗painter, const QRectF &rect, bool fillBackground) const =0

- virtual bool isEmpty () const =0
- virtual int scrollExtent (Qt::Orientation) const

### 12.3.1 Detailed Description

Abstract base class for legend widgets.

Legends, that need to be under control of the QwtPlot layout system need to be derived from QwtAbstractLegend.

**Note**

Other type of legends can be implemented by connecting to the QwtPlot::legendDataChanged() signal. But as these legends are unknown to the plot layout system the layout code ( on screen and for QwtPlotRenderer ) need to be organized in application code.

**See Also**

QwtLegend

### 12.3.2 Constructor & Destructor Documentation

#### 12.3.2.1 QwtAbstractLegend::QwtAbstractLegend ( QWidget ∗ *parent* = `NULL` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

### 12.3.3 Member Function Documentation

#### 12.3.3.1 virtual bool QwtAbstractLegend::isEmpty ( ) const `[pure virtual]`

**Returns**

True, when no plot item is inserted

Implemented in QwtLegend.

#### 12.3.3.2 virtual void QwtAbstractLegend::renderLegend ( QPainter ∗ *painter,* const QRectF & *rect,* bool *fillBackground* ) const `[pure virtual]`

Render the legend into a given rectangle.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Bounding rectangle |
| *fillBackground* | When true, fill rect with the widget background |

**See Also**

renderLegend() is used by QwtPlotRenderer

Implemented in QwtLegend.

#### 12.3.3.3 int QwtAbstractLegend::scrollExtent ( Qt::Orientation *orientation* ) const `[virtual]`

Return the extent, that is needed for elements to scroll the legend ( usually scrollbars ),

**Parameters**

| | |
|---|---|
| *orientation* | Orientation |

**Returns**

Extent of the corresponding scroll element

Reimplemented in QwtLegend.

#### 12.3.3.4 virtual void QwtAbstractLegend::updateLegend ( const QVariant & *itemInfo*, const QList< QwtLegendData > & *data* ) `[pure virtual]`, `[slot]`

Update the entries for a plot item.

**Parameters**

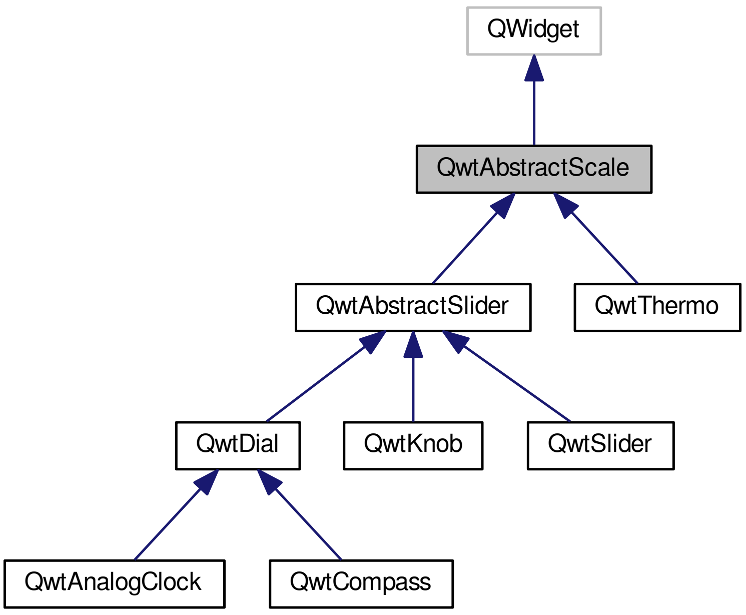
| | |
|---|---|
| *itemInfo* | Info about an item |
| *data* | List of legend entry attributes for the item |

## 12.4 QwtAbstractScale Class Reference

An abstract base class for widgets having a scale.

`#include <qwt_abstract_scale.h>`

Inheritance diagram for QwtAbstractScale:



**Public Member Functions**

- QwtAbstractScale (QWidget $*$parent=NULL)

- virtual ∼QwtAbstractScale ()

    *Destructor.*
- void setScale (double lowerBound, double upperBound)

    *Specify a scale.*
- void setScale (const QwtInterval &)

    *Specify a scale.*
- void setScale (const QwtScaleDiv &)

    *Specify a scale.*
- const QwtScaleDiv & scaleDiv () const
- void setLowerBound (double value)
- double lowerBound () const
- void setUpperBound (double value)
- double upperBound () const
- void setScaleStepSize (double stepSize)

    *Set the step size used for calculating a scale division.*
- double scaleStepSize () const
- void setScaleMaxMajor (int ticks)

    *Set the maximum number of major tick intervals.*
- int scaleMaxMinor () const
- void setScaleMaxMinor (int ticks)

    *Set the maximum number of minor tick intervals.*
- int scaleMaxMajor () const
- void setScaleEngine (QwtScaleEngine ∗)

    *Set a scale engine.*
- const QwtScaleEngine ∗ scaleEngine () const
- QwtScaleEngine ∗ scaleEngine ()
- int transform (double) const
- double invTransform (int) const
- bool isInverted () const
- double minimum () const
- double maximum () const
- const QwtScaleMap & scaleMap () const

#### Protected Member Functions

- void rescale (double lowerBound, double upperBound, double stepSize)
- void setAbstractScaleDraw (QwtAbstractScaleDraw ∗)

    *Set a scale draw.*
- const QwtAbstractScaleDraw ∗ abstractScaleDraw () const
- QwtAbstractScaleDraw ∗ abstractScaleDraw ()
- virtual void scaleChange ()

    *Notify changed scale.*

### 12.4.1 Detailed Description

An abstract base class for widgets having a scale.

The scale of an QwtAbstractScale is determined by a QwtScaleDiv definition, that contains the boundaries and the ticks of the scale. The scale is painted using a QwtScaleDraw object.

The scale division might be assigned explicitly - but usually it is calculated from the boundaries using a QwtScale-Engine.

The scale engine also decides the type of transformation of the scale ( linear, logarithmic ... ).

### 12.4.2 Constructor & Destructor Documentation

#### 12.4.2.1 QwtAbstractScale::QwtAbstractScale ( QWidget ∗ *parent* = NULL )

Constructor

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

Creates a default QwtScaleDraw and a QwtLinearScaleEngine. The initial scale boundaries are set to [ 0.0, 100.0 ]

The scaleStepSize() is initialized to 0.0, scaleMaxMajor() to 5 and scaleMaxMajor to 3.

### 12.4.3 Member Function Documentation

#### 12.4.3.1 const QwtAbstractScaleDraw ∗ QwtAbstractScale::abstractScaleDraw ( ) const `[protected]`

**Returns**

Scale draw

**See Also**

setAbstractScaleDraw()

#### 12.4.3.2 QwtAbstractScaleDraw ∗ QwtAbstractScale::abstractScaleDraw ( ) `[protected]`

**Returns**

Scale draw

**See Also**

setAbstractScaleDraw()

#### 12.4.3.3 double QwtAbstractScale::invTransform ( int *value* ) const

Translate a widget coordinate into a scale value

**Parameters**

| | |
|---|---|
| *value* | Widget coordinate |

**Returns**

Corresponding scale coordinate for value

**See Also**

scaleMap(), transform()

#### 12.4.3.4 bool QwtAbstractScale::isInverted ( ) const

**Returns**

True, when the scale is increasing in opposite direction to the widget coordinates

#### 12.4.3.5 double QwtAbstractScale::lowerBound ( ) const

**Returns**

Lower bound of the scale

**See Also**

setLowerBound(), setScale(), upperBound()

#### 12.4.3.6 double QwtAbstractScale::maximum ( ) const

**Returns**

The boundary with the larger value

**See Also**

minimum(), lowerBound(), upperBound()

#### 12.4.3.7 double QwtAbstractScale::minimum ( ) const

**Returns**

The boundary with the smaller value

**See Also**

maximum(), lowerBound(), upperBound()

#### 12.4.3.8 void QwtAbstractScale::rescale ( double *lowerBound,* double *upperBound,* double *stepSize* ) [protected]

Recalculate the scale division and update the scale.

**Parameters**

| | |
|---|---|
| *lowerBound* | Lower limit of the scale interval |
| *upperBound* | Upper limit of the scale interval |
| *stepSize* | Major step size |

**See Also**

scaleChange()

#### 12.4.3.9 const QwtScaleDiv & QwtAbstractScale::scaleDiv ( ) const

**Returns**

Scale boundaries and positions of the ticks

The scale division might have been assigned explicitly or calculated implicitly by rescale().

#### 12.4.3.10 const QwtScaleEngine ∗ QwtAbstractScale::scaleEngine ( ) const

**Returns**

Scale engine

**See Also**

setScaleEngine()

#### 12.4.3.11 QwtScaleEngine ∗ QwtAbstractScale::scaleEngine ( )

**Returns**

Scale engine

**See Also**

setScaleEngine()

#### 12.4.3.12 const QwtScaleMap & QwtAbstractScale::scaleMap ( ) const

**Returns**

Map to translate between scale and widget coordinates

#### 12.4.3.13 int QwtAbstractScale::scaleMaxMajor ( ) const

**Returns**

Maximal number of major tick intervals

**See Also**

setScaleMaxMajor(), scaleMaxMinor()

#### 12.4.3.14 int QwtAbstractScale::scaleMaxMinor ( ) const

**Returns**

Maximal number of minor tick intervals

**See Also**

setScaleMaxMinor(), scaleMaxMajor()

#### 12.4.3.15 double QwtAbstractScale::scaleStepSize ( ) const

**Returns**

Hint for the step size of the scale

**See Also**

setScaleStepSize(), QwtScaleEngine::divideScale()

#### 12.4.3.16 void QwtAbstractScale::setAbstractScaleDraw ( QwtAbstractScaleDraw * *scaleDraw* ) [protected]

Set a scale draw.

scaleDraw has to be created with new and will be deleted in the destructor or the next call of setAbstractScaleDraw().

**See Also**

abstractScaleDraw()

#### 12.4.3.17 void QwtAbstractScale::setLowerBound ( double *value* )

Set the lower bound of the scale

**Parameters**

| | |
|---|---|
| *value* | Lower bound |

**See Also**

lowerBound(), setScale(), setUpperBound()

**Note**

For inverted scales the lower bound is greater than the upper bound

#### 12.4.3.18 void QwtAbstractScale::setScale ( double *lowerBound,* double *upperBound* )

Specify a scale.

Define a scale by an interval

The ticks are calculated using scaleMaxMinor(), scaleMaxMajor() and scaleStepSize().

**Parameters**

| | |
|---|---|
| *lowerBound* | lower limit of the scale interval |
| *upperBound* | upper limit of the scale interval |

**Note**

For inverted scales the lower bound is greater than the upper bound

#### 12.4.3.19 void QwtAbstractScale::setScale ( const QwtInterval & *interval* )

Specify a scale.

Define a scale by an interval

The ticks are calculated using scaleMaxMinor(), scaleMaxMajor() and scaleStepSize().

**Parameters**

| | |
|---|---|
| *interval* | Interval |

#### 12.4.3.20 void QwtAbstractScale::setScale ( const QwtScaleDiv & *scaleDiv* )

Specify a scale.

scaleMaxMinor(), scaleMaxMajor() and scaleStepSize() and have no effect.

**Parameters**

| | |
|---|---|
| *scaleDiv* | Scale division |

**See Also**

setAutoScale()

#### 12.4.3.21 void QwtAbstractScale::setScaleEngine ( QwtScaleEngine ∗ *scaleEngine* )

Set a scale engine.

The scale engine is responsible for calculating the scale division and provides a transformation between scale and widget coordinates.

scaleEngine has to be created with new and will be deleted in the destructor or the next call of setScaleEngine.

#### 12.4.3.22 void QwtAbstractScale::setScaleMaxMajor ( int *ticks* )

Set the maximum number of major tick intervals.

The scale's major ticks are calculated automatically such that the number of major intervals does not exceed ticks.

The default value is 5.

**Parameters**

| | |
|---|---|
| *ticks* | Maximal number of major ticks. |

**See Also**

scaleMaxMajor(), setScaleMaxMinor(), setScaleStepSize(), QwtScaleEngine::divideInterval()

#### 12.4.3.23 void QwtAbstractScale::setScaleMaxMinor ( int *ticks* )

Set the maximum number of minor tick intervals.

The scale's minor ticks are calculated automatically such that the number of minor intervals does not exceed ticks. The default value is 3.

**Parameters**

| | |
|---|---|
| *ticks* | Maximal number of minor ticks. |

**See Also**

scaleMaxMajor(), setScaleMaxMinor(), setScaleStepSize(), QwtScaleEngine::divideInterval()

#### 12.4.3.24 void QwtAbstractScale::setScaleStepSize ( double *stepSize* )

Set the step size used for calculating a scale division.

The step size is hint for calculating the intervals for the major ticks of the scale. A value of 0.0 is interpreted as no hint.

**Parameters**

| | |
|---|---|
| *stepSize* | Hint for the step size of the scale |

**See Also**

scaleStepSize(), QwtScaleEngine::divideScale()

**Note**

Position and distance between the major ticks also depends on scaleMaxMajor().

#### 12.4.3.25 void QwtAbstractScale::setUpperBound ( double *value* )

Set the upper bound of the scale

**Parameters**

| | |
|---|---|
| *value* | Upper bound |

**See Also**

upperBound(), setScale(), setLowerBound()

**Note**

For inverted scales the lower bound is greater than the upper bound

#### 12.4.3.26 int QwtAbstractScale::transform ( double *value* ) const

Translate a scale value into a widget coordinate

**Parameters**

| | |
|---|---|
| *value* | Scale value |

**Returns**

Corresponding widget coordinate for value

**See Also**

scaleMap(), invTransform()

#### 12.4.3.27 double QwtAbstractScale::upperBound ( ) const

**Returns**

Upper bound of the scale

**See Also**

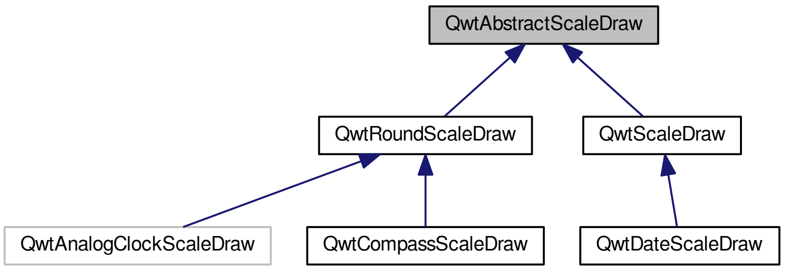
setUpperBound(), setScale(), lowerBound()

## 12.5 QwtAbstractScaleDraw Class Reference

A abstract base class for drawing scales.

`#include <qwt_abstract_scale_draw.h>`

Inheritance diagram for QwtAbstractScaleDraw:



**Public Types**

- enum ScaleComponent { Backbone = 0x01, Ticks = 0x02, Labels = 0x04 }
- typedef QFlags< ScaleComponent > ScaleComponents

  *Scale components.*

**Public Member Functions**

- QwtAbstractScaleDraw ()

  *Constructor.*
- virtual ~QwtAbstractScaleDraw ()

*Destructor.*

- void setScaleDiv (const QwtScaleDiv &s)
- const QwtScaleDiv & scaleDiv () const
- void setTransformation (QwtTransform ∗)
- const QwtScaleMap & scaleMap () const
- QwtScaleMap & scaleMap ()
- void enableComponent (ScaleComponent, bool enable=true)
- bool hasComponent (ScaleComponent) const
- void setTickLength (QwtScaleDiv::TickType, double length)
- double tickLength (QwtScaleDiv::TickType) const
- double maxTickLength () const
- void setSpacing (double margin)

  *Set the spacing between tick and labels.*
- double spacing () const

  *Get the spacing.*
- void setPenWidth (int width)

  *Specify the width of the scale pen.*
- int penWidth () const
- virtual void draw (QPainter ∗, const QPalette &) const

  *Draw the scale.*
- virtual QwtText label (double) const

  *Convert a value into its representing label.*
- virtual double extent (const QFont &font) const =0
- void setMinimumExtent (double)

  *Set a minimum for the extent.*
- double minimumExtent () const

**Protected Member Functions**

- virtual void drawTick (QPainter ∗painter, double value, double len) const =0
- virtual void drawBackbone (QPainter ∗painter) const =0
- virtual void drawLabel (QPainter ∗painter, double value) const =0
- void invalidateCache ()
- const QwtText & tickLabel (const QFont &, double value) const

  *Convert a value into its representing label and cache it.*

### 12.5.1 Detailed Description

A abstract base class for drawing scales.

QwtAbstractScaleDraw can be used to draw linear or logarithmic scales.

After a scale division has been specified as a QwtScaleDiv object using setScaleDiv(), the scale can be drawn with the draw() member.

### 12.5.2 Member Enumeration Documentation

#### 12.5.2.1 enum QwtAbstractScaleDraw::ScaleComponent

Components of a scale

**See Also**

enableComponent(), hasComponent

**Enumerator**

***Backbone*** Backbone = the line where the ticks are located.

***Ticks*** Ticks.

***Labels*** Labels.

### 12.5.3 Constructor & Destructor Documentation

#### 12.5.3.1 QwtAbstractScaleDraw::QwtAbstractScaleDraw ( )

Constructor.

The range of the scale is initialized to [0, 100], The spacing (distance between ticks and labels) is set to 4, the tick lengths are set to 4,6 and 8 pixels

### 12.5.4 Member Function Documentation

#### 12.5.4.1 void QwtAbstractScaleDraw::draw ( QPainter ∗ *painter,* const QPalette & *palette* ) const [virtual]

Draw the scale.

**Parameters**

| | |
|---|---|
| *painter* | The painter |
| *palette* | Palette, text color is used for the labels, foreground color for ticks and backbone |

#### 12.5.4.2 virtual void QwtAbstractScaleDraw::drawBackbone ( QPainter ∗ *painter* ) const [protected], [pure virtual]

Draws the baseline of the scale

**Parameters**

| | |
|---|---|
| *painter* | Painter |

**See Also**

drawTick(), drawLabel()

Implemented in QwtScaleDraw, and QwtRoundScaleDraw.

#### 12.5.4.3 virtual void QwtAbstractScaleDraw::drawLabel ( QPainter ∗ *painter,* double *value* ) const [protected], [pure virtual]

Draws the label for a major scale tick

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *value* | Value |

**See Also**

drawTick(), drawBackbone()

Implemented in QwtScaleDraw, and QwtRoundScaleDraw.

#### 12.5.4.4 virtual void QwtAbstractScaleDraw::drawTick ( QPainter * *painter,* double *value,* double *len* ) const [protected], [pure virtual]

Draw a tick

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *value* | Value of the tick |
| *len* | Length of the tick |

**See Also**

drawBackbone(), drawLabel()

Implemented in QwtScaleDraw, and QwtRoundScaleDraw.

#### 12.5.4.5 void QwtAbstractScaleDraw::enableComponent ( ScaleComponent *component*, bool *enable* = `true` )

En/Disable a component of the scale

**Parameters**

| | |
|---|---|
| *component* | Scale component |
| *enable* | On/Off |

**See Also**

hasComponent()

#### 12.5.4.6 virtual double QwtAbstractScaleDraw::extent ( const QFont & *font* ) const `[pure virtual]`

Calculate the extent

The extent is the distance from the baseline to the outermost pixel of the scale draw in opposite to its orientation. It is at least minimumExtent() pixels.

**Parameters**

| | |
|---|---|
| *font* | Font used for drawing the tick labels |

**Returns**

Number of pixels

**See Also**

setMinimumExtent(), minimumExtent()

Implemented in QwtScaleDraw, and QwtRoundScaleDraw.

#### 12.5.4.7 bool QwtAbstractScaleDraw::hasComponent ( ScaleComponent *component* ) const

Check if a component is enabled

**Parameters**

| | |
|---|---|
| *component* | Component type |

**Returns**

true, when component is enabled

**See Also**

enableComponent()

#### 12.5.4.8 void QwtAbstractScaleDraw::invalidateCache ( ) [protected]

Invalidate the cache used by tickLabel()

The cache is invalidated, when a new QwtScaleDiv is set. If the labels need to be changed. while the same QwtScaleDiv is set, invalidateCache() needs to be called manually.

#### 12.5.4.9 QwtText QwtAbstractScaleDraw::label ( double *value* ) const [virtual]

Convert a value into its representing label.

The value is converted to a plain text using QLocale().toString(value). This method is often overloaded by applications to have individual labels.

**Parameters**

| | |
|---|---|
| *value* | Value |

**Returns**

Label string.

Reimplemented in QwtDateScaleDraw, and QwtCompassScaleDraw.

#### 12.5.4.10 double QwtAbstractScaleDraw::maxTickLength ( ) const

**Returns**

Length of the longest tick

Useful for layout calculations

**See Also**

tickLength(), setTickLength()

#### 12.5.4.11 double QwtAbstractScaleDraw::minimumExtent ( ) const

Get the minimum extent

**Returns**

Minimum extent

**See Also**

extent(), setMinimumExtent()

#### 12.5.4.12 int QwtAbstractScaleDraw::penWidth ( ) const

**Returns**

Scale pen width

**See Also**

setPenWidth()

#### 12.5.4.13 const QwtScaleDiv & QwtAbstractScaleDraw::scaleDiv ( ) const

**Returns**

scale division

#### 12.5.4.14 const QwtScaleMap & QwtAbstractScaleDraw::scaleMap ( ) const

**Returns**

Map how to translate between scale and pixel values

#### 12.5.4.15 QwtScaleMap & QwtAbstractScaleDraw::scaleMap ( )

**Returns**

Map how to translate between scale and pixel values

#### 12.5.4.16 void QwtAbstractScaleDraw::setMinimumExtent ( double *minExtent* )

Set a minimum for the extent.

The extent is calculated from the components of the scale draw. In situations, where the labels are changing and the layout depends on the extent (f.e scrolling a scale), setting an upper limit as minimum extent will avoid jumps of the layout.

**Parameters**

| | |
|---|---|
| *minExtent* | Minimum extent |

**See Also**

extent(), minimumExtent()

#### 12.5.4.17 void QwtAbstractScaleDraw::setPenWidth ( int *width* )

Specify the width of the scale pen.

**Parameters**

| | |
|---|---|
| *width* | Pen width |

**See Also**

penWidth()

#### 12.5.4.18 void QwtAbstractScaleDraw::setScaleDiv ( const QwtScaleDiv & *scaleDiv* )

Change the scale division

**Parameters**

| | |
|---|---|
| *scaleDiv* | New scale division |

#### 12.5.4.19 void QwtAbstractScaleDraw::setSpacing ( double *spacing* )

Set the spacing between tick and labels.

The spacing is the distance between ticks and labels. The default spacing is 4 pixels.

**Parameters**

| | |
|---|---|
| *spacing* | Spacing |

**See Also**

spacing()

#### 12.5.4.20 void QwtAbstractScaleDraw::setTickLength ( QwtScaleDiv::TickType *tickType,* double *length* )

Set the length of the ticks

**Parameters**

| | |
|---|---|
| *tickType* | Tick type |
| *length* | New length |

**Warning**

the length is limited to [0..1000]

#### 12.5.4.21 void QwtAbstractScaleDraw::setTransformation ( QwtTransform ∗ *transformation* )

Change the transformation of the scale

**Parameters**

| | |
|---|---|
| *transformation* | New scale transformation |

#### 12.5.4.22 double QwtAbstractScaleDraw::spacing ( ) const

Get the spacing.

The spacing is the distance between ticks and labels. The default spacing is 4 pixels.

**Returns**

Spacing

**See Also**

setSpacing()

#### 12.5.4.23 const QwtText & QwtAbstractScaleDraw::tickLabel ( const QFont & *font,* double *value* ) const [protected]

Convert a value into its representing label and cache it.

The conversion between value and label is called very often in the layout and painting code. Unfortunately the calculation of the label sizes might be slow (really slow for rich text in Qt4), so it's necessary to cache the labels.

**Parameters**

| | |
|---|---|
| *font* | Font |
| *value* | Value |

**Returns**

Tick label

#### 12.5.4.24 double QwtAbstractScaleDraw::tickLength ( QwtScaleDiv::TickType *tickType* ) const

**Returns**

Length of the ticks

**See Also**

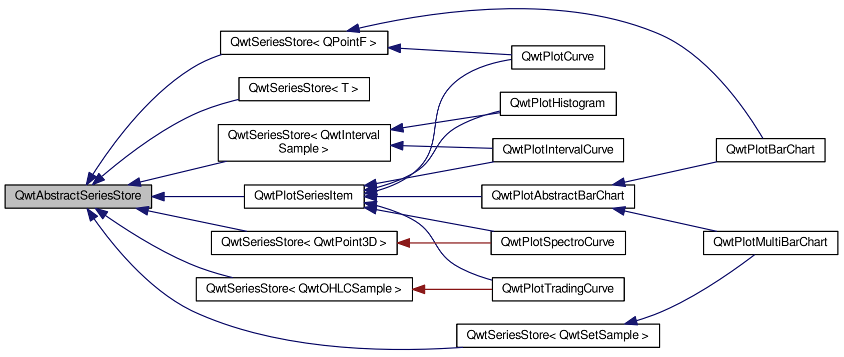
setTickLength(), maxTickLength()

## 12.6 QwtAbstractSeriesStore Class Reference

Bridge between QwtSeriesStore and QwtPlotSeriesItem.

```
#include <qwt_series_store.h>
```

Inheritance diagram for QwtAbstractSeriesStore:



**Protected Member Functions**

- virtual ∼QwtAbstractSeriesStore ()

  *Destructor.*
- virtual void dataChanged ()=0

  *dataChanged() indicates, that the series has been changed.*
- virtual void setRectOfInterest (const QRectF &)=0
- virtual QRectF dataRect () const =0
- virtual size_t dataSize () const =0

### 12.6.1 Detailed Description

Bridge between QwtSeriesStore and QwtPlotSeriesItem.

QwtAbstractSeriesStore is an abstract interface only to make it possible to isolate the template based methods ( QwtSeriesStore ) from the regular methods ( QwtPlotSeriesItem ) to make it possible to derive from QwtPlotSeriesItem without any hassle with templates.

### 12.6.2 Member Function Documentation

#### 12.6.2.1 virtual QRectF QwtAbstractSeriesStore::dataRect ( ) const [protected], [pure virtual]

**Returns**

Bounding rectangle of the stored series

Implemented in QwtSeriesStore< T >, QwtSeriesStore< QwtIntervalSample >, QwtSeriesStore< QwtOHLCSample >, QwtSeriesStore< QPointF >, QwtSeriesStore< QwtSetSample >, and QwtSeriesStore< QwtPoint3D >.

#### 12.6.2.2 virtual size_t QwtAbstractSeriesStore::dataSize ( ) const [protected], [pure virtual]

**Returns**

Number of samples

Implemented in QwtSeriesStore< T >, QwtSeriesStore< QwtIntervalSample >, QwtSeriesStore< QwtOHLCSample >, QwtSeriesStore< QPointF >, QwtSeriesStore< QwtSetSample >, and QwtSeriesStore< QwtPoint3D >.

#### 12.6.2.3 virtual void QwtAbstractSeriesStore::setRectOfInterest ( const QRectF & ) [protected], [pure virtual]

Set a the "rectangle of interest" for the stored series

**See Also**

QwtSeriesData<T>::setRectOfInterest()

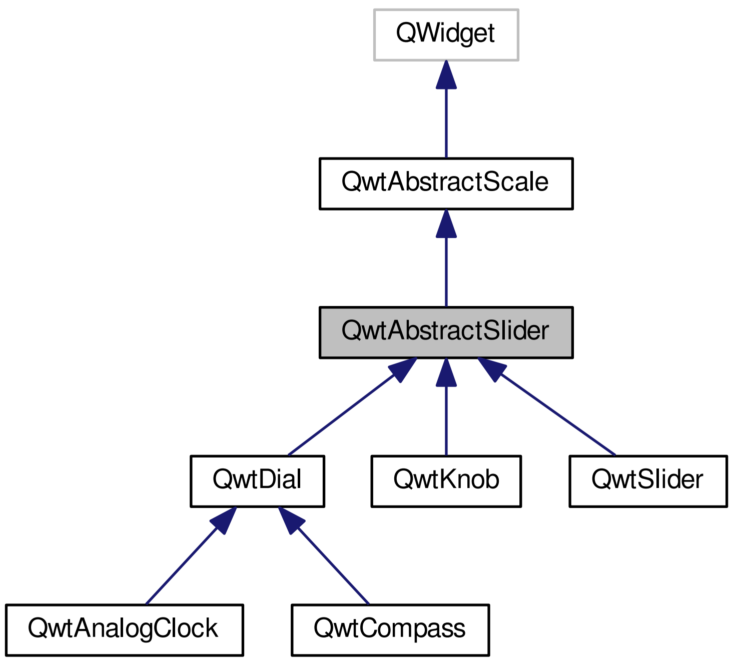
Implemented in QwtSeriesStore< T >, QwtSeriesStore< QwtIntervalSample >, QwtSeriesStore< QwtOHLCSample >, QwtSeriesStore< QPointF >, QwtSeriesStore< QwtSetSample >, and QwtSeriesStore< QwtPoint3D >.

## 12.7 QwtAbstractSlider Class Reference

An abstract base class for slider widgets with a scale.

`#include <qwt_abstract_slider.h>`

Inheritance diagram for QwtAbstractSlider:



**Public Slots**

- void setValue (double val)

**Signals**

- void valueChanged (double value)

*Notify a change of value.*

- void sliderPressed ()
- void sliderReleased ()
- void sliderMoved (double value)

### Public Member Functions

- QwtAbstractSlider (QWidget ∗parent=NULL)

  *Constructor.*
- virtual ∼QwtAbstractSlider ()

  *Destructor.*
- void setValid (bool)
- bool isValid () const
- double value () const

  *Returns the current value.*
- void setWrapping (bool)
- bool wrapping () const
- void setTotalSteps (uint)

  *Set the number of steps.*
- uint totalSteps () const
- void setSingleSteps (uint)

  *Set the number of steps for a single increment.*
- uint singleSteps () const
- void setPageSteps (uint)

  *Set the number of steps for a page increment.*
- uint pageSteps () const
- void setStepAlignment (bool)

  *Enable step alignment.*
- bool stepAlignment () const
- void setTracking (bool)

  *Enables or disables tracking.*
- bool isTracking () const
- void setReadOnly (bool)
- bool isReadOnly () const
- void setInvertedControls (bool)
- bool invertedControls () const

### Protected Member Functions

- virtual void mousePressEvent (QMouseEvent ∗)
- virtual void mouseReleaseEvent (QMouseEvent ∗)
- virtual void mouseMoveEvent (QMouseEvent ∗)
- virtual void keyPressEvent (QKeyEvent ∗)
- virtual void wheelEvent (QWheelEvent ∗)
- virtual bool isScrollPosition (const QPoint &pos) const =0

  *Determine what to do when the user presses a mouse button.*
- virtual double scrolledTo (const QPoint &pos) const =0

  *Determine the value for a new position of the movable part of the slider.*
- void incrementValue (int numSteps)
- virtual void scaleChange ()
- virtual void sliderChange ()

  *Calling update()*
- double incrementedValue (double value, int stepCount) const

### 12.7.1 Detailed Description

An abstract base class for slider widgets with a scale.

A slider widget displays a value according to a scale. The class is designed as a common super class for widgets like QwtKnob, QwtDial and QwtSlider.

When the slider is nor readOnly() its value can be modified by keyboard, mouse and wheel inputs.

The range of the slider is divided into a number of steps from which the value increments according to user inputs depend. Only for linear scales the number of steps correspond with a fixed step size.

### 12.7.2 Constructor & Destructor Documentation

#### 12.7.2.1 QwtAbstractSlider::QwtAbstractSlider ( QWidget * *parent* = `NULL` ) `[explicit]`

Constructor.

The scale is initialized to [0.0, 100.0], the number of steps is set to 100 with 1 and 10 and single an page step sizes. Step alignment is enabled.

The initial value is invalid.

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

### 12.7.3 Member Function Documentation

#### 12.7.3.1 double QwtAbstractSlider::incrementedValue ( double *value,* int *stepCount* ) const `[protected]`

Increment a value

**Parameters**

| | |
|---|---|
| *value* | Value |
| *stepCount* | Number of steps |

**Returns**

Incremented value

#### 12.7.3.2 void QwtAbstractSlider::incrementValue ( int *stepCount* ) `[protected]`

Increment the slider

The step size depends on the number of totalSteps()

**Parameters**

| | |
|---|---|
| *stepCount* | Number of steps |

**See Also**

setTotalSteps(), incrementedValue()

#### 12.7.3.3 bool QwtAbstractSlider::invertedControls ( ) const

**Returns**

True, when the controls are inverted

**See Also**

setInvertedControls()

#### 12.7.3.4 bool QwtAbstractSlider::isReadOnly ( ) const

In read only mode the slider can't be controlled by mouse or keyboard.

**Returns**

true if read only

**See Also**

setReadOnly()

#### 12.7.3.5 virtual bool QwtAbstractSlider::isScrollPosition ( const QPoint & *pos* ) const [protected], [pure virtual]

Determine what to do when the user presses a mouse button.

**Parameters**

| | |
|---|---|
| *pos* | Mouse position |

**Return values**

| | |
|---|---|
| *True,when* | pos is a valid scroll position |

**See Also**

scrolledTo()

Implemented in QwtKnob, QwtDial, and QwtSlider.

#### 12.7.3.6 bool QwtAbstractSlider::isTracking ( ) const

**Returns**

True, when tracking has been enabled

**See Also**

setTracking()

#### 12.7.3.7 bool QwtAbstractSlider::isValid ( ) const

**Returns**

True, when the value is invalid

#### 12.7.3.8 void QwtAbstractSlider::keyPressEvent ( QKeyEvent ∗ *event* ) [protected], [virtual]

Handles key events

QwtAbstractSlider handles the following keys:

- Qt::Key_Left
  Add/Subtract singleSteps() in direction to lowerBound();

- Qt::Key_Right

  Add/Subtract singleSteps() in direction to upperBound();

- Qt::Key_Down

  Subtract singleSteps(), when invertedControls() is false

- Qt::Key_Up

  Add singleSteps(), when invertedControls() is false

- Qt::Key_PageDown

  Subtract pageSteps(), when invertedControls() is false

- Qt::Key_PageUp

  Add pageSteps(), when invertedControls() is false

- Qt::Key_Home

  Set the value to the minimum()

- Qt::Key_End

  Set the value to the maximum()

**Parameters**

| | |
|---|---|
| *event* | Key event |

**See Also**

isReadOnly()

Reimplemented in QwtCompass.

#### 12.7.3.9 void QwtAbstractSlider::mouseMoveEvent ( QMouseEvent ∗ *event* ) `[protected]`, `[virtual]`

Mouse Move Event handler

**Parameters**

| | |
|---|---|
| *event* | Mouse event |

#### 12.7.3.10 void QwtAbstractSlider::mousePressEvent ( QMouseEvent ∗ *event* ) `[protected]`, `[virtual]`

Mouse press event handler

**Parameters**

| | |
|---|---|
| *event* | Mouse event |

Reimplemented in QwtSlider.

#### 12.7.3.11 void QwtAbstractSlider::mouseReleaseEvent ( QMouseEvent ∗ *event* ) `[protected]`, `[virtual]`

Mouse Release Event handler

**Parameters**

| | |
|---|---|
| *event* | Mouse event |

Reimplemented in QwtSlider.

#### 12.7.3.12 uint QwtAbstractSlider::pageSteps ( ) const

**Returns**

Number of steps

**See Also**

setPageSteps(), totalSteps(), singleSteps()

#### 12.7.3.13 void QwtAbstractSlider::scaleChange ( ) [protected], [virtual]

Update the slider according to modifications of the scale

Reimplemented from QwtAbstractScale.

Reimplemented in QwtDial, and QwtSlider.

#### 12.7.3.14 virtual double QwtAbstractSlider::scrolledTo ( const QPoint & *pos* ) const [protected], [pure virtual]

Determine the value for a new position of the movable part of the slider.

**Parameters**

| | |
|---|---|
| *pos* | Mouse position |

**Returns**

Value for the mouse position

**See Also**

isScrollPosition()

Implemented in QwtKnob, QwtDial, and QwtSlider.

#### 12.7.3.15 void QwtAbstractSlider::setInvertedControls ( bool *on* )

Invert wheel and key events

Usually scrolling the mouse wheel "up" and using keys like page up will increase the slider's value towards its maximum. When invertedControls() is enabled the value is scrolled towards its minimum.

Inverting the controls might be f.e. useful for a vertical slider with an inverted scale ( decreasing from top to bottom ).

**Parameters**

| | |
|---|---|
| *on* | Invert controls, when true |

**See Also**

invertedControls(), keyEvent(), wheelEvent()

#### 12.7.3.16 void QwtAbstractSlider::setPageSteps ( uint *stepCount* )

Set the number of steps for a page increment.

The range of the slider is divided into a number of steps from which the value increments according to user inputs depend.

**Parameters**

| | |
|---|---|
| *stepCount* | Number of steps |

**See Also**

pageSteps(), setTotalSteps(), setSingleSteps()

#### 12.7.3.17 void QwtAbstractSlider::setReadOnly ( bool *on* )

En/Disable read only mode

In read only mode the slider can't be controlled by mouse or keyboard.

**Parameters**

| | |
|---|---|
| *on* | Enables in case of true |

**See Also**

isReadOnly()

**Warning**

The focus policy is set to Qt::StrongFocus or Qt::NoFocus

#### 12.7.3.18 void QwtAbstractSlider::setSingleSteps ( uint *stepCount* )

Set the number of steps for a single increment.

The range of the slider is divided into a number of steps from which the value increments according to user inputs depend.

**Parameters**

| | |
|---|---|
| *stepCount* | Number of steps |

**See Also**

singleSteps(), setTotalSteps(), setPageSteps()

#### 12.7.3.19 void QwtAbstractSlider::setStepAlignment ( bool *on* )

Enable step alignment.

When step alignment is enabled values resulting from slider movements are aligned to the step size.

**Parameters**

| | |
|---|---|
| *on* | Enable step alignment when true |

**See Also**

stepAlignment()

#### 12.7.3.20 void QwtAbstractSlider::setTotalSteps ( uint *stepCount* )

Set the number of steps.

The range of the slider is divided into a number of steps from which the value increments according to user inputs depend.

The default setting is 100.

**Parameters**

| | |
|---|---|
| *stepCount* | Number of steps |

**See Also**

totalSteps(), setSingleSteps(), setPageSteps()

#### 12.7.3.21 void QwtAbstractSlider::setTracking ( bool *on* )

Enables or disables tracking.

If tracking is enabled, the slider emits the valueChanged() signal while the movable part of the slider is being dragged. If tracking is disabled, the slider emits the valueChanged() signal only when the user releases the slider.

Tracking is enabled by default.

**Parameters**

| | |
|---|---|
| *on* | `true` (enable) or `false` (disable) tracking. |

**See Also**

isTracking(), sliderMoved()

#### 12.7.3.22 void QwtAbstractSlider::setValid ( bool *on* )

Set the value to be valid/invalid

**Parameters**

| | |
|---|---|
| *on* | When true, the value is invalidated |

**See Also**

setValue()

#### 12.7.3.23 void QwtAbstractSlider::setValue ( double *value* ) [slot]

Set the slider to the specified value

**Parameters**

| | |
|---|---|
| *value* | New value |

**See Also**

setValid(), sliderChange(), valueChanged()

#### 12.7.3.24 void QwtAbstractSlider::setWrapping ( bool *on* )

If wrapping is true stepping up from upperBound() value will take you to the minimum() value and vice versa.

**Parameters**

| | |
|---|---|
| *on* | En/Disable wrapping |

**See Also**

wrapping()

#### 12.7.3.25 uint QwtAbstractSlider::singleSteps ( ) const

**Returns**

Number of steps

**See Also**

setSingleSteps(), totalSteps(), pageSteps()

#### 12.7.3.26 void QwtAbstractSlider::sliderMoved ( double *value* ) [signal]

This signal is emitted when the user moves the slider with the mouse.

**Parameters**

| | |
|---|---|
| *value* | New value |

**See Also**

valueChanged()

#### 12.7.3.27 void QwtAbstractSlider::sliderPressed ( ) [signal]

This signal is emitted when the user presses the movable part of the slider.

#### 12.7.3.28 void QwtAbstractSlider::sliderReleased ( ) [signal]

This signal is emitted when the user releases the movable part of the slider.

#### 12.7.3.29 bool QwtAbstractSlider::stepAlignment ( ) const

**Returns**

True, when step alignment is enabled

**See Also**

setStepAlignment()

#### 12.7.3.30 uint QwtAbstractSlider::totalSteps ( ) const

**Returns**

Number of steps

**See Also**

setTotalSteps(), singleSteps(), pageSteps()

#### 12.7.3.31 void QwtAbstractSlider::valueChanged ( double *value* ) [signal]

Notify a change of value.

When tracking is enabled (default setting), this signal will be emitted every time the value changes.

**Parameters**

| | |
|---|---|
| *value* | New value |

**See Also**

setTracking(), sliderMoved()

#### 12.7.3.32 void QwtAbstractSlider::wheelEvent ( QWheelEvent ∗ *event* ) [protected], [virtual]

Wheel Event handler

In/decreases the value by s number of steps. The direction depends on the invertedControls() property.

When the control or shift modifier is pressed the wheel delta ( divided by 120 ) is mapped to an increment according to pageSteps(). Otherwise it is mapped to singleSteps().

**Parameters**

| | |
|---|---|
| *event* | Wheel event |

Reimplemented in QwtDial.

#### 12.7.3.33 bool QwtAbstractSlider::wrapping ( ) const

**Returns**

True, when wrapping is set

**See Also**

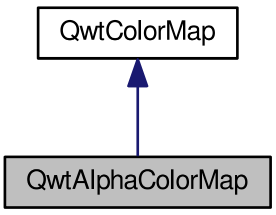
setWrapping()

## 12.8 QwtAlphaColorMap Class Reference

QwtAlphaColorMap varies the alpha value of a color.

`#include <qwt_color_map.h>`

Inheritance diagram for QwtAlphaColorMap:



**Public Member Functions**

- QwtAlphaColorMap (const QColor &=QColor(Qt::gray))
- virtual ∼QwtAlphaColorMap ()

*Destructor.*
- void setColor (const QColor &)
- QColor color () const
- virtual QRgb rgb (const QwtInterval &, double value) const

  *Map a value of a given interval into a alpha value.*

**Additional Inherited Members**

### 12.8.1 Detailed Description

QwtAlphaColorMap varies the alpha value of a color.

### 12.8.2 Constructor & Destructor Documentation

#### 12.8.2.1 QwtAlphaColorMap::QwtAlphaColorMap ( const QColor & *color* = `QColor( Qt::gray )` )

Constructor

**Parameters**

| | |
|---|---|
| *color* | Color of the map |

### 12.8.3 Member Function Documentation

#### 12.8.3.1 QColor QwtAlphaColorMap::color ( ) const

**Returns**

the color

**See Also**

setColor()

#### 12.8.3.2 QRgb QwtAlphaColorMap::rgb ( const QwtInterval & *interval,* double *value* ) const `[virtual]`

Map a value of a given interval into a alpha value.

alpha := (value - interval.minValue()) / interval.width();

**Parameters**

| | |
|---|---|
| *interval* | Range for all values |
| *value* | Value to map into a RGB value |

**Returns**

RGB value, with an alpha value

Implements QwtColorMap.

#### 12.8.3.3 void QwtAlphaColorMap::setColor ( const QColor & *color* )

Set the color

**Parameters**

| | |
|---|---|
| *color* | Color |

**See Also**

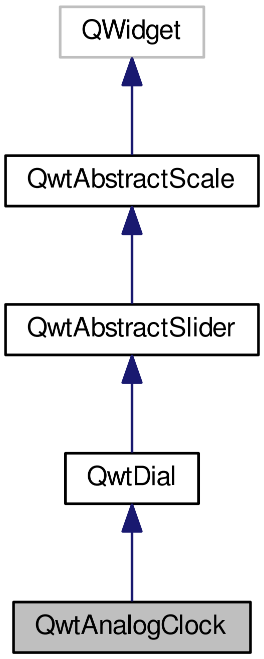
color()

## 12.9 QwtAnalogClock Class Reference

An analog clock.

`#include <qwt_analog_clock.h>`

Inheritance diagram for QwtAnalogClock:



**Public Types**

- enum Hand { SecondHand, MinuteHand, HourHand, NHands }

**Public Slots**

- void setCurrentTime ()

  *Set the current time.*

- void setTime (const QTime &)

#### Public Member Functions

- QwtAnalogClock (QWidget ∗parent=NULL)
- virtual ∼QwtAnalogClock ()

  *Destructor.*
- void setHand (Hand, QwtDialNeedle ∗)
- const QwtDialNeedle ∗ hand (Hand) const
- QwtDialNeedle ∗ hand (Hand)

#### Protected Member Functions

- virtual void drawNeedle (QPainter ∗, const QPointF &, double radius, double direction, QPalette::ColorGroup) const

  *Draw the needle.*
- virtual void drawHand (QPainter ∗, Hand, const QPointF &, double radius, double direction, QPalette::ColorGroup) const

#### Additional Inherited Members

### 12.9.1 Detailed Description

An analog clock.

#### Example

```
#include <qwt_analog_clock.h>

QwtAnalogClock *clock = new QwtAnalogClock(...);
clock->scaleDraw()->setPenWidth(3);
clock->setLineWidth(6);
clock->setFrameShadow(QwtDial::Sunken);
clock->setTime();

// update the clock every second
QTimer *timer = new QTimer(clock);
timer->connect(timer, SIGNAL(timeout()), clock, SLOT(setCurrentTime()));
timer->start(1000);
```

#### Note

The examples/dials example shows how to use QwtAnalogClock.

### 12.9.2 Member Enumeration Documentation

#### 12.9.2.1 enum **QwtAnalogClock::Hand**

Hand type

#### See Also

setHand(), hand()

#### Enumerator

***SecondHand*** Needle displaying the seconds.

***MinuteHand*** Needle displaying the minutes.

***HourHand*** Needle displaying the hours.

***NHands*** Number of needles.

### 12.9.3 Constructor & Destructor Documentation

#### 12.9.3.1 QwtAnalogClock::QwtAnalogClock ( QWidget ∗ *parent* = `NULL` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

### 12.9.4 Member Function Documentation

#### 12.9.4.1 void QwtAnalogClock::drawHand ( QPainter ∗ *painter,* Hand *hd,* const QPointF & *center,* double *radius,* double *direction,* QPalette::ColorGroup *cg* ) const [protected], [virtual]

Draw a clock hand

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *hd* | Specify the type of hand |
| *center* | Center of the clock |
| *radius* | Maximum length for the hands |
| *direction* | Direction of the hand in degrees, counter clockwise |
| *cg* | ColorGroup |

#### 12.9.4.2 void QwtAnalogClock::drawNeedle ( QPainter ∗ *painter,* const QPointF & *center,* double *radius,* double *dir,* QPalette::ColorGroup *colorGroup* ) const [protected], [virtual]

Draw the needle.

A clock has no single needle but three hands instead. drawNeedle() translates value() into directions for the hands and calls drawHand().

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *center* | Center of the clock |
| *radius* | Maximum length for the hands |
| *dir* | Dummy, not used. |
| *colorGroup* | ColorGroup |

**See Also**

drawHand()

Reimplemented from QwtDial.

#### 12.9.4.3 const QwtDialNeedle ∗ QwtAnalogClock::hand ( Hand *hd* ) const

**Returns**

Clock hand

**Parameters**

| | |
|---|---|
| *hd* | Specifies the type of hand |

**See Also**

setHand()

#### 12.9.4.4 QwtDialNeedle ∗ QwtAnalogClock::hand ( Hand *hd* )

**Returns**

Clock hand

**Parameters**

| | |
|---|---|
| *hd* | Specifies the type of hand |

**See Also**

setHand()

#### 12.9.4.5 void QwtAnalogClock::setHand ( Hand *hand*, QwtDialNeedle ∗ *needle* )

Set a clock hand

**Parameters**

| | |
|---|---|
| *hand* | Specifies the type of hand |
| *needle* | Hand |

**See Also**

hand()

#### 12.9.4.6 void QwtAnalogClock::setTime ( const QTime & *time* ) [slot]

Set a time

**Parameters**

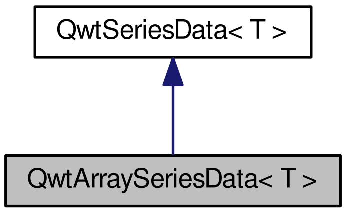
| | |
|---|---|
| *time* | Time to display |

## 12.10 QwtArraySeriesData< T > Class Template Reference

Template class for data, that is organized as QVector.

`#include <qwt_series_data.h>`

Inheritance diagram for QwtArraySeriesData< T >:



**Public Member Functions**

- QwtArraySeriesData ()

  *Constructor.*
- QwtArraySeriesData (const QVector< T > &samples)
- void setSamples (const QVector< T > &samples)

- const QVector< T > samples () const
- virtual size_t size () const
- virtual T sample (size_t index) const

#### Protected Attributes

- QVector< T > d_samples

    *Vector of samples.*

### 12.10.1 Detailed Description

**template<typename T>class QwtArraySeriesData< T >**

Template class for data, that is organized as QVector.

QVector uses implicit data sharing and can be passed around as argument efficiently.

### 12.10.2 Constructor & Destructor Documentation

#### 12.10.2.1 template<typename T> QwtArraySeriesData< T >::QwtArraySeriesData ( const QVector< T > & *samples* )

Constructor

**Parameters**

| | |
|---|---|
| *samples* | Array of samples |

### 12.10.3 Member Function Documentation

#### 12.10.3.1 template<typename T > T QwtArraySeriesData< T >::sample ( size_t *index* ) const [virtual]

**Returns**

Sample at a specific position

**Parameters**

| | |
|---|---|
| *index* | Index |

**Returns**

Sample at position index

Implements QwtSeriesData< T >.

#### 12.10.3.2 template<typename T > const QVector< T > QwtArraySeriesData< T >::samples ( ) const

**Returns**

Array of samples

#### 12.10.3.3 template<typename T> void QwtArraySeriesData< T >::setSamples ( const QVector< T > & *samples* )

Assign an array of samples

**Parameters**

| | |
|---|---|
| *samples* | Array of samples |

#### 12.10.3.4 template<typename T > size_t QwtArraySeriesData< T >::size ( ) const [virtual]

**Returns**

Number of samples

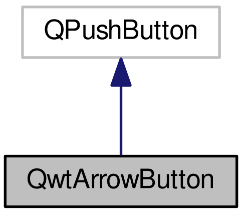
Implements QwtSeriesData< T >.

## 12.11 QwtArrowButton Class Reference

Arrow Button.

`#include <qwt_arrow_button.h>`

Inheritance diagram for QwtArrowButton:



**Public Member Functions**

- QwtArrowButton (int num, Qt::ArrowType, QWidget ∗parent=NULL)
- virtual ~QwtArrowButton ()

  *Destructor.*
- Qt::ArrowType arrowType () const

  *The direction of the arrows.*
- int num () const

  *The number of arrows.*
- virtual QSize sizeHint () const
- virtual QSize minimumSizeHint () const

  *Return a minimum size hint.*

**Protected Member Functions**

- virtual void paintEvent (QPaintEvent ∗event)
- virtual void drawButtonLabel (QPainter ∗p)

  *Draw the button label.*
- virtual void drawArrow (QPainter ∗, const QRect &, Qt::ArrowType) const
- virtual QRect labelRect () const
- virtual QSize arrowSize (Qt::ArrowType, const QSize &boundingSize) const

- virtual void keyPressEvent (QKeyEvent ∗)

  *autoRepeat for the space keys*

### 12.11.1 Detailed Description

Arrow Button.

A push button with one or more filled triangles on its front. An Arrow button can have 1 to 3 arrows in a row, pointing up, down, left or right.

### 12.11.2 Constructor & Destructor Documentation

#### 12.11.2.1 QwtArrowButton::QwtArrowButton ( int *num,* Qt::ArrowType *arrowType,* QWidget ∗ *parent* = NULL ) [explicit]

**Parameters**

| | |
|---|---|
| *num* | Number of arrows |
| *arrowType* | see Qt::ArrowType in the Qt docs. |
| *parent* | Parent widget |

### 12.11.3 Member Function Documentation

#### 12.11.3.1 QSize QwtArrowButton::arrowSize ( Qt::ArrowType *arrowType,* const QSize & *boundingSize* ) const [protected], [virtual]

Calculate the size for a arrow that fits into a rectangle of a given size

**Parameters**

| | |
|---|---|
| *arrowType* | Arrow type |
| *boundingSize* | Bounding size |

**Returns**

Size of the arrow

#### 12.11.3.2 void QwtArrowButton::drawArrow ( QPainter ∗ *painter,* const QRect & *r,* Qt::ArrowType *arrowType* ) const [protected], [virtual]

Draw an arrow int a bounding rectangle

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *r* | Rectangle where to paint the arrow |
| *arrowType* | Arrow type |

#### 12.11.3.3 void QwtArrowButton::drawButtonLabel ( QPainter ∗ *painter* ) [protected], [virtual]

Draw the button label.

**Parameters**

|  |  |
|---|---|
| *painter* | Painter |

**See Also**

The Qt Manual for QPushButton

#### 12.11.3.4 QRect QwtArrowButton::labelRect ( ) const [protected], [virtual]

**Returns**

the bounding rectangle for the label

#### 12.11.3.5 void QwtArrowButton::paintEvent ( QPaintEvent ∗ *event* ) [protected], [virtual]

Paint event handler

**Parameters**

|  |  |
|---|---|
| *event* | Paint event |

#### 12.11.3.6 QSize QwtArrowButton::sizeHint ( ) const [virtual]

**Returns**

a size hint

## 12.12 QwtClipper Class Reference

Some clipping algorithms.

```
#include <qwt_clipper.h>
```

**Static Public Member Functions**

- static QPolygon clipPolygon (const QRect &, const QPolygon &, bool closePolygon=false)
- static QPolygon clipPolygon (const QRectF &, const QPolygon &, bool closePolygon=false)
- static QPolygonF clipPolygonF (const QRectF &, const QPolygonF &, bool closePolygon=false)
- static QVector< QwtInterval > clipCircle (const QRectF &, const QPointF &, double radius)

### 12.12.1 Detailed Description

Some clipping algorithms.

### 12.12.2 Member Function Documentation

#### 12.12.2.1 QVector< QwtInterval > QwtClipper::clipCircle ( const QRectF & *clipRect,* const QPointF & *center,* double *radius* ) [static]

Circle clipping

clipCircle() divides a circle into intervals of angles representing arcs of the circle. When the circle is completely inside the clip rectangle an interval [0.0, 2 ∗ M_PI] is returned.

**Parameters**

| | |
|---|---|
| *clipRect* | Clip rectangle |
| *center* | Center of the circle |
| *radius* | Radius of the circle |

**Returns**

Arcs of the circle

#### 12.12.2.2 QPolygon QwtClipper::clipPolygon ( const QRect & *clipRect,* const QPolygon & *polygon,* bool *closePolygon =* `false` ) `[static]`

Sutherland-Hodgman polygon clipping

**Parameters**

| | |
|---|---|
| *clipRect* | Clip rectangle |
| *polygon* | Polygon |
| *closePolygon* | True, when the polygon is closed |

**Returns**

Clipped polygon

#### 12.12.2.3 QPolygon QwtClipper::clipPolygon ( const QRectF & *clipRect,* const QPolygon & *polygon,* bool *closePolygon =* `false` ) `[static]`

Sutherland-Hodgman polygon clipping

**Parameters**

| | |
|---|---|
| *clipRect* | Clip rectangle |
| *polygon* | Polygon |
| *closePolygon* | True, when the polygon is closed |

**Returns**

Clipped polygon

#### 12.12.2.4 QPolygonF QwtClipper::clipPolygonF ( const QRectF & *clipRect,* const QPolygonF & *polygon,* bool *closePolygon =* `false` ) `[static]`

Sutherland-Hodgman polygon clipping

**Parameters**

| | |
|---|---|
| *clipRect* | Clip rectangle |
| *polygon* | Polygon |
| *closePolygon* | True, when the polygon is closed |

**Returns**

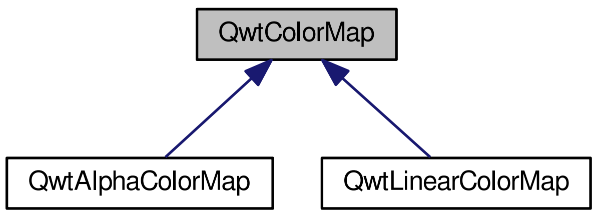
Clipped polygon

## 12.13 QwtColorMap Class Reference

QwtColorMap is used to map values into colors.

```
#include <qwt_color_map.h>
```

Inheritance diagram for QwtColorMap:



#### Public Types

- enum Format { RGB, Indexed }

#### Public Member Functions

- QwtColorMap (Format=QwtColorMap::RGB)

    *Constructor.*
- virtual ∼QwtColorMap ()

    *Destructor.*
- Format format () const
- virtual QRgb rgb (const QwtInterval &interval, double value) const =0
- virtual unsigned char colorIndex (const QwtInterval &interval, double value) const =0
- QColor color (const QwtInterval &, double value) const
- virtual QVector< QRgb > colorTable (const QwtInterval &) const

### 12.13.1 Detailed Description

QwtColorMap is used to map values into colors.

For displaying 3D data on a 2D plane the 3rd dimension is often displayed using colors, like f.e in a spectrogram.

Each color map is optimized to return colors for only one of the following image formats:

- QImage::Format_Indexed8
- QImage::Format_ARGB32

    **See Also**

    QwtPlotSpectrogram, QwtScaleWidget

### 12.13.2 Member Enumeration Documentation

#### 12.13.2.1 enum QwtColorMap::Format

Format for color mapping

**See Also**

rgb(), colorIndex(), colorTable()

**Enumerator**

***RGB*** The map is intended to map into RGB values.

***Indexed*** The map is intended to map into 8 bit values, that are indices into the color table.

### 12.13.3 Member Function Documentation

#### 12.13.3.1 QColor QwtColorMap::color ( const QwtInterval & *interval,* double *value* ) const [inline]

Map a value into a color

**Parameters**

| | |
|---|---|
| *interval* | Valid interval for values |
| *value* | Value |

**Returns**

Color corresponding to value

**Warning**

This method is slow for Indexed color maps. If it is necessary to map many values, its better to get the color table once and find the color using colorIndex().

#### 12.13.3.2 virtual unsigned char QwtColorMap::colorIndex ( const QwtInterval & *interval,* double *value* ) const [pure virtual]

Map a value of a given interval into a color index

**Parameters**

| | |
|---|---|
| *interval* | Range for the values |
| *value* | Value |

**Returns**

color index, corresponding to value

Implemented in QwtLinearColorMap.

#### 12.13.3.3 QVector< QRgb > QwtColorMap::colorTable ( const QwtInterval & *interval* ) const [virtual]

Build and return a color map of 256 colors

The color table is needed for rendering indexed images in combination with using colorIndex().

**Parameters**

| | |
|---|---|
| *interval* | Range for the values |

**Returns**

A color table, that can be used for a QImage

#### 12.13.3.4 QwtColorMap::Format QwtColorMap::format ( ) const [inline]

**Returns**

Intended format of the color map

**See Also**

Format

#### 12.13.3.5 virtual QRgb QwtColorMap::rgb ( const QwtInterval & *interval,* double *value* ) const [pure virtual]

Map a value of a given interval into a RGB value.

**Parameters**

| | |
|---|---|
| *interval* | Range for the values |
| *value* | Value |

**Returns**

RGB value, corresponding to value

Implemented in QwtAlphaColorMap, and QwtLinearColorMap.

## 12.14 QwtColumnRect Class Reference

Directed rectangle representing bounding rectangle and orientation of a column.

```
#include <qwt_column_symbol.h>
```

**Public Types**

- enum Direction { LeftToRight, RightToLeft, BottomToTop, TopToBottom }

  *Direction of the column.*

**Public Member Functions**

- QwtColumnRect ()

  *Build an rectangle with invalid intervals directed BottomToTop.*
- QRectF toRect () const
- Qt::Orientation orientation () const

**Public Attributes**

- QwtInterval hInterval

  *Interval for the horizontal coordinates.*
- QwtInterval vInterval

  *Interval for the vertical coordinates.*
- Direction direction

  *Direction.*

### 12.14.1 Detailed Description

Directed rectangle representing bounding rectangle and orientation of a column.

#### 12.14.2 Member Enumeration Documentation

##### 12.14.2.1 enum QwtColumnRect::Direction

Direction of the column.

**Enumerator**

| | |
|---|---|
| ***LeftToRight*** | From left to right. |
| ***RightToLeft*** | From right to left. |
| ***BottomToTop*** | From bottom to top. |
| ***TopToBottom*** | From top to bottom. |

#### 12.14.3 Member Function Documentation

##### 12.14.3.1 Qt::Orientation QwtColumnRect::orientation ( ) const [inline]

**Returns**

Orientation

##### 12.14.3.2 QRectF QwtColumnRect::toRect ( ) const [inline]

**Returns**

A normalized QRect built from the intervals

### 12.15 QwtColumnSymbol Class Reference

A drawing primitive for columns.

```
#include <qwt_column_symbol.h>
```

**Public Types**

- enum Style { NoStyle = -1, Box, UserStyle = 1000 }
- enum FrameStyle { NoFrame, Plain, Raised }

**Public Member Functions**

- QwtColumnSymbol (Style=NoStyle)
- virtual ∼QwtColumnSymbol ()

  *Destructor.*
- void setFrameStyle (FrameStyle style)
- FrameStyle frameStyle () const
- void setLineWidth (int width)
- int lineWidth () const
- void setPalette (const QPalette &)
- const QPalette & palette () const
- void setStyle (Style)
- Style style () const
- virtual void draw (QPainter ∗, const QwtColumnRect &) const

**Protected Member Functions**

- void drawBox (QPainter ∗, const QwtColumnRect &) const

### 12.15.1 Detailed Description

A drawing primitive for columns.

### 12.15.2 Member Enumeration Documentation

#### 12.15.2.1 enum QwtColumnSymbol::FrameStyle

Frame Style used in Box style().

**See Also**

Style, setFrameStyle(), frameStyle(), setStyle(), setPalette()

**Enumerator**

***NoFrame*** No frame.

***Plain*** A plain frame style.

***Raised*** A raised frame style.

#### 12.15.2.2 enum QwtColumnSymbol::Style

Style

**See Also**

setStyle(), style()

**Enumerator**

***NoStyle*** No Style, the symbol draws nothing.

***Box*** The column is painted with a frame depending on the frameStyle() and lineWidth() using the palette().

***UserStyle*** Styles >= QwtColumnSymbol::UserStyle are reserved for derived classes of QwtColumnSymbol that overload draw() with additional application specific symbol types.

### 12.15.3 Constructor & Destructor Documentation

#### 12.15.3.1 QwtColumnSymbol::QwtColumnSymbol ( Style *style* = NoStyle )

Constructor

**Parameters**

| | |
|---|---|
| *style* | Style of the symbol |

**See Also**

setStyle(), style(), Style

### 12.15.4 Member Function Documentation

#### 12.15.4.1 void QwtColumnSymbol::draw ( QPainter ∗ *painter*, const QwtColumnRect & *rect* ) const [virtual]

Draw the symbol depending on its style.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Directed rectangle |

**See Also**

drawBox()

#### 12.15.4.2 void QwtColumnSymbol::drawBox ( QPainter ∗ *painter*, const QwtColumnRect & *rect* ) const [protected]

Draw the symbol when it is in Box style.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Directed rectangle |

**See Also**

draw()

#### 12.15.4.3 QwtColumnSymbol::FrameStyle QwtColumnSymbol::frameStyle ( ) const

**Returns**

Current frame style, that is used for the Box style.

**See Also**

setFrameStyle(), lineWidth(), setStyle()

#### 12.15.4.4 int QwtColumnSymbol::lineWidth ( ) const

**Returns**

Line width of the frame, that is used for the Box style.

**See Also**

setLineWidth(), frameStyle(), setStyle()

#### 12.15.4.5 const QPalette & QwtColumnSymbol::palette ( ) const

**Returns**

Current palette

**See Also**

setPalette()

#### 12.15.4.6 void QwtColumnSymbol::setFrameStyle ( FrameStyle *frameStyle* )

Set the frame, that is used for the Box style.

**Parameters**

| | |
|---|---|
| *frameStyle* | Frame style |

**See Also**

frameStyle(), setLineWidth(), setStyle()

#### 12.15.4.7 void QwtColumnSymbol::setLineWidth ( int *width* )

Set the line width of the frame, that is used for the Box style.

**Parameters**

| | |
|---|---|
| *width* | Width |

**See Also**

lineWidth(), setFrameStyle()

#### 12.15.4.8 void QwtColumnSymbol::setPalette ( const QPalette & *palette* )

Assign a palette for the symbol

**Parameters**

| | |
|---|---|
| *palette* | Palette |

**See Also**

palette(), setStyle()

#### 12.15.4.9 void QwtColumnSymbol::setStyle ( Style *style* )

Specify the symbol style

**Parameters**

| | |
|---|---|
| *style* | Style |

**See Also**

style(), setPalette()

#### 12.15.4.10 QwtColumnSymbol::Style QwtColumnSymbol::style ( ) const

**Returns**

Current symbol style

**See Also**

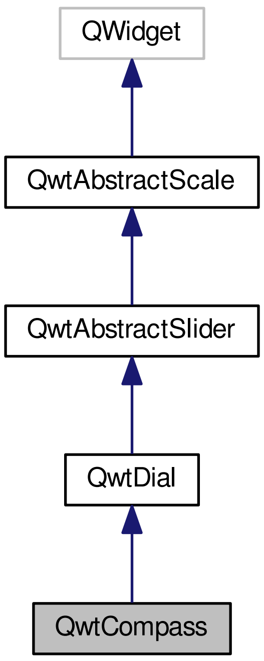
setStyle()

## 12.16 QwtCompass Class Reference

A Compass Widget.

```
#include <qwt_compass.h>
```

Inheritance diagram for QwtCompass:



#### Public Member Functions

- QwtCompass (QWidget ∗parent=NULL)

  *Constructor.*
- virtual ∼QwtCompass ()

  *Destructor.*
- void setRose (QwtCompassRose ∗rose)
- const QwtCompassRose ∗ rose () const
- QwtCompassRose ∗ rose ()

#### Protected Member Functions

- virtual void drawRose (QPainter ∗, const QPointF &center, double radius, double north, QPalette::ColorGroup) const
- virtual void drawScaleContents (QPainter ∗, const QPointF &center, double radius) const
- virtual void keyPressEvent (QKeyEvent ∗)

#### Additional Inherited Members

### 12.16.1 Detailed Description

A Compass Widget.

QwtCompass is a widget to display and enter directions. It consists of a scale, an optional needle and rose.

**Note**

The examples/dials example shows how to use QwtCompass.

### 12.16.2 Constructor & Destructor Documentation

#### 12.16.2.1 QwtCompass::QwtCompass ( QWidget ∗ *parent* = NULL ) [explicit]

Constructor.

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

Create a compass widget with a scale, no needle and no rose. The default origin is 270.0 with no valid value. It accepts mouse and keyboard inputs and has no step size. The default mode is QwtDial::RotateNeedle.

### 12.16.3 Member Function Documentation

#### 12.16.3.1 void QwtCompass::drawRose ( QPainter ∗ *painter,* const QPointF & *center,* double *radius,* double *north,* QPalette::ColorGroup *cg* ) const [protected], [virtual]

Draw the compass rose

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *center* | Center of the compass |
| *radius* | of the circle, where to paint the rose |
| *north* | Direction pointing north, in degrees counter clockwise |
| *cg* | Color group |

#### 12.16.3.2 void QwtCompass::drawScaleContents ( QPainter ∗ *painter,* const QPointF & *center,* double *radius* ) const [protected], [virtual]

Draw the contents of the scale

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *center* | Center of the content circle |
| *radius* | Radius of the content circle |

Reimplemented from QwtDial.

#### 12.16.3.3 void QwtCompass::keyPressEvent ( QKeyEvent ∗ *kev* ) [protected], [virtual]

Handles key events

Beside the keys described in QwtDial::keyPressEvent numbers from 1-9 (without 5) set the direction according to their position on the num pad.

**See Also**

isReadOnly()

Reimplemented from QwtAbstractSlider.

#### 12.16.3.4 const QwtCompassRose ∗ QwtCompass::rose ( ) const

**Returns**

rose

**See Also**

setRose()

#### 12.16.3.5 QwtCompassRose ∗ QwtCompass::rose ( )

**Returns**

rose

**See Also**

setRose()

#### 12.16.3.6 void QwtCompass::setRose ( QwtCompassRose ∗ *rose* )

Set a rose for the compass

**Parameters**

| | |
|---|---|
| *rose* | Compass rose |

**Warning**

The rose will be deleted, when a different rose is set or in ∼QwtCompass

**See Also**

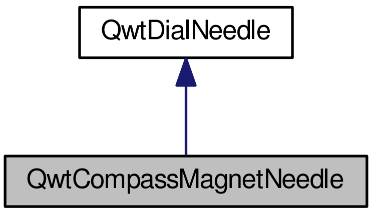
rose()

## 12.17 QwtCompassMagnetNeedle Class Reference

A magnet needle for compass widgets.

```
#include <qwt_dial_needle.h>
```

Inheritance diagram for QwtCompassMagnetNeedle:



**Public Types**

- enum Style { TriangleStyle, ThinStyle }

  *Style of the needle.*

#### Public Member Functions

- QwtCompassMagnetNeedle (Style=TriangleStyle, const QColor &light=Qt::white, const QColor &dark=Qt::red)

  *Constructor.*

#### Protected Member Functions

- virtual void drawNeedle (QPainter ∗, double length, QPalette::ColorGroup) const

### 12.17.1 Detailed Description

A magnet needle for compass widgets.

A magnet needle points to two opposite directions indicating north and south.

The following colors are used:

- QPalette::Light

  Used for pointing south
- QPalette::Dark

  Used for pointing north
- QPalette::Base

  Knob (ThinStyle only)

#### See Also

QwtDial, QwtCompass

### 12.17.2 Member Enumeration Documentation

#### 12.17.2.1 enum **QwtCompassMagnetNeedle::Style**

Style of the needle.

**Enumerator**

***TriangleStyle*** A needle with a triangular shape.

***ThinStyle*** A thin needle.

### 12.17.3 Member Function Documentation

#### 12.17.3.1 void QwtCompassMagnetNeedle::drawNeedle ( QPainter ∗ *painter,* double *length,* QPalette::ColorGroup *colorGroup* ) const `[protected]`, `[virtual]`

Draw the needle

**Parameters**

| | |
|---|---|
| *painter* | Painter |

| | |
|---|---|
| *length* | Length of the needle |
| *colorGroup* | Color group, used for painting |

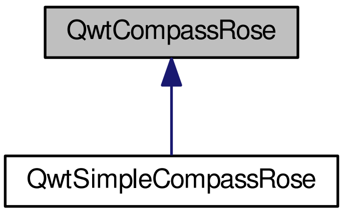
Implements QwtDialNeedle.

## 12.18 QwtCompassRose Class Reference

Abstract base class for a compass rose.

`#include <qwt_compass_rose.h>`

Inheritance diagram for QwtCompassRose:



**Public Member Functions**

- virtual ∼QwtCompassRose ()

  *Destructor.*
- virtual void setPalette (const QPalette &p)

  *Assign a palette.*
- const QPalette & palette () const
- virtual void draw (QPainter ∗painter, const QPointF &center, double radius, double north, QPalette::ColorGroup colorGroup=QPalette::Active) const =0

### 12.18.1 Detailed Description

Abstract base class for a compass rose.

### 12.18.2 Member Function Documentation

#### 12.18.2.1 virtual void QwtCompassRose::draw ( QPainter ∗ *painter,* const QPointF & *center,* double *radius,* double *north,* QPalette::ColorGroup *colorGroup* = `QPalette::Active` ) const `[pure virtual]`

Draw the rose

**Parameters**

| | |
|---|---|
| *painter* | Painter |

| | |
|---|---|
| *center* | Center point |
| *radius* | Radius of the rose |
| *north* | Position |
| *colorGroup* | Color group |

Implemented in QwtSimpleCompassRose.

#### 12.18.2.2 const QPalette& QwtCompassRose::palette ( ) const [inline]

**Returns**

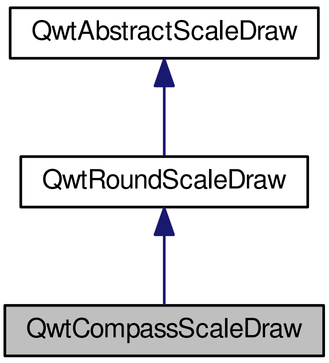
Current palette

## 12.19 QwtCompassScaleDraw Class Reference

A special scale draw made for QwtCompass.

`#include <qwt_compass.h>`

Inheritance diagram for QwtCompassScaleDraw:



### Public Member Functions

- QwtCompassScaleDraw ()

    *Constructor.*
- QwtCompassScaleDraw (const QMap< double, QString > &map)

    *Constructor.*
- void setLabelMap (const QMap< double, QString > &map)

    *Set a map, mapping values to labels.*
- QMap< double, QString > labelMap () const
- virtual QwtText label (double value) const

### Additional Inherited Members

### 12.19.1 Detailed Description

A special scale draw made for QwtCompass.

QwtCompassScaleDraw maps values to strings using a special map, that can be modified by the application

The default map consists of the labels N, NE, E, SE, S, SW, W, NW.

**See Also**

QwtCompass

### 12.19.2 Constructor & Destructor Documentation

#### 12.19.2.1 QwtCompassScaleDraw::QwtCompassScaleDraw ( ) [explicit]

Constructor.

Initializes a label map for multiples of 45 degrees

#### 12.19.2.2 QwtCompassScaleDraw::QwtCompassScaleDraw ( const QMap< double, QString > & *map* ) [explicit]

Constructor.

**Parameters**

| | |
|---|---|
| *map* | Value to label map |

### 12.19.3 Member Function Documentation

#### 12.19.3.1 QwtText QwtCompassScaleDraw::label ( double *value* ) const [virtual]

Map a value to a corresponding label

**Parameters**

| | |
|---|---|
| *value* | Value that will be mapped |

label() looks in the labelMap() for a corresponding label for value or returns an null text.

**Returns**

Label, or QString::null

**See Also**

labelMap(), setLabelMap()

Reimplemented from QwtAbstractScaleDraw.

#### 12.19.3.2 QMap< double, QString > QwtCompassScaleDraw::labelMap ( ) const

**Returns**

map, mapping values to labels

**See Also**

setLabelMap()

#### 12.19.3.3 void QwtCompassScaleDraw::setLabelMap ( const QMap< double, QString > & *map* )

Set a map, mapping values to labels.

#### Parameters

| | |
|---|---|
| *map* | Value to label map |

The values of the major ticks are found by looking into this map. The default map consists of the labels N, NE, E, SE, S, SW, W, NW.

#### Warning

The map will have no effect for values that are no major tick values. Major ticks can be changed by QwtScale-Draw::setScale

#### See Also

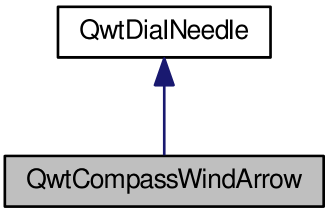
labelMap(), scaleDraw(), setScale()

## 12.20 QwtCompassWindArrow Class Reference

An indicator for the wind direction.

`#include <qwt_dial_needle.h>`

Inheritance diagram for QwtCompassWindArrow:



#### Public Types

- enum Style { Style1, Style2 }

  *Style of the arrow.*

#### Public Member Functions

- QwtCompassWindArrow (Style, const QColor &light=Qt::white, const QColor &dark=Qt::gray)

#### Protected Member Functions

- virtual void drawNeedle (QPainter ∗, double length, QPalette::ColorGroup) const

### 12.20.1 Detailed Description

An indicator for the wind direction.

QwtCompassWindArrow shows the direction where the wind comes from.

- QPalette::Light

  Used for Style1, or the light half of Style2

- QPalette::Dark

  Used for the dark half of Style2

**See Also**

QwtDial, QwtCompass

### 12.20.2 Member Enumeration Documentation

#### 12.20.2.1 enum QwtCompassWindArrow::Style

Style of the arrow.

**Enumerator**

***Style1*** A needle pointing to the center.

***Style2*** A needle pointing to the center.

### 12.20.3 Constructor & Destructor Documentation

#### 12.20.3.1 QwtCompassWindArrow::QwtCompassWindArrow ( Style *style*, const QColor & *light* = `Qt::white`, const QColor & *dark* = `Qt::gray` )

Constructor

**Parameters**

| | |
|---|---|
| *style* | Arrow style |
| *light* | Light color |
| *dark* | Dark color |

### 12.20.4 Member Function Documentation

#### 12.20.4.1 void QwtCompassWindArrow::drawNeedle ( QPainter ∗ *painter*, double *length*, QPalette::ColorGroup *colorGroup* ) const `[protected]`, `[virtual]`

Draw the needle

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *length* | Length of the needle |
| *colorGroup* | Color group, used for painting |

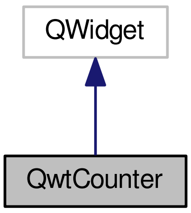
Implements QwtDialNeedle.

## 12.21 QwtCounter Class Reference

The Counter Widget.

```
#include <qwt_counter.h>
```

Inheritance diagram for QwtCounter:



### Public Types

- enum Button { Button1, Button2, Button3, ButtonCnt }

  *Button index.*

### Public Slots

- void setValue (double)

  *Set a new value without adjusting to the step raster.*

### Signals

- void buttonReleased (double value)
- void valueChanged (double value)

### Public Member Functions

- QwtCounter (QWidget ∗parent=NULL)
- virtual ∼QwtCounter ()

  *Destructor.*
- void setValid (bool)
- bool isValid () const
- void setWrapping (bool)

  *En/Disable wrapping.*
- bool wrapping () const
- bool isReadOnly () const
- void setReadOnly (bool)

  *Allow/disallow the user to manually edit the value.*
- void setNumButtons (int n)
- int numButtons () const
- void setIncSteps (QwtCounter::Button btn, int nSteps)
- int incSteps (QwtCounter::Button btn) const
- virtual QSize sizeHint () const

  *A size hint.*
- double singleStep () const
- void setSingleStep (double s)

*Set the step size of the counter.*
- void setRange (double min, double max)

  *Set the minimum and maximum values.*
- double minimum () const
- void setMinimum (double min)
- double maximum () const
- void setMaximum (double max)
- void setStepButton1 (int nSteps)
- int stepButton1 () const

  *returns the number of increment steps for button 1*
- void setStepButton2 (int nSteps)
- int stepButton2 () const

  *returns the number of increment steps for button 2*
- void setStepButton3 (int nSteps)
- int stepButton3 () const

  *returns the number of increment steps for button 3*
- double value () const

#### Protected Member Functions

- virtual bool event (QEvent ∗)
- virtual void wheelEvent (QWheelEvent ∗)
- virtual void keyPressEvent (QKeyEvent ∗)

### 12.21.1 Detailed Description

The Counter Widget.

A Counter consists of a label displaying a number and one ore more (up to three) push buttons on each side of the label which can be used to increment or decrement the counter's value.

A counter has a range from a minimum value to a maximum value and a step size. When the wrapping property is set the counter is circular.

The number of steps by which a button increments or decrements the value can be specified using setIncSteps(). The number of buttons can be changed with setNumButtons().

Example:

```
#include <qwt_counter.h>

QwtCounter *counter = new QwtCounter(parent);

counter->setRange(0.0, 100.0);                  // From 0.0 to 100
counter->setSingleStep( 1.0 );                  // Step size 1.0
counter->setNumButtons(2);                      // Two buttons each side
counter->setIncSteps(QwtCounter::Button1, 1);   // Button 1 increments 1 step
counter->setIncSteps(QwtCounter::Button2, 20);  // Button 2 increments 20
       steps

connect(counter, SIGNAL(valueChanged(double)), myClass, SLOT(newValue(double)));
```

### 12.21.2 Member Enumeration Documentation

#### 12.21.2.1 enum QwtCounter::Button

Button index.

**Enumerator**

***Button1*** Button intended for minor steps.

***Button2*** Button intended for medium steps.

***Button3*** Button intended for large steps.

***ButtonCnt*** Number of buttons.

### 12.21.3 Constructor & Destructor Documentation

#### 12.21.3.1 QwtCounter::QwtCounter ( QWidget ∗ *parent* = NULL ) [explicit]

The counter is initialized with a range is set to [0.0, 1.0] with 0.01 as single step size. The value is invalid.

The default number of buttons is set to 2. The default increments are:

- Button 1: 1 step
- Button 2: 10 steps
- Button 3: 100 steps

**Parameters**

| | |
|---|---|
| *parent* | |

### 12.21.4 Member Function Documentation

#### 12.21.4.1 void QwtCounter::buttonReleased ( double *value* ) [signal]

This signal is emitted when a button has been released

**Parameters**

| | |
|---|---|
| *value* | The new value |

#### 12.21.4.2 bool QwtCounter::event ( QEvent ∗ *event* ) [protected], [virtual]

Handle QEvent::PolishRequest events

**Parameters**

| | |
|---|---|
| *event* | Event |

**Returns**

see QWidget::event()

#### 12.21.4.3 int QwtCounter::incSteps ( QwtCounter::Button *button* ) const

**Returns**

The number of steps by which a specified button increments the value or 0 if the button is invalid.

**Parameters**

| | |
|---|---|
| *button* | Button index |

**See Also**

setIncSteps()

#### 12.21.4.4 bool QwtCounter::isReadOnly ( ) const

**Returns**

True, when the line line edit is read only. (default is no)

**See Also**

setReadOnly()

#### 12.21.4.5 bool QwtCounter::isValid ( ) const

**Returns**

True, if the value is valid

**See Also**

setValid(), setValue()

#### 12.21.4.6 void QwtCounter::keyPressEvent ( QKeyEvent * *event* ) [protected], [virtual]

Handle key events

- Ctrl + Qt::Key_Home
  Step to minimum()
- Ctrl + Qt::Key_End
  Step to maximum()
- Qt::Key_Up
  Increment by incSteps(QwtCounter::Button1)
- Qt::Key_Down
  Decrement by incSteps(QwtCounter::Button1)
- Qt::Key_PageUp
  Increment by incSteps(QwtCounter::Button2)
- Qt::Key_PageDown
  Decrement by incSteps(QwtCounter::Button2)
- Shift + Qt::Key_PageUp
  Increment by incSteps(QwtCounter::Button3)
- Shift + Qt::Key_PageDown
  Decrement by incSteps(QwtCounter::Button3)

**Parameters**

| | |
|---|---|
| *event* | Key event |

#### 12.21.4.7 double QwtCounter::maximum ( ) const

**Returns**

The maximum of the range

**See Also**

setRange(), setMaximum(), minimum()

#### 12.21.4.8 double QwtCounter::minimum ( ) const

**Returns**

The minimum of the range

**See Also**

setRange(), setMinimum(), maximum()

#### 12.21.4.9 int QwtCounter::numButtons ( ) const

**Returns**

The number of buttons on each side of the widget.

**See Also**

setNumButtons()

#### 12.21.4.10 void QwtCounter::setIncSteps ( QwtCounter::Button *button*, int *numSteps* )

Specify the number of steps by which the value is incremented or decremented when a specified button is pushed.

**Parameters**

| | |
|---|---|
| *button* | Button index |
| *numSteps* | Number of steps |

**See Also**

incSteps()

#### 12.21.4.11 void QwtCounter::setMaximum ( double *value* )

Set the maximum value of the range

**Parameters**

| | |
|---|---|
| *value* | Maximum value |

**See Also**

setRange(), setMinimum(), maximum()

#### 12.21.4.12 void QwtCounter::setMinimum ( double *value* )

Set the minimum value of the range

**Parameters**

| | |
|---|---|
| *value* | Minimum value |

**See Also**

setRange(), setMaximum(), minimum()

**Note**

The maximum is adjusted if necessary to ensure that the range remains valid.

#### 12.21.4.13 void QwtCounter::setNumButtons ( int *numButtons* )

Specify the number of buttons on each side of the label

**Parameters**

| | |
|---|---|
| *numButtons* | Number of buttons |

**See Also**

numButtons()

#### 12.21.4.14 void QwtCounter::setRange ( double *min*, double *max* )

Set the minimum and maximum values.

The maximum is adjusted if necessary to ensure that the range remains valid. The value might be modified to be inside of the range.

**Parameters**

| | |
|---|---|
| *min* | Minimum value |
| *max* | Maximum value |

**See Also**

minimum(), maximum()

#### 12.21.4.15 void QwtCounter::setReadOnly ( bool *on* )

Allow/disallow the user to manually edit the value.

**Parameters**

| | |
|---|---|
| *on* | True disable editing |

**See Also**

isReadOnly()

#### 12.21.4.16 void QwtCounter::setSingleStep ( double *stepSize* )

Set the step size of the counter.

A value <= 0.0 disables stepping

**Parameters**

| | |
|---|---|
| *stepSize* | Single step size |

**See Also**

singleStep()

#### 12.21.4.17 void QwtCounter::setStepButton1 ( int *nSteps* )

Set the number of increment steps for button 1

**Parameters**

| | |
|---|---|
| *nSteps* | Number of steps |

#### 12.21.4.18 void QwtCounter::setStepButton2 ( int *nSteps* )

Set the number of increment steps for button 2

**Parameters**

| | |
|---|---|
| *nSteps* | Number of steps |

#### 12.21.4.19 void QwtCounter::setStepButton3 ( int *nSteps* )

Set the number of increment steps for button 3

**Parameters**

| | |
|---|---|
| *nSteps* | Number of steps |

#### 12.21.4.20 void QwtCounter::setValid ( bool *on* )

Set the counter to be in valid/invalid state

When the counter is set to invalid, no numbers are displayed and the buttons are disabled.

**Parameters**

| | |
|---|---|
| *on* | If true the counter will be set as valid |

**See Also**

setValue(), isValid()

#### 12.21.4.21 void QwtCounter::setValue ( double *value* ) [slot]

Set a new value without adjusting to the step raster.

The state of the counter is set to be valid.

**Parameters**

| | |
|---|---|
| *value* | New value |

**See Also**

isValid(), value(), valueChanged()

**Warning**

The value is clipped when it lies outside the range.

#### 12.21.4.22 void QwtCounter::setWrapping ( bool *on* )

En/Disable wrapping.

If wrapping is true stepping up from maximum() value will take you to the minimum() value and vice versa.

**Parameters**

| | |
|---|---|
| *on* | En/Disable wrapping |

**See Also**

wrapping()

#### 12.21.4.23 double QwtCounter::singleStep ( ) const

**Returns**

Single step size

**See Also**

setSingleStep()

#### 12.21.4.24 double QwtCounter::value ( ) const

**Returns**

Current value of the counter

**See Also**

setValue(), valueChanged()

#### 12.21.4.25 void QwtCounter::valueChanged ( double *value* ) [signal]

This signal is emitted when the counter's value has changed

**Parameters**

| | |
|---|---|
| *value* | The new value |

#### 12.21.4.26 void QwtCounter::wheelEvent ( QWheelEvent ∗ *event* ) [protected], [virtual]

Handle wheel events

**Parameters**

| | |
|---|---|
| *event* | Wheel event |

#### 12.21.4.27 bool QwtCounter::wrapping ( ) const

**Returns**

True, when wrapping is set

**See Also**

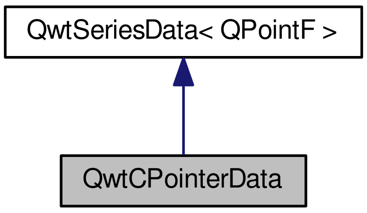
setWrapping()

## 12.22 QwtCPointerData Class Reference

Data class containing two pointers to memory blocks of doubles.

`#include <qwt_point_data.h>`

Inheritance diagram for QwtCPointerData:



**Public Member Functions**

- QwtCPointerData (const double ∗x, const double ∗y, size_t size)
- virtual QRectF boundingRect () const

  *Calculate the bounding rectangle.*
- virtual size_t size () const
- virtual QPointF sample (size_t i) const
- const double ∗ xData () const
- const double ∗ yData () const

**Additional Inherited Members**

### 12.22.1 Detailed Description

Data class containing two pointers to memory blocks of doubles.

### 12.22.2 Constructor & Destructor Documentation

#### 12.22.2.1 QwtCPointerData::QwtCPointerData ( const double ∗ *x*, const double ∗ *y*, size_t *size* )

Constructor

**Parameters**

| | |
|---|---|
| *x* | Array of x values |
| *y* | Array of y values |

|  |  |
|---|---|
| *size* | Size of the x and y arrays |

**Warning**

The programmer must assure that the memory blocks referenced by the pointers remain valid during the lifetime of the QwtPlotCPointer object.

**See Also**

QwtPlotCurve::setData(), QwtPlotCurve::setRawSamples()

### 12.22.3 Member Function Documentation

#### 12.22.3.1 QRectF QwtCPointerData::boundingRect ( ) const [virtual]

Calculate the bounding rectangle.

The bounding rectangle is calculated once by iterating over all points and is stored for all following requests.

**Returns**

Bounding rectangle

Implements QwtSeriesData< QPointF >.

#### 12.22.3.2 QPointF QwtCPointerData::sample ( size_t *index* ) const [virtual]

Return the sample at position i

**Parameters**

|  |  |
|---|---|
| *index* | Index |

**Returns**

Sample at position i

Implements QwtSeriesData< QPointF >.

#### 12.22.3.3 size_t QwtCPointerData::size ( ) const [virtual]

**Returns**

Size of the data set

Implements QwtSeriesData< QPointF >.

#### 12.22.3.4 const double ∗ QwtCPointerData::xData ( ) const

**Returns**

Array of the x-values

#### 12.22.3.5 const double ∗ QwtCPointerData::yData ( ) const

**Returns**

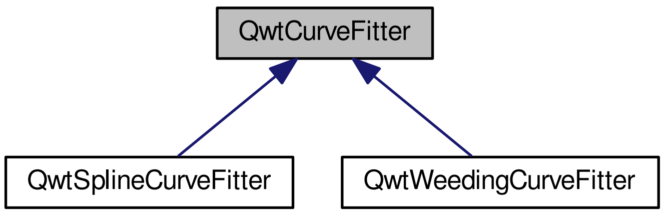
Array of the y-values

## 12.23 QwtCurveFitter Class Reference

Abstract base class for a curve fitter.

`#include <qwt_curve_fitter.h>`

Inheritance diagram for QwtCurveFitter:



#### Public Member Functions

- virtual ~QwtCurveFitter ()

  *Destructor.*
- virtual QPolygonF fitCurve (const QPolygonF &polygon) const =0

#### Protected Member Functions

- QwtCurveFitter ()

  *Constructor.*

### 12.23.1 Detailed Description

Abstract base class for a curve fitter.

### 12.23.2 Member Function Documentation

#### 12.23.2.1 virtual QPolygonF QwtCurveFitter::fitCurve ( const QPolygonF & *polygon* ) const `[pure virtual]`

Find a curve which has the best fit to a series of data points

**Parameters**

| | |
|---|---|
| *polygon* | Series of data points |

**Returns**

Curve points

Implemented in QwtWeedingCurveFitter, and QwtSplineCurveFitter.

## 12.24 QwtDate Class Reference

A collection of methods around date/time values.

`#include <qwt_date.h>`

### Public Types

- enum Week0Type { FirstThursday, FirstDay }
- enum IntervalType {
  Millisecond, Second, Minute, Hour,
  Day, Week, Month, Year }
- enum { JulianDayForEpoch = 2440588 }

### Static Public Member Functions

- static QDate minDate ()
- static QDate maxDate ()
- static QDateTime toDateTime (double value, Qt::TimeSpec=Qt::UTC)
- static double toDouble (const QDateTime &)
- static QDateTime ceil (const QDateTime &, IntervalType)
- static QDateTime floor (const QDateTime &, IntervalType)
- static QDate dateOfWeek0 (int year, Week0Type)

  *Date of the first day of the first week for a year.*
- static int weekNumber (const QDate &, Week0Type)
- static int utcOffset (const QDateTime &)
- static QString toString (const QDateTime &, const QString &format, Week0Type)

### 12.24.1 Detailed Description

A collection of methods around date/time values.

Qt offers convenient classes for dealing with date/time values, but Qwt uses coordinate systems that are based on doubles. QwtDate offers methods to translate from QDateTime to double and v.v.

A double is interpreted as the number of milliseconds since 1970-01-01T00:00:00 Universal Coordinated Time - also known as "The Epoch".

While the range of the Julian day in Qt4 is limited to [0, MAX_INT], Qt5 stores it as qint64 offering a huge range of valid dates. As the significance of a double is below this ( assuming a fraction of 52 bits ) the translation is not bijective with rounding errors for dates very far from Epoch. For a resolution of 1 ms those start to happen for dates above the year 144683.

An axis for a date/time interval is expected to be aligned and divided in time/date units like seconds, minutes, ... QwtDate offers several algorithms that are needed to calculate these axes.

#### See Also

QwtDateScaleEngine, QwtDateScaleDraw, QDate, QTime

### 12.24.2 Member Enumeration Documentation

#### 12.24.2.1 anonymous enum

**Enumerator**

***JulianDayForEpoch*** The Julian day of "The Epoch".

#### 12.24.2.2 enum QwtDate::IntervalType

Classification of an time interval

Time intervals needs to be classified to decide how to align and divide it.

**Enumerator**

***Millisecond*** The interval is related to milliseconds.

***Second*** The interval is related to seconds.

***Minute*** The interval is related to minutes.

***Hour*** The interval is related to hours.

***Day*** The interval is related to days.

***Week*** The interval is related to weeks.

***Month*** The interval is related to months.

***Year*** The interval is related to years.

#### 12.24.2.3 enum QwtDate::Week0Type

How to identify the first week of year differs between countries.

**Enumerator**

***FirstThursday*** According to ISO 8601 the first week of a year is defined as "the week with the year's first Thursday in it".

FirstThursday corresponds to the numbering that is implemented in QDate::weekNumber().

***FirstDay*** "The week with January 1.1 in it."

In the U.S. this definition is more common than FirstThursday.

### 12.24.3 Member Function Documentation

#### 12.24.3.1 QDateTime QwtDate::ceil ( const QDateTime & *dateTime,* IntervalType *intervalType* ) [static]

Ceil a datetime according the interval type

**Parameters**

| | |
|---|---|
| *dateTime* | Datetime value |
| *intervalType* | Interval type, how to ceil. F.e. when intervalType = QwtDate::Months, the result will be ceiled to the next beginning of a month |

**Returns**

Ceiled datetime

**See Also**

floor()

#### 12.24.3.2 QDate QwtDate::dateOfWeek0 ( int *year,* Week0Type *type* ) [static]

Date of the first day of the first week for a year.

The first day of a week depends on the current locale ( QLocale::firstDayOfWeek() ).

**Parameters**

| | |
|---:|---|
| *year* | Year |
| *type* | Option how to identify the first week |

**Returns**

First day of week 0

**See Also**

QLocale::firstDayOfWeek(), weekNumber()

#### 12.24.3.3 QDateTime QwtDate::floor ( const QDateTime & *dateTime*, IntervalType *intervalType* ) `[static]`

Floor a datetime according the interval type

**Parameters**

| | |
|---:|---|
| *dateTime* | Datetime value |
| *intervalType* | Interval type, how to ceil. F.e. when intervalType = QwtDate::Months, the result will be ceiled to the next beginning of a month |

**Returns**

Floored datetime

**See Also**

floor()

#### 12.24.3.4 QDate QwtDate::maxDate ( ) `[static]`

Maximum for the supported date range

The range of valid dates depends on how QDate stores the Julian day internally.

- For Qt4 it is "Tue Jun 3 5874898"
- For Qt5 it is "Tue Dec 31 2147483647"

**Returns**

maximum of the date range

**See Also**

minDate()

**Note**

The maximum differs between Qt4 and Qt5

#### 12.24.3.5 QDate QwtDate::minDate ( ) [static]

Minimum for the supported date range

The range of valid dates depends on how QDate stores the Julian day internally.

- For Qt4 it is "Tue Jan 2 -4713"
- For Qt5 it is "Thu Jan 1 -2147483648"

**Returns**

minimum of the date range

**See Also**

maxDate()

#### 12.24.3.6 QDateTime QwtDate::toDateTime ( double *value*, Qt::TimeSpec *timeSpec* = `Qt::UTC` ) [static]

Translate from double to QDateTime

**Parameters**

| | |
|---|---|
| *value* | Number of milliseconds since the epoch, 1970-01-01T00:00:00 UTC |
| *timeSpec* | Time specification |

**Returns**

Datetime value

**See Also**

toDouble(), QDateTime::setMSecsSinceEpoch()

**Note**

The return datetime for Qt::OffsetFromUTC will be Qt::UTC

#### 12.24.3.7 double QwtDate::toDouble ( const QDateTime & *dateTime* ) [static]

Translate from QDateTime to double

**Parameters**

| | |
|---|---|
| *dateTime* | Datetime value |

**Returns**

Number of milliseconds since 1970-01-01T00:00:00 UTC has passed.

**See Also**

toDateTime(), QDateTime::toMSecsSinceEpoch()

**Warning**

For values very far below or above 1970-01-01 UTC rounding errors will happen due to the limited significance of a double.

#### 12.24.3.8 QString QwtDate::toString ( const QDateTime & *dateTime,* const QString & *format,* Week0Type *week0Type* ) [static]

Translate a datetime into a string

Beside the format expressions documented in QDateTime::toString() the following expressions are supported:

- w

  week number: ( 1 - 53 )
- ww

  week number with a leading zero ( 01 - 53 )

**Parameters**

| | |
|---|---|
| *dateTime* | Datetime value |
| *format* | Format string |
| *week0Type* | Specification of week 0 |

**Returns**

Datetime string

**See Also**

QDateTime::toString(), weekNumber(), QwtDateScaleDraw

#### 12.24.3.9 int QwtDate::utcOffset ( const QDateTime & *dateTime* ) [static]

Offset in seconds from Coordinated Universal Time

The offset depends on the time specification of dateTime:

- Qt::UTC 0, dateTime has no offset
- Qt::OffsetFromUTC returns dateTime.utcOffset()
- Qt::LocalTime: number of seconds from the UTC

For Qt::LocalTime the offset depends on the timezone and daylight savings.

**Parameters**

| | |
|---|---|
| *dateTime* | Datetime value |

**Returns**

Offset in seconds

#### 12.24.3.10 int QwtDate::weekNumber ( const QDate & *date,* Week0Type *type* ) [static]

Find the week number of a date

- QwtDate::FirstThursday

  Corresponding to ISO 8601 ( see QDate::weekNumber() ).
- QwtDate::FirstDay

  Number of weeks that have begun since dateOfWeek0().

**Parameters**

| | |
|---|---|
| *date* | Date |
| *type* | Option how to identify the first week |

**Returns**

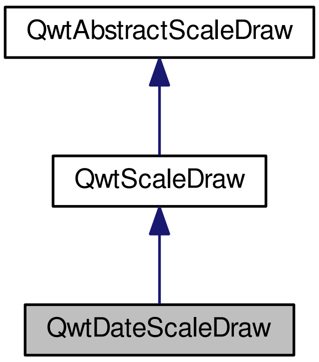
Week number, starting with 1

## 12.25 QwtDateScaleDraw Class Reference

A class for drawing datetime scales.

`#include <qwt_date_scale_draw.h>`

Inheritance diagram for QwtDateScaleDraw:



**Public Member Functions**

- QwtDateScaleDraw (Qt::TimeSpec=Qt::LocalTime)

  *Constructor.*
- virtual ∼QwtDateScaleDraw ()

  *Destructor.*
- void setDateFormat (QwtDate::IntervalType, const QString &)
- QString dateFormat (QwtDate::IntervalType) const
- void setTimeSpec (Qt::TimeSpec)
- Qt::TimeSpec timeSpec () const
- void setUtcOffset (int seconds)
- int utcOffset () const
- void setWeek0Type (QwtDate::Week0Type)
- QwtDate::Week0Type week0Type () const
- virtual QwtText label (double) const

  *Convert a value into its representing label.*
- QDateTime toDateTime (double) const

#### Protected Member Functions

- virtual QwtDate::IntervalType intervalType (const QwtScaleDiv &) const
- virtual QString dateFormatOfDate (const QDateTime &, QwtDate::IntervalType) const

#### Additional Inherited Members

### 12.25.1 Detailed Description

A class for drawing datetime scales.

QwtDateScaleDraw displays values as datetime labels. The format of the labels depends on the alignment of the major tick labels.

The default format strings are:

- Millisecond

  "hh:mm:ss:zzz\nddd dd MMM yyyy"

- Second

  "hh:mm:ss\nddd dd MMM yyyy"

- Minute

  "hh:mm\nddd dd MMM yyyy"

- Hour

  "hh:mm\nddd dd MMM yyyy"

- Day

  "ddd dd MMM yyyy"

- Week

  "Www yyyy"

- Month

  "MMM yyyy"

- Year

  "yyyy"

The format strings can be modified using setDateFormat() or individually for each tick label by overloading dateFormatOfDate(),

Usually QwtDateScaleDraw is used in combination with QwtDateScaleEngine, that calculates scales for datetime intervals.

#### See Also

QwtDateScaleEngine, QwtPlot::setAxisScaleDraw()

### 12.25.2 Constructor & Destructor Documentation

#### 12.25.2.1 QwtDateScaleDraw::QwtDateScaleDraw ( Qt::TimeSpec *timeSpec* = `Qt::LocalTime` )

Constructor.

The default setting is to display tick labels for the given time specification. The first week of a year is defined like for QwtDate::FirstThursday.

**Parameters**

| | |
|---|---|
| *timeSpec* | Time specification |

**See Also**

setTimeSpec(), setWeek0Type()

### 12.25.3 Member Function Documentation

#### 12.25.3.1 QString QwtDateScaleDraw::dateFormat ( QwtDate::IntervalType *intervalType* ) const

**Parameters**

| | |
|---|---|
| *intervalType* | Interval type |

**Returns**

Default format string for an datetime interval type

**See Also**

setDateFormat(), dateFormatOfDate()

#### 12.25.3.2 QString QwtDateScaleDraw::dateFormatOfDate ( const QDateTime & *dateTime*, QwtDate::IntervalType *intervalType* ) const [protected], [virtual]

Format string for the representation of a datetime

dateFormatOfDate() is intended to be overloaded for situations, where formats are individual for specific datetime values.

The default setting ignores dateTime and return the default format for the interval type.

**Parameters**

| | |
|---|---|
| *dateTime* | Datetime value |
| *intervalType* | Interval type |

**Returns**

Format string

**See Also**

setDateFormat(), QwtDate::toString()

#### 12.25.3.3 QwtDate::IntervalType QwtDateScaleDraw::intervalType ( const QwtScaleDiv & *scaleDiv* ) const [protected], [virtual]

Find the less detailed datetime unit, where no rounding errors happen.

**Parameters**

| | |
|---|---|
| *scaleDiv* | Scale division |

**Returns**

Interval type

**See Also**

dateFormatOfDate()

#### 12.25.3.4 QwtText QwtDateScaleDraw::label ( double *value* ) const [virtual]

Convert a value into its representing label.

The value is converted to a datetime value using toDateTime() and converted to a plain text using QwtDate::toString().

**Parameters**

| | |
|---|---|
| *value* | Value |

**Returns**

Label string.

**See Also**

dateFormatOfDate()

Reimplemented from QwtAbstractScaleDraw.

#### 12.25.3.5 void QwtDateScaleDraw::setDateFormat ( QwtDate::IntervalType *intervalType,* const QString & *format* )

Set the default format string for an datetime interval type

**Parameters**

| | |
|---|---|
| *intervalType* | Interval type |
| *format* | Default format string |

**See Also**

dateFormat(), dateFormatOfDate(), QwtDate::toString()

#### 12.25.3.6 void QwtDateScaleDraw::setTimeSpec ( Qt::TimeSpec *timeSpec* )

Set the time specification used for the tick labels

**Parameters**

| | |
|---|---|
| *timeSpec* | Time specification |

**See Also**

timeSpec(), setUtcOffset(), toDateTime()

#### 12.25.3.7 void QwtDateScaleDraw::setUtcOffset ( int *seconds* )

Set the offset in seconds from Coordinated Universal Time

**Parameters**

| | |
|---|---|
| *seconds* | Offset in seconds |

**Note**

The offset has no effect beside for the time specification Qt::OffsetFromUTC.

**See Also**

QDate::utcOffset(), setTimeSpec(), toDateTime()

#### 12.25.3.8 void QwtDateScaleDraw::setWeek0Type ( QwtDate::Week0Type *week0Type* )

Sets how to identify the first week of a year.

**Parameters**

| | |
|---|---|
| *week0Type* | Mode how to identify the first week of a year |

**See Also**

week0Type().

**Note**

week0Type has no effect beside for intervals classified as QwtDate::Week.

#### 12.25.3.9 Qt::TimeSpec QwtDateScaleDraw::timeSpec ( ) const

**Returns**

Time specification used for the tick labels

**See Also**

setTimeSpec(), utcOffset(), toDateTime()

#### 12.25.3.10 QDateTime QwtDateScaleDraw::toDateTime ( double *value* ) const

Translate a double value into a QDateTime object.

**Returns**

QDateTime object initialized with timeSpec() and utcOffset().

**See Also**

timeSpec(), utcOffset(), QwtDate::toDateTime()

#### 12.25.3.11 int QwtDateScaleDraw::utcOffset ( ) const

**Returns**

Offset in seconds from Coordinated Universal Time

**Note**

The offset has no effect beside for the time specification Qt::OffsetFromUTC.

**See Also**

QDate::setUtcOffset(), setTimeSpec(), toDateTime()

#### 12.25.3.12 QwtDate::Week0Type QwtDateScaleDraw::week0Type ( ) const

**Returns**

Setting how to identify the first week of a year.

**See Also**

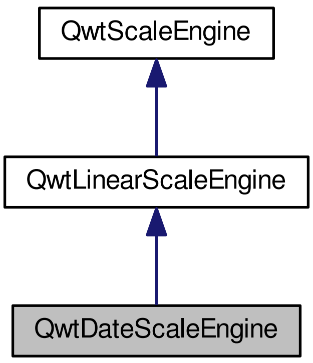
setWeek0Type()

## 12.26 QwtDateScaleEngine Class Reference

A scale engine for date/time values.

`#include <qwt_date_scale_engine.h>`

Inheritance diagram for QwtDateScaleEngine:



### Public Member Functions

- QwtDateScaleEngine (Qt::TimeSpec=Qt::LocalTime)

  *Constructor.*
- virtual ∼QwtDateScaleEngine ()

  *Destructor.*
- void setTimeSpec (Qt::TimeSpec)
- Qt::TimeSpec timeSpec () const
- void setUtcOffset (int seconds)
- int utcOffset () const
- void setWeek0Type (QwtDate::Week0Type)
- QwtDate::Week0Type week0Type () const
- void setMaxWeeks (int)
- int maxWeeks () const
- virtual void autoScale (int maxNumSteps, double &x1, double &x2, double &stepSize) const
- virtual QwtScaleDiv divideScale (double x1, double x2, int maxMajorSteps, int maxMinorSteps, double stepSize=0.0) const

  *Calculate a scale division for a date/time interval.*
- virtual QwtDate::IntervalType intervalType (const QDateTime &, const QDateTime &, int maxSteps) const
- QDateTime toDateTime (double) const

### Protected Member Functions

- virtual QDateTime alignDate (const QDateTime &, double stepSize, QwtDate::IntervalType, bool up) const

#### Additional Inherited Members

### 12.26.1 Detailed Description

A scale engine for date/time values.

QwtDateScaleEngine builds scales from a time intervals. Together with QwtDateScaleDraw it can be used for axes according to date/time values.

Years, months, weeks, days, hours and minutes are organized in steps with non constant intervals. QwtDateScale-Engine classifies intervals and aligns the boundaries and tick positions according to this classification.

QwtDateScaleEngine supports representations depending on Qt::TimeSpec specifications. The valid range for scales is limited by the range of QDateTime, that differs between Qt4 and Qt5.

Datetime values are expected as the number of milliseconds since 1970-01-01T00:00:00 Universal Coordinated Time - also known as "The Epoch", that can be converted to QDateTime using QwtDate::toDateTime().

**See Also**

QwtDate, QwtPlot::setAxisScaleEngine(), QwtAbstractScale::setScaleEngine()

### 12.26.2 Constructor & Destructor Documentation

#### 12.26.2.1 QwtDateScaleEngine::QwtDateScaleEngine ( Qt::TimeSpec *timeSpec* = `Qt::LocalTime` )

Constructor.

The engine is initialized to build scales for the given time specification. It classifies intervals $>$ 4 weeks as $>=$ Qt::Month. The first week of a year is defined like for QwtDate::FirstThursday.

**Parameters**

| | |
|---|---|
| *timeSpec* | Time specification |

**See Also**

setTimeSpec(), setMaxWeeks(), setWeek0Type()

### 12.26.3 Member Function Documentation

#### 12.26.3.1 QDateTime QwtDateScaleEngine::alignDate ( const QDateTime & *dateTime*, double *stepSize*, QwtDate::IntervalType *intervalType*, bool *up* ) const `[protected]`, `[virtual]`

Align a date/time value for a step size

For Qt::Day alignments there is no "natural day 0" - instead the first day of the year is used to avoid jumping major ticks positions when panning a scale. For other alignments ( f.e according to the first day of the month ) alignDate() has to be overloaded.

**Parameters**

| | |
|---|---|
| *dateTime* | Date/time value |
| *stepSize* | Step size |
| *intervalType* | Interval type |
| *up* | When true dateTime is ceiled - otherwise it is floored |

**Returns**

Aligned date/time value

#### 12.26.3.2 void QwtDateScaleEngine::autoScale ( int *maxNumSteps,* double & *x1,* double & *x2,* double & *stepSize* ) const [virtual]

Align and divide an interval

The algorithm aligns and divides the interval into steps.

Datetime interval divisions are usually not equidistant and the calculated stepSize can only be used as an approximation for the steps calculated by divideScale().

**Parameters**

| | |
|---|---|
| *maxNumSteps* | Max. number of steps |
| *x1* | First limit of the interval (In/Out) |
| *x2* | Second limit of the interval (In/Out) |
| *stepSize* | Step size (Out) |

**See Also**

QwtScaleEngine::setAttribute()

Reimplemented from QwtLinearScaleEngine.

#### 12.26.3.3 QwtScaleDiv QwtDateScaleEngine::divideScale ( double *x1,* double *x2,* int *maxMajorSteps,* int *maxMinorSteps,* double *stepSize* = 0.0 ) const [virtual]

Calculate a scale division for a date/time interval.

**Parameters**

| | |
|---|---|
| *x1* | First interval limit |
| *x2* | Second interval limit |
| *maxMajorSteps* | Maximum for the number of major steps |
| *maxMinorSteps* | Maximum number of minor steps |
| *stepSize* | Step size. If stepSize == 0, the scaleEngine calculates one. |

**Returns**

Calculated scale division

Reimplemented from QwtLinearScaleEngine.

#### 12.26.3.4 QwtDate::IntervalType QwtDateScaleEngine::intervalType ( const QDateTime & *minDate,* const QDateTime & *maxDate,* int *maxSteps* ) const [virtual]

Classification of a date/time interval division

**Parameters**

| | |
|---|---|
| *minDate* | Minimum ( = earlier ) of the interval |
| *maxDate* | Maximum ( = later ) of the interval |
| *maxSteps* | Maximum for the number of steps |

**Returns**

Interval classification

#### 12.26.3.5 int QwtDateScaleEngine::maxWeeks ( ) const

**Returns**

Upper limit for the number of weeks, when an interval can be classified as Qt::Week.

**See Also**

setMaxWeeks(), week0Type()

#### 12.26.3.6 void QwtDateScaleEngine::setMaxWeeks ( int *weeks* )

Set a upper limit for the number of weeks, when an interval can be classified as Qt::Week.

The default setting is 4 weeks.

**Parameters**

| | |
|---|---|
| *weeks* | Upper limit for the number of weeks |

**Note**

In business charts a year is often devided into weeks [1-52]

**See Also**

maxWeeks(), setWeek0Type()

#### 12.26.3.7 void QwtDateScaleEngine::setTimeSpec ( Qt::TimeSpec *timeSpec* )

Set the time specification used by the engine

**Parameters**

| | |
|---|---|
| *timeSpec* | Time specification |

**See Also**

timeSpec(), setUtcOffset(), toDateTime()

#### 12.26.3.8 void QwtDateScaleEngine::setUtcOffset ( int *seconds* )

Set the offset in seconds from Coordinated Universal Time

**Parameters**

| | |
|---|---|
| *seconds* | Offset in seconds |

**Note**

The offset has no effect beside for the time specification Qt::OffsetFromUTC.

**See Also**

QDate::utcOffset(), setTimeSpec(), toDateTime()

#### 12.26.3.9 void QwtDateScaleEngine::setWeek0Type ( QwtDate::Week0Type *week0Type* )

Sets how to identify the first week of a year.

**Parameters**

| | |
|---|---|
| *week0Type* | Mode how to identify the first week of a year |

**See Also**

week0Type(), setMaxWeeks()

**Note**

week0Type has no effect beside for intervals classified as QwtDate::Week.

#### 12.26.3.10 Qt::TimeSpec QwtDateScaleEngine::timeSpec ( ) const

**Returns**

Time specification used by the engine

**See Also**

setTimeSpec(), utcOffset(), toDateTime()

#### 12.26.3.11 QDateTime QwtDateScaleEngine::toDateTime ( double *value* ) const

Translate a double value into a QDateTime object.

For QDateTime result is bounded by QwtDate::minDate() and QwtDate::maxDate()

**Returns**

QDateTime object initialized with timeSpec() and utcOffset().

**See Also**

timeSpec(), utcOffset(), QwtDate::toDateTime()

#### 12.26.3.12 int QwtDateScaleEngine::utcOffset ( ) const

**Returns**

Offset in seconds from Coordinated Universal Time

**Note**

The offset has no effect beside for the time specification Qt::OffsetFromUTC.

**See Also**

QDate::setUtcOffset(), setTimeSpec(), toDateTime()

#### 12.26.3.13 QwtDate::Week0Type QwtDateScaleEngine::week0Type ( ) const

**Returns**

Setting how to identify the first week of a year.

**See Also**

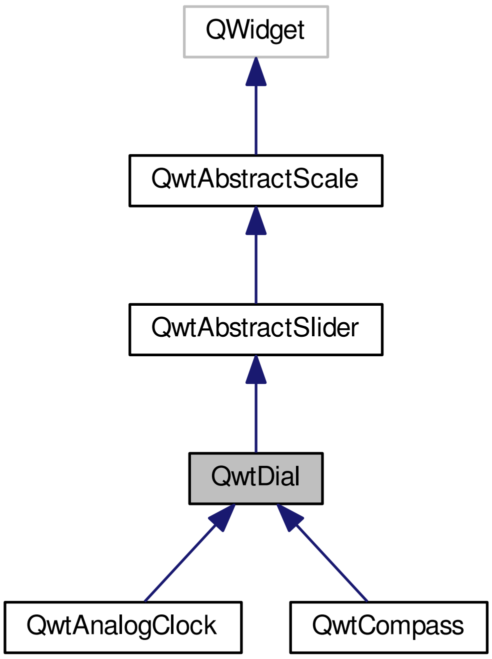
setWeek0Type(), maxWeeks()

## 12.27 QwtDial Class Reference

QwtDial class provides a rounded range control.

`#include <qwt_dial.h>`

Inheritance diagram for QwtDial:



### Public Types

- enum Shadow { Plain = QFrame::Plain, Raised = QFrame::Raised, Sunken = QFrame::Sunken }

  *Frame shadow.*
- enum Mode { RotateNeedle, RotateScale }

  *Mode controlling whether the needle or the scale is rotating.*

### Public Member Functions

- QwtDial (QWidget ∗parent=NULL)

  *Constructor.*
- virtual ∼QwtDial ()

  *Destructor.*
- void setFrameShadow (Shadow)
- Shadow frameShadow () const
- void setLineWidth (int)
- int lineWidth () const
- void setMode (Mode)

  *Change the mode of the dial.*

- Mode mode () const
- void setScaleArc (double min, double max)
- void setMinScaleArc (double min)
- double minScaleArc () const
- void setMaxScaleArc (double min)
- double maxScaleArc () const
- virtual void setOrigin (double)

  *Change the origin.*
- double origin () const
- void setNeedle (QwtDialNeedle ∗)
- const QwtDialNeedle ∗ needle () const
- QwtDialNeedle ∗ needle ()
- QRect boundingRect () const
- QRect innerRect () const
- virtual QRect scaleInnerRect () const
- virtual QSize sizeHint () const
- virtual QSize minimumSizeHint () const
- void setScaleDraw (QwtRoundScaleDraw ∗)
- QwtRoundScaleDraw ∗ scaleDraw ()
- const QwtRoundScaleDraw ∗ scaleDraw () const

#### Protected Member Functions

- virtual void wheelEvent (QWheelEvent ∗)
- virtual void paintEvent (QPaintEvent ∗)
- virtual void changeEvent (QEvent ∗)
- virtual void drawFrame (QPainter ∗p)
- virtual void drawContents (QPainter ∗) const

  *Draw the contents inside the frame.*
- virtual void drawFocusIndicator (QPainter ∗) const
- void invalidateCache ()
- virtual void drawScale (QPainter ∗, const QPointF &center, double radius) const
- virtual void drawScaleContents (QPainter ∗painter, const QPointF &center, double radius) const
- virtual void drawNeedle (QPainter ∗, const QPointF &, double radius, double direction, QPalette::ColorGroup) const
- virtual double scrolledTo (const QPoint &) const

  *Determine the value for a new position of the slider handle.*
- virtual bool isScrollPosition (const QPoint &) const

  *Determine what to do when the user presses a mouse button.*
- virtual void sliderChange ()

  *Calling update()*
- virtual void scaleChange ()

#### Additional Inherited Members

### 12.27.1 Detailed Description

QwtDial class provides a rounded range control.

QwtDial is intended as base class for dial widgets like speedometers, compass widgets, clocks ...

A dial contains a scale and a needle indicating the current value of the dial. Depending on Mode one of them is fixed and the other is rotating. If not isReadOnly() the dial can be rotated by dragging the mouse or using keyboard inputs (see QwtAbstractSlider::keyPressEvent()). A dial might be wrapping, what means a rotation below/above one limit continues on the other limit (f.e compass). The scale might cover any arc of the dial, its values are related to the origin() of the dial.

Often dials have to be updated very often according to values from external devices. For these high refresh rates QwtDial caches as much as possible. For derived classes it might be necessary to clear these caches manually according to attribute changes using invalidateCache().

**See Also**

QwtCompass, QwtAnalogClock, QwtDialNeedle

**Note**

The controls and dials examples shows different types of dials.
QDial is more similar to QwtKnob than to QwtDial

### 12.27.2 Member Enumeration Documentation

#### 12.27.2.1 enum QwtDial::Mode

Mode controlling whether the needle or the scale is rotating.

**Enumerator**

***RotateNeedle*** The needle is rotating.

***RotateScale*** The needle is fixed, the scales are rotating.

#### 12.27.2.2 enum QwtDial::Shadow

Frame shadow.

Unfortunately it is not possible to use QFrame::Shadow as a property of a widget that is not derived from QFrame. The following enum is made for the designer only. It is safe to use QFrame::Shadow instead.

**Enumerator**

***Plain*** QFrame::Plain.

***Raised*** QFrame::Raised.

***Sunken*** QFrame::Sunken.

### 12.27.3 Constructor & Destructor Documentation

#### 12.27.3.1 QwtDial::QwtDial ( QWidget ∗ *parent* = `NULL` ) `[explicit]`

Constructor.

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

Create a dial widget with no needle. The scale is initialized to [ 0.0, 360.0 ] and 360 steps ( QwtAbstractSlider::setTotalSteps() ). The origin of the scale is at 90°,

The value is set to 0.0.

The default mode is QwtDial::RotateNeedle.

### 12.27.4 Member Function Documentation

#### 12.27.4.1 QRect QwtDial::boundingRect ( ) const

**Returns**

bounding rectangle of the dial including the frame

**See Also**

setLineWidth(), scaleInnerRect(), innerRect()

#### 12.27.4.2 void QwtDial::changeEvent ( QEvent ∗ *event* ) [protected], [virtual]

Change Event handler

**Parameters**

| | |
|---|---|
| *event* | Change event |

Invalidates internal paint caches if necessary

#### 12.27.4.3 void QwtDial::drawContents ( QPainter ∗ *painter* ) const [protected], [virtual]

Draw the contents inside the frame.

QPalette::Window is the background color outside of the frame. QPalette::Base is the background color inside the frame. QPalette::WindowText is the background color inside the scale.

**Parameters**

| | |
|---|---|
| *painter* | Painter |

**See Also**

boundingRect(), innerRect(), scaleInnerRect(), QWidget::setPalette()

#### 12.27.4.4 void QwtDial::drawFocusIndicator ( QPainter ∗ *painter* ) const [protected], [virtual]

Draw the focus indicator

**Parameters**

| | |
|---|---|
| *painter* | Painter |

#### 12.27.4.5 void QwtDial::drawFrame ( QPainter ∗ *painter* ) [protected], [virtual]

Draw the frame around the dial

**Parameters**

| | |
|---|---|
| *painter* | Painter |

**See Also**

lineWidth(), frameShadow()

#### 12.27.4.6 void QwtDial::drawNeedle ( QPainter ∗ *painter,* const QPointF & *center,* double *radius,* double *direction,* QPalette::ColorGroup *colorGroup* ) const [protected], [virtual]

Draw the needle

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *center* | Center of the dial |
| *radius* | Length for the needle |
| *direction* | Direction of the needle in degrees, counter clockwise |
| *colorGroup* | ColorGroup |

Reimplemented in QwtAnalogClock.

#### 12.27.4.7 void QwtDial::drawScale ( QPainter ∗ *painter,* const QPointF & *center,* double *radius* ) const [protected], [virtual]

Draw the scale

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *center* | Center of the dial |
| *radius* | Radius of the scale |

#### 12.27.4.8 void QwtDial::drawScaleContents ( QPainter ∗ *painter,* const QPointF & *center,* double *radius* ) const [protected], [virtual]

Draw the contents inside the scale

Paints nothing.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *center* | Center of the contents circle |
| *radius* | Radius of the contents circle |

Reimplemented in QwtCompass.

#### 12.27.4.9 QwtDial::Shadow QwtDial::frameShadow ( ) const

**Returns**

Frame shadow /sa setFrameShadow(), lineWidth(), QFrame::frameShadow()

#### 12.27.4.10 QRect QwtDial::innerRect ( ) const

**Returns**

bounding rectangle of the circle inside the frame

**See Also**

setLineWidth(), scaleInnerRect(), boundingRect()

#### 12.27.4.11 void QwtDial::invalidateCache ( ) [protected]

Invalidate the internal caches used to speed up repainting

#### 12.27.4.12 bool QwtDial::isScrollPosition ( const QPoint & *pos* ) const [protected], [virtual]

Determine what to do when the user presses a mouse button.

**Parameters**

| | |
|---|---|
| *pos* | Mouse position |

**Return values**

| | |
|---|---|
| *True,when* | the inner circle contains pos |

**See Also**

scrolledTo()

Implements QwtAbstractSlider.

#### 12.27.4.13 int QwtDial::lineWidth ( ) const

**Returns**

Line width of the frame

**See Also**

setLineWidth(), frameShadow(), lineWidth()

#### 12.27.4.14 double QwtDial::maxScaleArc ( ) const

**Returns**

Upper limit of the scale arc

**See Also**

setScaleArc()

#### 12.27.4.15 QSize QwtDial::minimumSizeHint ( ) const [virtual]

**Returns**

Minimum size hint

**See Also**

sizeHint()

#### 12.27.4.16 double QwtDial::minScaleArc ( ) const

**Returns**

Lower limit of the scale arc

**See Also**

setScaleArc()

#### 12.27.4.17 QwtDial::Mode QwtDial::mode ( ) const

**Returns**

Mode of the dial.

**See Also**

setMode(), origin(), setScaleArc(), value()

#### 12.27.4.18 const QwtDialNeedle ∗ QwtDial::needle ( ) const

**Returns**

needle

**See Also**

setNeedle()

#### 12.27.4.19 QwtDialNeedle ∗ QwtDial::needle ( )

**Returns**

needle

**See Also**

setNeedle()

#### 12.27.4.20 double QwtDial::origin ( ) const

The origin is the angle where scale and needle is relative to.

**Returns**

Origin of the dial

**See Also**

setOrigin()

#### 12.27.4.21 void QwtDial::paintEvent ( QPaintEvent ∗ *event* ) [protected], [virtual]

Paint the dial

**Parameters**

| | |
|---|---|
| *event* | Paint event |

#### 12.27.4.22 void QwtDial::scaleChange ( ) [protected], [virtual]

Invalidate the internal caches and call QwtAbstractSlider::scaleChange()

Reimplemented from QwtAbstractSlider.

#### 12.27.4.23 QwtRoundScaleDraw ∗ QwtDial::scaleDraw ( )

**Returns**

the scale draw

#### 12.27.4.24 const QwtRoundScaleDraw ∗ QwtDial::scaleDraw ( ) const

**Returns**

the scale draw

#### 12.27.4.25 QRect QwtDial::scaleInnerRect ( ) const [virtual]

**Returns**

rectangle inside the scale

**See Also**

setLineWidth(), boundingRect(), innerRect()

#### 12.27.4.26 double QwtDial::scrolledTo ( const QPoint & *pos* ) const [protected], [virtual]

Determine the value for a new position of the slider handle.

**Parameters**

| | |
|---|---|
| *pos* | Mouse position |

**Returns**

Value for the mouse position

**See Also**

isScrollPosition()

Implements QwtAbstractSlider.

#### 12.27.4.27 void QwtDial::setFrameShadow ( Shadow *shadow* )

Sets the frame shadow value from the frame style.

**Parameters**

| | |
|---|---|
| *shadow* | Frame shadow |

**See Also**

setLineWidth(), QFrame::setFrameShadow()

#### 12.27.4.28 void QwtDial::setLineWidth ( int *lineWidth* )

Sets the line width of the frame

**Parameters**

| | |
|---|---|
| *lineWidth* | Line width |

**See Also**

setFrameShadow()

#### 12.27.4.29 void QwtDial::setMaxScaleArc ( double *max* )

Set the upper limit for the scale arc

**Parameters**

| | |
|---|---|
| *max* | Upper limit of the scale arc |

**See Also**

setScaleArc(), setMinScaleArc()

#### 12.27.4.30 void QwtDial::setMinScaleArc ( double *min* )

Set the lower limit for the scale arc

**Parameters**

| | |
|---|---|
| *min* | Lower limit of the scale arc |

**See Also**

setScaleArc(), setMaxScaleArc()

#### 12.27.4.31 void QwtDial::setMode ( Mode *mode* )

Change the mode of the dial.

**Parameters**

| | |
|---|---|
| *mode* | New mode |

In case of QwtDial::RotateNeedle the needle is rotating, in case of QwtDial::RotateScale, the needle points to origin() and the scale is rotating.

The default mode is QwtDial::RotateNeedle.

**See Also**

mode(), setValue(), setOrigin()

#### 12.27.4.32 void QwtDial::setNeedle ( QwtDialNeedle ∗ *needle* )

Set a needle for the dial

**Parameters**

| | |
|---|---|
| *needle* | Needle |

**Warning**

The needle will be deleted, when a different needle is set or in ∼QwtDial()

#### 12.27.4.33 void QwtDial::setOrigin ( double *origin* ) [virtual]

Change the origin.

The origin is the angle where scale and needle is relative to.

**Parameters**

| | |
|---|---|
| *origin* | New origin |

**See Also**

origin()

#### 12.27.4.34 void QwtDial::setScaleArc ( double *minArc*, double *maxArc* )

Change the arc of the scale

**Parameters**

| | |
|---|---|
| *minArc* | Lower limit |
| *maxArc* | Upper limit |

**See Also**

minScaleArc(), maxScaleArc()

#### 12.27.4.35 void QwtDial::setScaleDraw ( QwtRoundScaleDraw ∗ *scaleDraw* )

Set an individual scale draw

The motivation for setting a scale draw is often to overload QwtRoundScaleDraw::label() to return individual tick labels.

**Parameters**

| | |
|---|---|
| *scaleDraw* | Scale draw |

**Warning**

The previous scale draw is deleted

#### 12.27.4.36 QSize QwtDial::sizeHint ( ) const [virtual]

**Returns**

Size hint

**See Also**

minimumSizeHint()

#### 12.27.4.37 void QwtDial::wheelEvent ( QWheelEvent ∗ *event* ) [protected], [virtual]

Wheel Event handler

**Parameters**

| | |
|---|---|
| *event* | Wheel event |

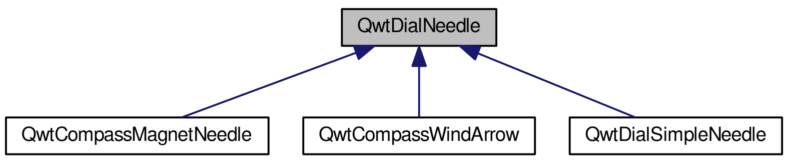
Reimplemented from QwtAbstractSlider.

## 12.28 QwtDialNeedle Class Reference

Base class for needles that can be used in a QwtDial.

`#include <qwt_dial_needle.h>`

Inheritance diagram for QwtDialNeedle:



### Public Member Functions

- QwtDialNeedle ()

  *Constructor.*
- virtual ∼QwtDialNeedle ()

  *Destructor.*
- virtual void setPalette (const QPalette &)
- const QPalette & palette () const
- virtual void draw (QPainter ∗painter, const QPointF &center, double length, double direction, QPalette::Color-Group=QPalette::Active) const

### Protected Member Functions

- virtual void drawNeedle (QPainter ∗painter, double length, QPalette::ColorGroup colorGroup) const =0

  *Draw the needle.*
- virtual void drawKnob (QPainter ∗, double width, const QBrush &, bool sunken) const

  *Draw the knob.*

## 12.28.1 Detailed Description

Base class for needles that can be used in a QwtDial.

QwtDialNeedle is a pointer that indicates a value by pointing to a specific direction.

**See Also**

QwtDial, QwtCompass

## 12.28.2 Member Function Documentation

### 12.28.2.1 void QwtDialNeedle::draw ( QPainter ∗ *painter,* const QPointF & *center,* double *length,* double *direction,* QPalette::ColorGroup *colorGroup* = `QPalette::Active` ) const `[virtual]`

Draw the needle

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *center* | Center of the dial, start position for the needle |
| *length* | Length of the needle |
| *direction* | Direction of the needle, in degrees counter clockwise |
| *colorGroup* | Color group, used for painting |

### 12.28.2.2 virtual void QwtDialNeedle::drawNeedle ( QPainter ∗ *painter,* double *length,* QPalette::ColorGroup *colorGroup* ) const `[protected]`, `[pure virtual]`

Draw the needle.

The origin of the needle is at position (0.0, 0.0 ) pointing in direction 0.0 ( = east ).

The painter is already initialized with translation and rotation.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *length* | Length of the needle |
| *colorGroup* | Color group, used for painting |

**See Also**

setPalette(), palette()

Implemented in QwtCompassWindArrow, QwtCompassMagnetNeedle, and QwtDialSimpleNeedle.

#### 12.28.2.3 const QPalette & QwtDialNeedle::palette ( ) const

**Returns**

the palette of the needle.

#### 12.28.2.4 void QwtDialNeedle::setPalette ( const QPalette & *palette* ) [virtual]

Sets the palette for the needle.

**Parameters**

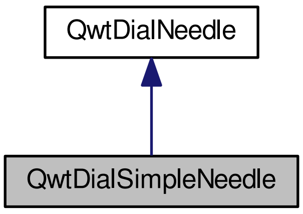
| | |
|---|---|
| *palette* | New Palette |

## 12.29 QwtDialSimpleNeedle Class Reference

A needle for dial widgets.

```
#include <qwt_dial_needle.h>
```

Inheritance diagram for QwtDialSimpleNeedle:



**Public Types**

- enum Style { Arrow, Ray }

  *Style of the needle.*

**Public Member Functions**

- QwtDialSimpleNeedle (Style, bool hasKnob=true, const QColor &mid=Qt::gray, const QColor &base=Qt::darkGray)
- void setWidth (double width)
- double width () const

**Protected Member Functions**

- virtual void drawNeedle (QPainter ∗, double length, QPalette::ColorGroup) const

### 12.29.1 Detailed Description

A needle for dial widgets.

The following colors are used:

- QPalette::Mid
  Pointer
- QPalette::Base
  Knob

**See Also**

QwtDial, QwtCompass

### 12.29.2 Member Enumeration Documentation

#### 12.29.2.1 enum QwtDialSimpleNeedle::Style

Style of the needle.

**Enumerator**

***Arrow*** Arrow.

***Ray*** A straight line from the center.

### 12.29.3 Constructor & Destructor Documentation

#### 12.29.3.1 QwtDialSimpleNeedle::QwtDialSimpleNeedle ( Style *style*, bool *hasKnob* = `true`, const QColor & *mid* = `Qt::gray`, const QColor & *base* = `Qt::darkGray` )

Constructor

**Parameters**

| | |
|---|---|
| *style* | Style |
| *hasKnob* | With/Without knob |
| *mid* | Middle color |
| *base* | Base color |

### 12.29.4 Member Function Documentation

#### 12.29.4.1 void QwtDialSimpleNeedle::drawNeedle ( QPainter ∗ *painter*, double *length*, QPalette::ColorGroup *colorGroup* ) const `[protected]`, `[virtual]`

Draw the needle

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *length* | Length of the needle |
| *colorGroup* | Color group, used for painting |

Implements QwtDialNeedle.

#### 12.29.4.2 void QwtDialSimpleNeedle::setWidth ( double *width* )

Set the width of the needle

**Parameters**

| | |
|---|---|
| *width* | Width |

**See Also**

width()

#### 12.29.4.3 double QwtDialSimpleNeedle::width ( ) const

**Returns**

the width of the needle

**See Also**

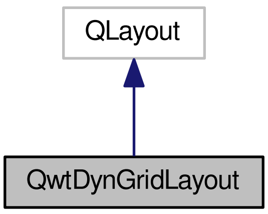
setWidth()

## 12.30 QwtDynGridLayout Class Reference

The QwtDynGridLayout class lays out widgets in a grid, adjusting the number of columns and rows to the current size.

```
#include <qwt_dyngrid_layout.h>
```

Inheritance diagram for QwtDynGridLayout:



**Public Member Functions**

- QwtDynGridLayout (QWidget ∗, int margin=0, int space=-1)
- QwtDynGridLayout (int space=-1)
- virtual ∼QwtDynGridLayout ()

  *Destructor.*

- virtual void invalidate ()

  *Invalidate all internal caches.*
- void setMaxColumns (uint maxCols)
- uint maxColumns () const

  *Return the upper limit for the number of columns.*
- uint numRows () const
- uint numColumns () const
- virtual void addItem (QLayoutItem ∗)

  *Add an item to the next free position.*
- virtual QLayoutItem ∗ itemAt (int index) const
- virtual QLayoutItem ∗ takeAt (int index)
- virtual int count () const
- void setExpandingDirections (Qt::Orientations)
- virtual Qt::Orientations expandingDirections () const

  *Returns whether this layout can make use of more space than sizeHint().*
- QList< QRect > layoutItems (const QRect &, uint numCols) const
- virtual int maxItemWidth () const
- virtual void setGeometry (const QRect &rect)
- virtual bool hasHeightForWidth () const
- virtual int heightForWidth (int) const
- virtual QSize sizeHint () const
- virtual bool isEmpty () const
- uint itemCount () const
- virtual uint columnsForWidth (int width) const

  *Calculate the number of columns for a given width.*

#### Protected Member Functions

- void layoutGrid (uint numCols, QVector< int > &rowHeight, QVector< int > &colWidth) const
- void stretchGrid (const QRect &rect, uint numCols, QVector< int > &rowHeight, QVector< int > &colWidth) const

### 12.30.1 Detailed Description

The QwtDynGridLayout class lays out widgets in a grid, adjusting the number of columns and rows to the current size.

QwtDynGridLayout takes the space it gets, divides it up into rows and columns, and puts each of the widgets it manages into the correct cell(s). It lays out as many number of columns as possible (limited by maxColumns()).

### 12.30.2 Constructor & Destructor Documentation

#### 12.30.2.1 QwtDynGridLayout::QwtDynGridLayout ( QWidget ∗ *parent*, int *margin* = 0, int *spacing* = -1 ) [explicit]

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |
| *margin* | Margin |
| *spacing* | Spacing |

#### 12.30.2.2 QwtDynGridLayout::QwtDynGridLayout ( int *spacing* = -1 ) [explicit]

**Parameters**

| | |
|---|---|
| *spacing* | Spacing |

### 12.30.3 Member Function Documentation

#### 12.30.3.1 void QwtDynGridLayout::addItem ( QLayoutItem ∗ *item* ) [virtual]

Add an item to the next free position.

**Parameters**

| | |
|---|---|
| *item* | Layout item |

#### 12.30.3.2 uint QwtDynGridLayout::columnsForWidth ( int *width* ) const [virtual]

Calculate the number of columns for a given width.

The calculation tries to use as many columns as possible ( limited by maxColumns() )

**Parameters**

| | |
|---|---|
| *width* | Available width for all columns |

**Returns**

Number of columns for a given width

**See Also**

maxColumns(), setMaxColumns()

#### 12.30.3.3 int QwtDynGridLayout::count ( ) const [virtual]

**Returns**

Number of items in the layout

#### 12.30.3.4 Qt::Orientations QwtDynGridLayout::expandingDirections ( ) const [virtual]

Returns whether this layout can make use of more space than sizeHint().

A value of Qt::Vertical or Qt::Horizontal means that it wants to grow in only one dimension, while Qt::Vertical | Qt::Horizontal means that it wants to grow in both dimensions.

**Returns**

Orientations, where the layout expands

**See Also**

setExpandingDirections()

#### 12.30.3.5 bool QwtDynGridLayout::hasHeightForWidth ( ) const [virtual]

**Returns**

true: QwtDynGridLayout implements heightForWidth().

**See Also**

heightForWidth()

#### 12.30.3.6 int QwtDynGridLayout::heightForWidth ( int *width* ) const [virtual]

**Returns**

The preferred height for this layout, given a width.

**See Also**

hasHeightForWidth()

#### 12.30.3.7 bool QwtDynGridLayout::isEmpty ( ) const [virtual]

**Returns**

true if this layout is empty.

#### 12.30.3.8 QLayoutItem $*$ QwtDynGridLayout::itemAt ( int *index* ) const [virtual]

Find the item at a specific index

**Parameters**

| | |
|---|---|
| *index* | Index |

**Returns**

Item at a specific index

**See Also**

takeAt()

#### 12.30.3.9 uint QwtDynGridLayout::itemCount ( ) const

**Returns**

number of layout items

#### 12.30.3.10 void QwtDynGridLayout::layoutGrid ( uint *numColumns,* QVector< int > & *rowHeight,* QVector< int > & *colWidth* ) const [protected]

Calculate the dimensions for the columns and rows for a grid of numColumns columns.

**Parameters**

| | |
|---|---|
| *numColumns* | Number of columns. |
| *rowHeight* | Array where to fill in the calculated row heights. |
| *colWidth* | Array where to fill in the calculated column widths. |

#### 12.30.3.11 QList< QRect > QwtDynGridLayout::layoutItems ( const QRect & *rect,* uint *numColumns* ) const

Calculate the geometries of the layout items for a layout with numColumns columns and a given rectangle.

**Parameters**

| | |
|---|---|
| *rect* | Rect where to place the items |

| | |
|---|---|
| *numColumns* | Number of columns |

**Returns**

item geometries

### 12.30.3.12 uint QwtDynGridLayout::maxColumns ( ) const

Return the upper limit for the number of columns.

0 means unlimited, what is the default.

**Returns**

Upper limit for the number of columns

**See Also**

setMaxColumns()

### 12.30.3.13 int QwtDynGridLayout::maxItemWidth ( ) const [virtual]

**Returns**

the maximum width of all layout items

### 12.30.3.14 uint QwtDynGridLayout::numColumns ( ) const

**Returns**

Number of columns of the current layout.

**See Also**

numRows()

**Warning**

The number of columns might change whenever the geometry changes

### 12.30.3.15 uint QwtDynGridLayout::numRows ( ) const

**Returns**

Number of rows of the current layout.

**See Also**

numColumns()

**Warning**

The number of rows might change whenever the geometry changes

### 12.30.3.16 void QwtDynGridLayout::setExpandingDirections ( Qt::Orientations *expanding* )

Set whether this layout can make use of more space than sizeHint(). A value of Qt::Vertical or Qt::Horizontal means that it wants to grow in only one dimension, while Qt::Vertical | Qt::Horizontal means that it wants to grow in both dimensions. The default value is 0.

**Parameters**

| | |
|---|---|
| *expanding* | Or'd orientations |

**See Also**

expandingDirections()

#### 12.30.3.17 void QwtDynGridLayout::setGeometry ( const QRect & *rect* ) [virtual]

Reorganizes columns and rows and resizes managed items within a rectangle.

**Parameters**

| | |
|---|---|
| *rect* | Layout geometry |

#### 12.30.3.18 void QwtDynGridLayout::setMaxColumns ( uint *maxColumns* )

Limit the number of columns.

**Parameters**

| | |
|---|---|
| *maxColumns* | upper limit, 0 means unlimited |

**See Also**

maxColumns()

#### 12.30.3.19 QSize QwtDynGridLayout::sizeHint ( ) const [virtual]

Return the size hint. If maxColumns() $>$ 0 it is the size for a grid with maxColumns() columns, otherwise it is the size for a grid with only one row.

**Returns**

Size hint

**See Also**

maxColumns(), setMaxColumns()

#### 12.30.3.20 void QwtDynGridLayout::stretchGrid ( const QRect & *rect*, uint *numColumns*, QVector< int > & *rowHeight*, QVector< int > & *colWidth* ) const [protected]

Stretch columns in case of expanding() & QSizePolicy::Horizontal and rows in case of expanding() & QSizePolicy::-Vertical to fill the entire rect. Rows and columns are stretched with the same factor.

**Parameters**

| | |
|---|---|
| *rect* | Bounding rectangle |
| *numColumns* | Number of columns |
| *rowHeight* | Array to be filled with the calculated row heights |
| *colWidth* | Array to be filled with the calculated column widths |

**See Also**

setExpanding(), expanding()

#### 12.30.3.21 QLayoutItem * QwtDynGridLayout::takeAt ( int *index* ) [virtual]

Find the item at a specific index and remove it from the layout

**Parameters**

| | |
|---|---|
| *index* | Index |

**Returns**

Layout item, removed from the layout

**See Also**

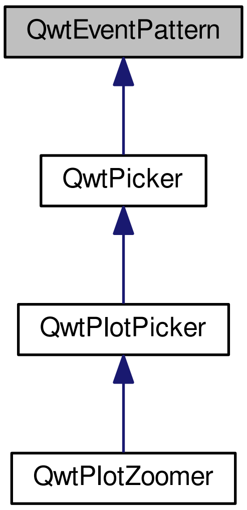
itemAt()

## 12.31 QwtEventPattern Class Reference

A collection of event patterns.

`#include <qwt_event_pattern.h>`

Inheritance diagram for QwtEventPattern:



**Classes**

- class KeyPattern

  *A pattern for key events.*
- class MousePattern

  *A pattern for mouse events.*

**Public Types**

- enum MousePatternCode {
  MouseSelect1, MouseSelect2, MouseSelect3, MouseSelect4,
  MouseSelect5, MouseSelect6, MousePatternCount }

*Symbolic mouse input codes.*

- enum KeyPatternCode {
  KeySelect1, KeySelect2, KeyAbort, KeyLeft,
  KeyRight, KeyUp, KeyDown, KeyRedo,
  KeyUndo, KeyHome, KeyPatternCount }

  *Symbolic keyboard input codes.*

**Public Member Functions**

- QwtEventPattern ()
- virtual ∼QwtEventPattern ()

  *Destructor.*
- void initMousePattern (int numButtons)
- void initKeyPattern ()
- void setMousePattern (MousePatternCode, Qt::MouseButton button, Qt::KeyboardModifiers=Qt::NoModifier)
- void setKeyPattern (KeyPatternCode, int keyCode, Qt::KeyboardModifiers modifierCodes=Qt::NoModifier)
- void setMousePattern (const QVector< MousePattern > &)

  *Change the mouse event patterns.*
- void setKeyPattern (const QVector< KeyPattern > &)

  *Change the key event patterns.*
- const QVector< MousePattern > & mousePattern () const
- const QVector< KeyPattern > & keyPattern () const
- QVector< MousePattern > & mousePattern ()
- QVector< KeyPattern > & keyPattern ()
- bool mouseMatch (MousePatternCode, const QMouseEvent ∗) const

  *Compare a mouse event with an event pattern.*
- bool keyMatch (KeyPatternCode, const QKeyEvent ∗) const

  *Compare a key event with an event pattern.*

**Protected Member Functions**

- virtual bool mouseMatch (const MousePattern &, const QMouseEvent ∗) const

  *Compare a mouse event with an event pattern.*
- virtual bool keyMatch (const KeyPattern &, const QKeyEvent ∗) const

  *Compare a key event with an event pattern.*

### 12.31.1 Detailed Description

A collection of event patterns.

QwtEventPattern introduces an level of indirection for mouse and keyboard inputs. Those are represented by symbolic names, so the application code can be configured by individual mappings.

**See Also**

QwtPicker, QwtPickerMachine, QwtPlotZoomer

### 12.31.2 Member Enumeration Documentation

#### 12.31.2.1 enum QwtEventPattern::KeyPatternCode

Symbolic keyboard input codes.

Individual settings can be configured using setKeyPattern()

**See Also**

setKeyPattern(), setMousePattern()

**Enumerator**

***KeySelect1*** Qt::Key_Return.

***KeySelect2*** Qt::Key_Space.

***KeyAbort*** Qt::Key_Escape.

***KeyLeft*** Qt::Key_Left.

***KeyRight*** Qt::Key_Right.

***KeyUp*** Qt::Key_Up.

***KeyDown*** Qt::Key_Down.

***KeyRedo*** Qt::Key_Plus.

***KeyUndo*** Qt::Key_Minus.

***KeyHome*** Qt::Key_Escape.

***KeyPatternCount*** Number of key patterns.

#### 12.31.2.2 enum QwtEventPattern::MousePatternCode

Symbolic mouse input codes.

QwtEventPattern implements 3 different settings for mice with 1, 2, or 3 buttons that can be activated using initMousePattern(). The default setting is for 3 button mice.

Individual settings can be configured using setMousePattern().

**See Also**

initMousePattern(), setMousePattern(), setKeyPattern()

**Enumerator**

***MouseSelect1*** The default setting for 1, 2 and 3 button mice is:

- Qt::LeftButton
- Qt::LeftButton
- Qt::LeftButton

***MouseSelect2*** The default setting for 1, 2 and 3 button mice is:

- Qt::LeftButton + Qt::ControlModifier
- Qt::RightButton
- Qt::RightButton

***MouseSelect3*** The default setting for 1, 2 and 3 button mice is:

- Qt::LeftButton + Qt::AltModifier
- Qt::LeftButton + Qt::AltModifier
- Qt::MidButton

***MouseSelect4*** The default setting for 1, 2 and 3 button mice is:

- Qt::LeftButton + Qt::ShiftModifier
- Qt::LeftButton + Qt::ShiftModifier
- Qt::LeftButton + Qt::ShiftModifier

***MouseSelect5*** The default setting for 1, 2 and 3 button mice is:

- Qt::LeftButton + Qt::ControlButton | Qt::ShiftModifier
- Qt::RightButton + Qt::ShiftModifier

- Qt::RightButton + Qt::ShiftModifier

***MouseSelect6*** The default setting for 1, 2 and 3 button mice is:

- Qt::LeftButton + Qt::AltModifier + Qt::ShiftModifier
- Qt::LeftButton + Qt::AltModifier | Qt::ShiftModifier
- Qt::MidButton + Qt::ShiftModifier

***MousePatternCount*** Number of mouse patterns.

### 12.31.3 Constructor & Destructor Documentation

#### 12.31.3.1 QwtEventPattern::QwtEventPattern ( )

Constructor

**See Also**

MousePatternCode, KeyPatternCode

### 12.31.4 Member Function Documentation

#### 12.31.4.1 void QwtEventPattern::initKeyPattern ( )

Set default mouse patterns.

**See Also**

KeyPatternCode

#### 12.31.4.2 void QwtEventPattern::initMousePattern ( int *numButtons* )

Set default mouse patterns, depending on the number of mouse buttons

**Parameters**

| | |
|---|---|
| *numButtons* | Number of mouse buttons ( <= 3 ) |

**See Also**

MousePatternCode

#### 12.31.4.3 bool QwtEventPattern::keyMatch ( KeyPatternCode *code*, const QKeyEvent ∗ *event* ) const

Compare a key event with an event pattern.

A key event matches the pattern when both have the same key value and in the state value the same key flags (Qt::KeyButtonMask) are set.

**Parameters**

| | |
|---|---|
| *code* | Index of the event pattern |
| *event* | Key event |

**Returns**

true if matches

**See Also**

mouseMatch()

#### 12.31.4.4 bool QwtEventPattern::keyMatch ( const KeyPattern & *pattern*, const QKeyEvent ∗ *event* ) const [protected], [virtual]

Compare a key event with an event pattern.

A key event matches the pattern when both have the same key value and in the state value the same key flags (Qt::KeyButtonMask) are set.

**Parameters**

| | |
|---|---|
| *pattern* | Key event pattern |
| *event* | Key event |

**Returns**

true if matches

**See Also**

mouseMatch()

#### 12.31.4.5 const QVector< QwtEventPattern::KeyPattern > & QwtEventPattern::keyPattern ( ) const

**Returns**

Key pattern

#### 12.31.4.6 QVector< QwtEventPattern::KeyPattern > & QwtEventPattern::keyPattern ( )

**Returns**

Key pattern

#### 12.31.4.7 bool QwtEventPattern::mouseMatch ( MousePatternCode *code*, const QMouseEvent ∗ *event* ) const

Compare a mouse event with an event pattern.

A mouse event matches the pattern when both have the same button value and in the state value the same key flags(Qt::KeyButtonMask) are set.

**Parameters**

| | |
|---|---|
| *code* | Index of the event pattern |
| *event* | Mouse event |

**Returns**

true if matches

**See Also**

keyMatch()

#### 12.31.4.8 bool QwtEventPattern::mouseMatch ( const MousePattern & *pattern*, const QMouseEvent ∗ *event* ) const [protected], [virtual]

Compare a mouse event with an event pattern.

A mouse event matches the pattern when both have the same button value and in the state value the same key flags(Qt::KeyButtonMask) are set.

**Parameters**

| | |
|---:|---|
| *pattern* | Mouse event pattern |
| *event* | Mouse event |

**Returns**

true if matches

**See Also**

keyMatch()

#### 12.31.4.9 const QVector< **QwtEventPattern::MousePattern** > & QwtEventPattern::mousePattern ( ) const

**Returns**

Mouse pattern

#### 12.31.4.10 QVector< **QwtEventPattern::MousePattern** > & QwtEventPattern::mousePattern ( )

**Returns**

Mouse pattern

#### 12.31.4.11 void QwtEventPattern::setKeyPattern ( **KeyPatternCode** *pattern*, int *key*, Qt::KeyboardModifiers *modifiers* = `Qt::NoModifier` )

Change one key pattern

**Parameters**

| | |
|---:|---|
| *pattern* | Index of the pattern |
| *key* | Key |
| *modifiers* | Keyboard modifiers |

**See Also**

QKeyEvent

#### 12.31.4.12 void QwtEventPattern::setMousePattern ( **MousePatternCode** *pattern*, Qt::MouseButton *button*, Qt::KeyboardModifiers *modifiers* = `Qt::NoModifier` )

Change one mouse pattern

**Parameters**

| | |
|---:|---|
| *pattern* | Index of the pattern |
| *button* | Button |
| *modifiers* | Keyboard modifiers |

**See Also**

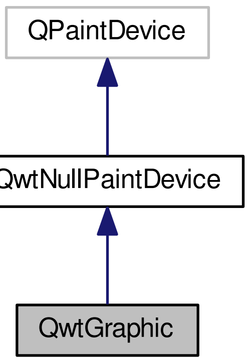
QMouseEvent

## 12.32 QwtGraphic Class Reference

A paint device for scalable graphics.

```
#include <qwt_graphic.h>
```

Inheritance diagram for QwtGraphic:



**Public Types**

- enum RenderHint { RenderPensUnscaled = 0x1 }
- typedef QFlags< RenderHint > RenderHints

  *Render hints.*

**Public Member Functions**

- QwtGraphic ()

  *Constructor.*
- QwtGraphic (const QwtGraphic &)

  *Copy constructor.*
- virtual ∼QwtGraphic ()

  *Destructor.*
- QwtGraphic & operator= (const QwtGraphic &)

  *Assignment operator.*
- void reset ()

  *Clear all stored commands.*
- bool isNull () const
- bool isEmpty () const
- void render (QPainter ∗) const

  *Replay all recorded painter commands.*
- void render (QPainter ∗, const QSizeF &, Qt::AspectRatioMode=Qt::IgnoreAspectRatio) const

  *Replay all recorded painter commands.*
- void render (QPainter ∗, const QRectF &, Qt::AspectRatioMode=Qt::IgnoreAspectRatio) const

  *Replay all recorded painter commands.*
- void render (QPainter ∗, const QPointF &, Qt::Alignment=Qt::AlignTop|Qt::AlignLeft) const

  *Replay all recorded painter commands.*
- QPixmap toPixmap () const

  *Convert the graphic to a QPixmap.*
- QPixmap toPixmap (const QSize &, Qt::AspectRatioMode=Qt::IgnoreAspectRatio) const

*Convert the graphic to a QPixmap.*

- QImage toImage () const

  *Convert the graphic to a QImage.*
- QImage toImage (const QSize &, Qt::AspectRatioMode=Qt::IgnoreAspectRatio) const

  *Convert the graphic to a QImage.*
- QRectF scaledBoundingRect (double sx, double sy) const

  *Calculate the target rectangle for scaling the graphic.*
- QRectF boundingRect () const
- QRectF controlPointRect () const
- const QVector
  < QwtPainterCommand > & commands () const
- void setCommands (QVector< QwtPainterCommand > &)

  *Append paint commands.*
- void setDefaultSize (const QSizeF &)

  *Set a default size.*
- QSizeF defaultSize () const

  *Default size.*
- void setRenderHint (RenderHint, bool on=true)
- bool testRenderHint (RenderHint) const

#### Protected Member Functions

- virtual QSize sizeMetrics () const
- virtual void drawPath (const QPainterPath &)
- virtual void drawPixmap (const QRectF &, const QPixmap &, const QRectF &)

  *Store a pixmap command in the command list.*
- virtual void drawImage (const QRectF &, const QImage &, const QRectF &, Qt::ImageConversionFlags)

  *Store a image command in the command list.*
- virtual void updateState (const QPaintEngineState &state)

  *Store a state command in the command list.*

### 12.32.1 Detailed Description

A paint device for scalable graphics.

QwtGraphic is the representation of a graphic that is tailored for scalability. Like QPicture it will be initialized by QPainter operations and can be replayed later to any target paint device.

While the usual image representations QImage and QPixmap are not scalable Qt offers two paint devices, that might be candidates for representing a vector graphic:

- QPicture

  Unfortunately QPicture had been forgotten, when Qt4 introduced floating point based render engines. Its API is still on integers, what make it unusable for proper scaling.

- QSvgRenderer/QSvgGenerator

  Unfortunately QSvgRenderer hides to much information about its nodes in internal APIs, that are necessary for proper layout calculations. Also it is derived from QObject and can't be copied like QImage/QPixmap.

QwtGraphic maps all scalable drawing primitives to a QPainterPath and stores them together with the painter state changes ( pen, brush, transformation ... ) in a list of QwtPaintCommands. For being a complete QPaintDevice it also stores pixmaps or images, what is somehow against the idea of the class, because these objects can't be scaled without a loss in quality.

The main issue about scaling a QwtGraphic object are the pens used for drawing the outlines of the painter paths. While non cosmetic pens ( QPen::isCosmetic() ) are scaled with the same ratio as the path, cosmetic pens have a fixed width. A graphic might have paths with different pens - cosmetic and non-cosmetic.

QwtGraphic caches 2 different rectangles:

- control point rectangle

  The control point rectangle is the bounding rectangle of all control point rectangles of the painter paths, or the target rectangle of the pixmaps/images.

- bounding rectangle

  The bounding rectangle extends the control point rectangle by what is needed for rendering the outline with an unscaled pen.

Because the offset for drawing the outline depends on the shape of the painter path ( the peak of a triangle is different than the flat side ) scaling with a fixed aspect ratio always needs to be calculated from the control point rectangle.

**See Also**

QwtPainterCommand

### 12.32.2 Member Typedef Documentation

#### 12.32.2.1 typedef QFlags<RenderHint> QwtGraphic::RenderHints

Render hints.

The default setting is to disable all hints

### 12.32.3 Member Enumeration Documentation

#### 12.32.3.1 enum QwtGraphic::RenderHint

Hint how to render a graphic

**See Also**

setRenderHint(), testRenderHint()

**Enumerator**

***RenderPensUnscaled*** When rendering a QwtGraphic a specific scaling between the controlPointRect() and the coordinates of the target rectangle is set up internally in render().

When RenderPensUnscaled is set this specific scaling is applied for the control points only, but not for the pens. All other painter transformations ( set up by application code ) are supposed to work like usual.

**See Also**

render();

### 12.32.4 Constructor & Destructor Documentation

#### 12.32.4.1 QwtGraphic::QwtGraphic ( )

Constructor.

Initializes a null graphic

**See Also**

isNull()

#### 12.32.4.2 QwtGraphic::QwtGraphic ( const QwtGraphic & *other* )

Copy constructor.

**Parameters**

| | |
|---|---|
| *other* | Source |

**See Also**

operator=()

### 12.32.5 Member Function Documentation

#### 12.32.5.1 QRectF QwtGraphic::boundingRect ( ) const

The bounding rectangle is the controlPointRect() extended by the areas needed for rendering the outlines with unscaled pens.

**Returns**

Bounding rectangle of the graphic

**See Also**

controlPointRect(), scaledBoundingRect()

#### 12.32.5.2 const QVector< QwtPainterCommand > & QwtGraphic::commands ( ) const

**Returns**

List of recorded paint commands

**See Also**

setCommands()

#### 12.32.5.3 QRectF QwtGraphic::controlPointRect ( ) const

The control point rectangle is the bounding rectangle of all control points of the paths and the target rectangles of the images/pixmaps.

**Returns**

Control point rectangle

**See Also**

boundingRect(), scaledBoundingRect()

#### 12.32.5.4 QSizeF QwtGraphic::defaultSize ( ) const

Default size.

When a non empty size has been assigned by setDefaultSize() this size will be returned. Otherwise the default size is the size of the bounding rectangle.

The default size is used in all methods rendering the graphic, where no size is explicitly specified.

**Returns**

Default size

**See Also**

setDefaultSize(), boundingRect()

#### 12.32.5.5 void QwtGraphic::drawImage ( const QRectF & *rect,* const QImage & *image,* const QRectF & *subRect,* Qt::ImageConversionFlags *flags* ) `[protected]`, `[virtual]`

Store a image command in the command list.

**Parameters**

| | |
|---|---|
| *rect* | traget rectangle |
| *image* | Image to be painted |
| *subRect* | Reactangle of the pixmap to be painted |
| *flags* | Image conversion flags |

**See Also**

QPaintEngine::drawImage()

Reimplemented from QwtNullPaintDevice.

#### 12.32.5.6 void QwtGraphic::drawPath ( const QPainterPath & *path* ) [protected], [virtual]

Store a path command in the command list

**Parameters**

| | |
|---|---|
| *path* | Painter path |

**See Also**

QPaintEngine::drawPath()

Reimplemented from QwtNullPaintDevice.

#### 12.32.5.7 void QwtGraphic::drawPixmap ( const QRectF & *rect*, const QPixmap & *pixmap*, const QRectF & *subRect* ) [protected], [virtual]

Store a pixmap command in the command list.

**Parameters**

| | |
|---|---|
| *rect* | target rectangle |
| *pixmap* | Pixmap to be painted |
| *subRect* | Reactangle of the pixmap to be painted |

**See Also**

QPaintEngine::drawPixmap()

Reimplemented from QwtNullPaintDevice.

#### 12.32.5.8 bool QwtGraphic::isEmpty ( ) const

**Returns**

True, when the bounding rectangle is empty

**See Also**

boundingRect(), isNull()

#### 12.32.5.9 bool QwtGraphic::isNull ( ) const

**Returns**

True, when no painter commands have been stored

**See Also**

isEmpty(), commands()

#### 12.32.5.10 QwtGraphic & QwtGraphic::operator= ( const QwtGraphic & *other* )

Assignment operator.

**Parameters**

| | |
|---|---|
| *other* | Source |

**Returns**

A reference of this object

#### 12.32.5.11 void QwtGraphic::render ( QPainter ∗ *painter* ) const

Replay all recorded painter commands.

**Parameters**

| | |
|---|---|
| *painter* | Qt painter |

#### 12.32.5.12 void QwtGraphic::render ( QPainter ∗ *painter,* const QSizeF & *size,* Qt::AspectRatioMode *aspectRatioMode =* `Qt::IgnoreAspectRatio` ) const

Replay all recorded painter commands.

The graphic is scaled to fit into the rectangle of the given size starting at ( 0, 0 ).

**Parameters**

| | |
|---|---|
| *painter* | Qt painter |
| *size* | Size for the scaled graphic |
| *aspectRatio-Mode* | Mode how to scale - See Qt::AspectRatioMode |

#### 12.32.5.13 void QwtGraphic::render ( QPainter ∗ *painter,* const QRectF & *rect,* Qt::AspectRatioMode *aspectRatioMode =* `Qt::IgnoreAspectRatio` ) const

Replay all recorded painter commands.

The graphic is scaled to fit into the given rectangle

**Parameters**

| | |
|---|---|
| *painter* | Qt painter |
| *rect* | Rectangle for the scaled graphic |
| *aspectRatio-Mode* | Mode how to scale - See Qt::AspectRatioMode |

#### 12.32.5.14 void QwtGraphic::render ( QPainter ∗ *painter,* const QPointF & *pos,* Qt::Alignment *alignment =* `Qt::AlignTop | Qt::AlignLeft` ) const

Replay all recorded painter commands.

The graphic is scaled to the defaultSize() and aligned to a position.

**Parameters**

| | |
|---|---|
| *painter* | Qt painter |
| *pos* | Reference point, where to render |
| *alignment* | Flags how to align the target rectangle to pos. |

#### 12.32.5.15 void QwtGraphic::reset ( )

Clear all stored commands.

**See Also**

isNull()

#### 12.32.5.16 QRectF QwtGraphic::scaledBoundingRect ( double *sx,* double *sy* ) const

Calculate the target rectangle for scaling the graphic.

**Parameters**

| | |
|---:|---|
| *sx* | Horizontal scaling factor |
| *sy* | Vertical scaling factor |

**Note**

In case of paths that are painted with a cosmetic pen ( see QPen::isCosmetic() ) the target rectangle is different to multiplying the bounding rectangle.

**Returns**

Scaled bounding rectangle

**See Also**

boundingRect(), controlPointRect()

#### 12.32.5.17 void QwtGraphic::setCommands ( QVector< **QwtPainterCommand** > & *commands* )

Append paint commands.

**Parameters**

| | |
|---:|---|
| *commands* | Paint commands |

**See Also**

commands()

#### 12.32.5.18 void QwtGraphic::setDefaultSize ( const QSizeF & *size* )

Set a default size.

The default size is used in all methods rendering the graphic, where no size is explicitly specified. Assigning an empty size means, that the default size will be calculated from the bounding rectangle.

The default setting is an empty size.

**Parameters**

| | |
|---:|---|
| *size* | Default size |

**See Also**

defaultSize(), boundingRect()

#### 12.32.5.19 void QwtGraphic::setRenderHint ( **RenderHint** *hint,* bool *on* = `true` )

Toggle an render hint

**Parameters**

| | |
|---|---|
| *hint* | Render hint |
| *on* | true/false |

**See Also**

testRenderHint(), RenderHint

#### 12.32.5.20 QSize QwtGraphic::sizeMetrics ( ) const [protected], [virtual]

**Returns**

Ceiled defaultSize()

Implements QwtNullPaintDevice.

#### 12.32.5.21 bool QwtGraphic::testRenderHint ( RenderHint *hint* ) const

Test a render hint

**Parameters**

| | |
|---|---|
| *hint* | Render hint |

**Returns**

true/false

**See Also**

setRenderHint(), RenderHint

#### 12.32.5.22 QImage QwtGraphic::toImage ( ) const

Convert the graphic to a QImage.

All pixels of the image get initialized by 0 ( transparent ) before the graphic is scaled and rendered on it.

The format of the image is QImage::Format_ARGB32_Premultiplied.

The size of the image is the default size ( ceiled to integers ) of the graphic.

**Returns**

The graphic as image in default size

**See Also**

defaultSize(), toPixmap(), render()

#### 12.32.5.23 QImage QwtGraphic::toImage ( const QSize & *size*, Qt::AspectRatioMode *aspectRatioMode* = Qt::IgnoreAspectRatio ) const

Convert the graphic to a QImage.

All pixels of the image get initialized by 0 ( transparent ) before the graphic is scaled and rendered on it.

The format of the image is QImage::Format_ARGB32_Premultiplied.

**Parameters**

| | |
|---|---|
| *size* | Size of the image |
| *aspectRatio-Mode* | Aspect ratio how to scale the graphic |

**Returns**

The graphic as image

**See Also**

toPixmap(), render()

#### 12.32.5.24 QPixmap QwtGraphic::toPixmap ( ) const

Convert the graphic to a QPixmap.

All pixels of the pixmap get initialized by Qt::transparent before the graphic is scaled and rendered on it.

The size of the pixmap is the default size ( ceiled to integers ) of the graphic.

**Returns**

The graphic as pixmap in default size

**See Also**

defaultSize(), toImage(), render()

#### 12.32.5.25 QPixmap QwtGraphic::toPixmap ( const QSize & *size*, Qt::AspectRatioMode *aspectRatioMode* = `Qt::IgnoreAspectRatio` ) const

Convert the graphic to a QPixmap.

All pixels of the pixmap get initialized by Qt::transparent before the graphic is scaled and rendered on it.

**Parameters**

| | |
|---|---|
| *size* | Size of the image |
| *aspectRatio-Mode* | Aspect ratio how to scale the graphic |

**Returns**

The graphic as pixmap

**See Also**

toImage(), render()

#### 12.32.5.26 void QwtGraphic::updateState ( const QPaintEngineState & *state* ) `[protected]`, `[virtual]`

Store a state command in the command list.

#### Parameters

| | |
|---|---|
| *state* | State to be stored |

#### See Also

QPaintEngine::updateState()

Reimplemented from QwtNullPaintDevice.

### 12.33 QwtInterval Class Reference

A class representing an interval.

```
#include <qwt_interval.h>
```

#### Public Types

- enum BorderFlag { IncludeBorders = 0x00, ExcludeMinimum = 0x01, ExcludeMaximum = 0x02, Exclude-Borders = ExcludeMinimum | ExcludeMaximum }
- typedef QFlags< BorderFlag > BorderFlags

  *Border flags.*

#### Public Member Functions

- QwtInterval ()

  *Default Constructor.*
- QwtInterval (double minValue, double maxValue, BorderFlags=IncludeBorders)
- void setInterval (double minValue, double maxValue, BorderFlags=IncludeBorders)
- QwtInterval normalized () const

  *Normalize the limits of the interval.*
- QwtInterval inverted () const
- QwtInterval limited (double minValue, double maxValue) const
- bool operator== (const QwtInterval &) const

  *Compare two intervals.*
- bool operator!= (const QwtInterval &) const

  *Compare two intervals.*
- void setBorderFlags (BorderFlags)
- BorderFlags borderFlags () const
- double minValue () const
- double maxValue () const
- double width () const

  *Return the width of an interval.*
- void setMinValue (double)
- void setMaxValue (double)
- bool contains (double value) const
- bool intersects (const QwtInterval &) const

  *Test if two intervals overlap.*
- QwtInterval intersect (const QwtInterval &) const

  *Intersect 2 intervals.*
- QwtInterval unite (const QwtInterval &) const

  *Unite 2 intervals.*
- QwtInterval operator| (const QwtInterval &) const

- QwtInterval operator& (const QwtInterval &) const

  *Intersection of two intervals.*
- QwtInterval & operator\|= (const QwtInterval &)

  *Unite this interval with the given interval.*
- QwtInterval & operator&= (const QwtInterval &)

  *Intersect this interval with the given interval.*
- QwtInterval extend (double value) const

  *Extend the interval.*
- QwtInterval operator\| (double) const
- QwtInterval & operator\|= (double)
- bool isValid () const
- bool isNull () const
- void invalidate ()
- QwtInterval symmetrize (double value) const

### 12.33.1 Detailed Description

A class representing an interval.

The interval is represented by 2 doubles, the lower and the upper limit.

### 12.33.2 Member Enumeration Documentation

#### 12.33.2.1 enum QwtInterval::BorderFlag

Flag indicating if a border is included or excluded

**See Also**

setBorderFlags(), borderFlags()

**Enumerator**

***IncludeBorders*** Min/Max values are inside the interval.

***ExcludeMinimum*** Min value is not included in the interval.

***ExcludeMaximum*** Max value is not included in the interval.

***ExcludeBorders*** Min/Max values are not included in the interval.

### 12.33.3 Constructor & Destructor Documentation

#### 12.33.3.1 QwtInterval::QwtInterval ( ) [inline]

Default Constructor.

Creates an invalid interval [0.0, -1.0]

**See Also**

setInterval(), isValid()

#### 12.33.3.2 QwtInterval::QwtInterval ( double *minValue*, double *maxValue*, BorderFlags *borderFlags* = IncludeBorders ) [inline]

Constructor

Build an interval with from min/max values

**Parameters**

| | |
|---|---|
| *minValue* | Minimum value |
| *maxValue* | Maximum value |
| *borderFlags* | Include/Exclude borders |

### 12.33.4 Member Function Documentation

#### 12.33.4.1 QwtInterval::BorderFlags QwtInterval::borderFlags ( ) const [inline]

**Returns**

Border flags

**See Also**

setBorderFlags()

#### 12.33.4.2 bool QwtInterval::contains ( double *value* ) const

Test if a value is inside an interval

**Parameters**

| | |
|---|---|
| *value* | Value |

**Returns**

true, if value >= minValue() && value <= maxValue()

#### 12.33.4.3 QwtInterval QwtInterval::extend ( double *value* ) const

Extend the interval.

If value is below minValue(), value becomes the lower limit. If value is above maxValue(), value becomes the upper limit.

extend() has no effect for invalid intervals

**Parameters**

| | |
|---|---|
| *value* | Value |

**Returns**

extended interval

**See Also**

isValid()

#### 12.33.4.4 QwtInterval QwtInterval::intersect ( const QwtInterval & *other* ) const

Intersect 2 intervals.

**Parameters**

| | |
|---|---|
| *other* | Interval to be intersect with |

**Returns**

Intersection

#### 12.33.4.5 bool QwtInterval::intersects ( const QwtInterval & *other* ) const

Test if two intervals overlap.

**Parameters**

| | |
|---|---|
| *other* | Interval |

**Returns**

True, when the intervals are intersecting

#### 12.33.4.6 void QwtInterval::invalidate ( ) `[inline]`

Invalidate the interval

The limits are set to interval [0.0, -1.0]

**See Also**

isValid()

#### 12.33.4.7 QwtInterval QwtInterval::inverted ( ) const

Invert the limits of the interval

**Returns**

Inverted interval

**See Also**

normalized()

#### 12.33.4.8 bool QwtInterval::isNull ( ) const `[inline]`

**Returns**

true, if isValid() && (minValue() >= maxValue())

#### 12.33.4.9 bool QwtInterval::isValid ( ) const `[inline]`

A interval is valid when minValue() <= maxValue(). In case of QwtInterval::ExcludeBorders it is true when minValue() < maxValue()

**Returns**

True, when the interval is valid

#### 12.33.4.10 QwtInterval QwtInterval::limited ( double *lowerBound*, double *upperBound* ) const

Limit the interval, keeping the border modes

**Parameters**

|  |  |
|---|---|
| *lowerBound* | Lower limit |
| *upperBound* | Upper limit |

**Returns**

Limited interval

### 12.33.4.11 double QwtInterval::maxValue ( ) const [inline]

**Returns**

Upper limit of the interval

### 12.33.4.12 double QwtInterval::minValue ( ) const [inline]

**Returns**

Lower limit of the interval

### 12.33.4.13 QwtInterval QwtInterval::normalized ( ) const

Normalize the limits of the interval.

If maxValue() < minValue() the limits will be inverted.

**Returns**

Normalized interval

**See Also**

isValid(), inverted()

### 12.33.4.14 bool QwtInterval::operator!= ( const QwtInterval & *other* ) const [inline]

Compare two intervals.

**Parameters**

|  |  |
|---|---|
| *other* | Interval to compare with |

**Returns**

True, when this and other are not equal

### 12.33.4.15 QwtInterval QwtInterval::operator& ( const QwtInterval & *other* ) const [inline]

Intersection of two intervals.

**Parameters**

|  |  |
|---|---|
| *other* | Interval to intersect with |

**Returns**

Intersection of this and other

**See Also**

intersect()

#### 12.33.4.16 QwtInterval & QwtInterval::operator&= ( const QwtInterval & *other* )

Intersect this interval with the given interval.

**Parameters**

| | |
|---|---|
| *other* | Interval to be intersected with |

**Returns**

This interval

#### 12.33.4.17 bool QwtInterval::operator== ( const QwtInterval & *other* ) const [inline]

Compare two intervals.

**Parameters**

| | |
|---|---|
| *other* | Interval to compare with |

**Returns**

True, when this and other are equal

#### 12.33.4.18 QwtInterval QwtInterval::operator\| ( const QwtInterval & *other* ) const [inline]

Union of two intervals

**Parameters**

| | |
|---|---|
| *other* | Interval to unite with |

**Returns**

Union of this and other

**See Also**

unite()

#### 12.33.4.19 QwtInterval QwtInterval::operator\| ( double *value* ) const [inline]

Extend an interval

**Parameters**

| | |
|---|---|
| *value* | Value |

**Returns**

Extended interval

**See Also**

extend()

#### 12.33.4.20 QwtInterval & QwtInterval::operator\|= ( const QwtInterval & *other* )

Unite this interval with the given interval.

**Parameters**

| | |
|---|---|
| *other* | Interval to be united with |

**Returns**

This interval

#### 12.33.4.21 QwtInterval & QwtInterval::operator\|= ( double *value* )

Extend an interval

**Parameters**

| | |
|---|---|
| *value* | Value |

**Returns**

Reference of the extended interval

**See Also**

extend()

#### 12.33.4.22 void QwtInterval::setBorderFlags ( BorderFlags *borderFlags* ) [inline]

Change the border flags

**Parameters**

| | |
|---|---|
| *borderFlags* | Or'd BorderMode flags |

**See Also**

borderFlags()

#### 12.33.4.23 void QwtInterval::setInterval ( double *minValue,* double *maxValue,* BorderFlags *borderFlags* = IncludeBorders ) [inline]

Assign the limits of the interval

**Parameters**

| | |
|---|---|
| *minValue* | Minimum value |
| *maxValue* | Maximum value |
| *borderFlags* | Include/Exclude borders |

#### 12.33.4.24 void QwtInterval::setMaxValue ( double *maxValue* ) [inline]

Assign the upper limit of the interval

**Parameters**

| | |
|---|---|
| *maxValue* | Maximum value |

#### 12.33.4.25 void QwtInterval::setMinValue ( double *minValue* ) [inline]

Assign the lower limit of the interval

**Parameters**

| | |
|---|---|
| *minValue* | Minimum value |

#### 12.33.4.26 QwtInterval QwtInterval::symmetrize ( double *value* ) const

Adjust the limit that is closer to value, so that value becomes the center of the interval.

**Parameters**

| | |
|---|---|
| *value* | Center |

**Returns**

Interval with value as center

#### 12.33.4.27 double QwtInterval::width ( ) const [inline]

Return the width of an interval.

The width of invalid intervals is 0.0, otherwise the result is maxValue() - minValue().

**Returns**

Interval width

**See Also**

isValid()

## 12.34 QwtIntervalSample Class Reference

A sample of the types (x1-x2, y) or (x, y1-y2)

```
#include <qwt_samples.h>
```

**Public Member Functions**

- QwtIntervalSample ()
- QwtIntervalSample (double, const QwtInterval &)

  *Constructor.*
- QwtIntervalSample (double value, double min, double max)

  *Constructor.*
- bool operator== (const QwtIntervalSample &) const

  *Compare operator.*
- bool operator!= (const QwtIntervalSample &) const

  *Compare operator.*

**Public Attributes**

- double value

  *Value.*
- QwtInterval interval

  *Interval.*

### 12.34.1 Detailed Description

A sample of the types (x1-x2, y) or (x, y1-y2)

### 12.34.2 Constructor & Destructor Documentation

#### 12.34.2.1 QwtIntervalSample::QwtIntervalSample ( ) [inline]

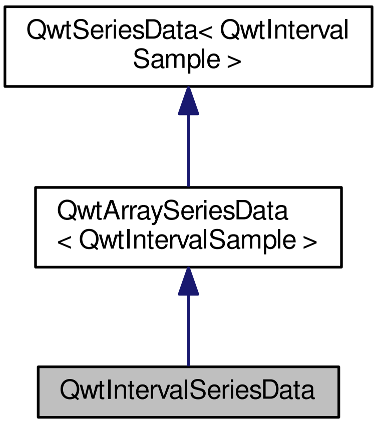
Constructor The value is set to 0.0, the interval is invalid

## 12.35 QwtIntervalSeriesData Class Reference

Interface for iterating over an array of intervals.

`#include <qwt_series_data.h>`

Inheritance diagram for QwtIntervalSeriesData:


QwtSeriesData< QwtInterval Sample >
QwtArraySeriesData < QwtIntervalSample >
QwtIntervalSeriesData

#### Public Member Functions

- QwtIntervalSeriesData (const QVector< QwtIntervalSample > &=QVector< QwtIntervalSample >())
- virtual QRectF boundingRect () const

  *Calculate the bounding rectangle.*

#### Additional Inherited Members

### 12.35.1 Detailed Description

Interface for iterating over an array of intervals.

### 12.35.2 Constructor & Destructor Documentation

#### 12.35.2.1 QwtIntervalSeriesData::QwtIntervalSeriesData ( const QVector< QwtIntervalSample > & *samples* = QVector<QwtIntervalSample>() )

Constructor

**Parameters**

| | |
|---|---|
| *samples* | Samples |

### 12.35.3 Member Function Documentation

#### 12.35.3.1 QRectF QwtIntervalSeriesData::boundingRect ( ) const [virtual]

Calculate the bounding rectangle.

The bounding rectangle is calculated once by iterating over all points and is stored for all following requests.

**Returns**

Bounding rectangle

Implements QwtSeriesData< QwtIntervalSample >.

## 12.36 QwtIntervalSymbol Class Reference

A drawing primitive for displaying an interval like an error bar.

`#include <qwt_interval_symbol.h>`

**Public Types**

- enum Style { NoSymbol = -1, Bar, Box, UserSymbol = 1000 }

  *Symbol style.*

**Public Member Functions**

- QwtIntervalSymbol (Style=NoSymbol)
- QwtIntervalSymbol (const QwtIntervalSymbol &)

  *Copy constructor.*
- virtual ∼QwtIntervalSymbol ()

  *Destructor.*
- QwtIntervalSymbol & operator= (const QwtIntervalSymbol &)

  *Assignment operator.*
- bool operator== (const QwtIntervalSymbol &) const

  *Compare two symbols.*
- bool operator!= (const QwtIntervalSymbol &) const

  *Compare two symbols.*
- void setWidth (int)
- int width () const
- void setBrush (const QBrush &b)

  *Assign a brush.*
- const QBrush & brush () const
- void setPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setPen (const QPen &)
- const QPen & pen () const
- void setStyle (Style)
- Style style () const
- virtual void draw (QPainter ∗, Qt::Orientation, const QPointF &from, const QPointF &to) const

### 12.36.1 Detailed Description

A drawing primitive for displaying an interval like an error bar.

**See Also**

QwtPlotIntervalCurve

### 12.36.2 Member Enumeration Documentation

#### 12.36.2.1 enum QwtIntervalSymbol::Style

Symbol style.

**Enumerator**

***NoSymbol*** No Style. The symbol cannot be drawn.

***Bar*** The symbol displays a line with caps at the beginning/end. The size of the caps depends on the symbol width().

***Box*** The symbol displays a plain rectangle using pen() and brush(). The size of the rectangle depends on the translated interval and the width(),

***UserSymbol*** Styles >= UserSymbol are reserved for derived classes of QwtIntervalSymbol that overload draw() with additional application specific symbol types.

### 12.36.3 Constructor & Destructor Documentation

#### 12.36.3.1 QwtIntervalSymbol::QwtIntervalSymbol ( Style *style* = NoSymbol )

Constructor

**Parameters**

| | |
|---|---|
| *style* | Style of the symbol |

**See Also**

setStyle(), style(), Style

### 12.36.4 Member Function Documentation

#### 12.36.4.1 const QBrush & QwtIntervalSymbol::brush ( ) const

**Returns**

Brush

**See Also**

setBrush()

#### 12.36.4.2 void QwtIntervalSymbol::draw ( QPainter ∗ *painter,* Qt::Orientation *orientation,* const QPointF & *from,* const QPointF & *to* ) const [virtual]

Draw a symbol depending on its style

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *orientation* | Orientation |
| *from* | Start point of the interval in target device coordinates |
| *to* | End point of the interval in target device coordinates |

**See Also**

setStyle()

#### 12.36.4.3 const QPen & QwtIntervalSymbol::pen ( ) const

**Returns**

Pen

**See Also**

setPen(), brush()

#### 12.36.4.4 void QwtIntervalSymbol::setBrush ( const QBrush & *brush* )

Assign a brush.

The brush is used for the Box style.

**Parameters**

| | |
|---:|---|
| *brush* | Brush |

**See Also**

brush()

#### 12.36.4.5 void QwtIntervalSymbol::setPen ( const QColor & *color*, qreal *width* = `0.0`, Qt::PenStyle *style* = `Qt::SolidLine` )

Build and assign a pen

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---:|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.36.4.6 void QwtIntervalSymbol::setPen ( const QPen & *pen* )

Assign a pen

**Parameters**

| | |
|---|---|
| *pen* | Pen |

**See Also**

pen(), setBrush()

#### 12.36.4.7 void QwtIntervalSymbol::setStyle ( Style *style* )

Specify the symbol style

**Parameters**

| | |
|---|---|
| *style* | Style |

**See Also**

style(), Style

#### 12.36.4.8 void QwtIntervalSymbol::setWidth ( int *width* )

Specify the width of the symbol It is used depending on the style.

**Parameters**

| | |
|---|---|
| *width* | Width |

**See Also**

width(), setStyle()

#### 12.36.4.9 QwtIntervalSymbol::Style QwtIntervalSymbol::style ( ) const

**Returns**

Current symbol style

**See Also**

setStyle()

#### 12.36.4.10 int QwtIntervalSymbol::width ( ) const

**Returns**

Width of the symbol.

**See Also**

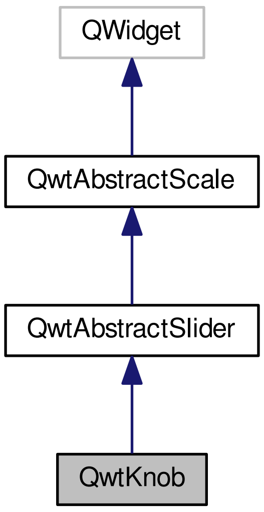
setWidth(), setStyle()

## 12.37 QwtKnob Class Reference

The Knob Widget.

```
#include <qwt_knob.h>
```

Inheritance diagram for QwtKnob:



#### Public Types

- enum KnobStyle { Flat, Raised, Sunken, Styled }

  *Style of the knob surface.*
- enum MarkerStyle {
  NoMarker = -1, Tick, Triangle, Dot,
  Nub, Notch }

  *Marker type.*

#### Public Member Functions

- QwtKnob (QWidget ∗parent=NULL)

  *Constructor.*
- virtual ∼QwtKnob ()

  *Destructor.*
- void setAlignment (Qt::Alignment)

  *Set the alignment of the knob.*
- Qt::Alignment alignment () const
- void setKnobWidth (int)

  *Change the knob's width.*
- int knobWidth () const

  *Return the width of the knob.*
- void setNumTurns (int)

  *Set the number of turns.*
- int numTurns () const
- void setTotalAngle (double angle)

  *Set the total angle by which the knob can be turned.*
- double totalAngle () const

- void setKnobStyle (KnobStyle)

  *Set the knob type.*
- KnobStyle knobStyle () const
- void setBorderWidth (int bw)

  *Set the knob's border width.*
- int borderWidth () const

  *Return the border width.*
- void setMarkerStyle (MarkerStyle)

  *Set the marker type of the knob.*
- MarkerStyle markerStyle () const
- void setMarkerSize (int)

  *Set the size of the marker.*
- int markerSize () const
- virtual QSize sizeHint () const
- virtual QSize minimumSizeHint () const
- void setScaleDraw (QwtRoundScaleDraw ∗)
- const QwtRoundScaleDraw ∗ scaleDraw () const
- QwtRoundScaleDraw ∗ scaleDraw ()
- QRect knobRect () const

#### Protected Member Functions

- virtual void paintEvent (QPaintEvent ∗)
- virtual void changeEvent (QEvent ∗)
- virtual void drawKnob (QPainter ∗, const QRectF &) const

  *Draw the knob.*
- virtual void drawFocusIndicator (QPainter ∗) const
- virtual void drawMarker (QPainter ∗, const QRectF &, double arc) const

  *Draw the marker at the knob's front.*
- virtual double scrolledTo (const QPoint &) const

  *Determine the value for a new position of the mouse.*
- virtual bool isScrollPosition (const QPoint &) const

  *Determine what to do when the user presses a mouse button.*

#### Additional Inherited Members

### 12.37.1 Detailed Description

The Knob Widget.

The QwtKnob widget imitates look and behavior of a volume knob on a radio. It looks similar to QDial - not to QwtDial.

The value range of a knob might be divided into several turns.

The layout of the knob depends on the knobWidth().

- width $>$ 0 The diameter of the knob is fixed and the knob is aligned according to the alignment() flags inside of the contentsRect().
- width $<=$ 0 The knob is extended to the minimum of width/height of the contentsRect() and aligned in the other direction according to alignment().

Setting a fixed knobWidth() is helpful to align several knobs with different scale labels.

### 12.37.2 Member Enumeration Documentation

#### 12.37.2.1 enum QwtKnob::KnobStyle

Style of the knob surface.

Depending on the KnobStyle the surface of the knob is filled from the brushes of the widget palette().

**See Also**

setKnobStyle(), knobStyle()

**Enumerator**

***Flat*** Fill the knob with a brush from QPalette::Button.

***Raised*** Build a gradient from QPalette::Midlight and QPalette::Button.

***Sunken*** Build a gradient from QPalette::Midlight, QPalette::Button and QPalette::Midlight

***Styled*** Build a radial gradient from QPalette::Button like it is used for QDial in various Qt styles.

#### 12.37.2.2 enum QwtKnob::MarkerStyle

Marker type.

The marker indicates the current value on the knob The default setting is a Notch marker.

**See Also**

setMarkerStyle(), setMarkerSize()

**Enumerator**

***NoMarker*** Don't paint any marker.

***Tick*** Paint a single tick in QPalette::ButtonText color.

***Triangle*** Paint a triangle in QPalette::ButtonText color.

***Dot*** Paint a circle in QPalette::ButtonText color.

***Nub*** Draw a raised ellipse with a gradient build from QPalette::Light and QPalette::Mid

***Notch*** Draw a sunken ellipse with a gradient build from QPalette::Light and QPalette::Mid

### 12.37.3 Constructor & Destructor Documentation

#### 12.37.3.1 QwtKnob::QwtKnob ( QWidget ∗ *parent* = `NULL` ) `[explicit]`

Constructor.

Construct a knob with an angle of 270°. The style is QwtKnob::Raised and the marker style is QwtKnob::Notch. The width of the knob is set to 50 pixels.

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

**See Also**

setTotalAngle()

### 12.37.4 Member Function Documentation

#### 12.37.4.1 Qt::Alignment QwtKnob::alignment ( ) const

**Returns**

Alignment of the knob inside of contentsRect()

**See Also**

setAlignment(), knobWidth(), knobRect()

#### 12.37.4.2 void QwtKnob::changeEvent ( QEvent ∗ *event* ) [protected], [virtual]

Handle QEvent::StyleChange and QEvent::FontChange;

**Parameters**

| | |
|---|---|
| *event* | Change event |

#### 12.37.4.3 void QwtKnob::drawFocusIndicator ( QPainter ∗ *painter* ) const [protected], [virtual]

Draw the focus indicator

**Parameters**

| | |
|---|---|
| *painter* | Painter |

#### 12.37.4.4 void QwtKnob::drawKnob ( QPainter ∗ *painter,* const QRectF & *knobRect* ) const [protected], [virtual]

Draw the knob.

**Parameters**

| | |
|---|---|
| *painter* | painter |
| *knobRect* | Bounding rectangle of the knob (without scale) |

#### 12.37.4.5 void QwtKnob::drawMarker ( QPainter ∗ *painter,* const QRectF & *rect,* double *angle* ) const [protected], [virtual]

Draw the marker at the knob's front.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Bounding rectangle of the knob without scale |
| *angle* | Angle of the marker in degrees ( clockwise, 0 at the 12 o'clock position ) |

#### 12.37.4.6 bool QwtKnob::isScrollPosition ( const QPoint & *pos* ) const [protected], [virtual]

Determine what to do when the user presses a mouse button.

**Parameters**

| | |
|---|---|
| *pos* | Mouse position |

**Return values**

| | |
|---|---|
| *True,when* | pos is inside the circle of the knob. |

**See Also**

scrolledTo()

Implements QwtAbstractSlider.

#### 12.37.4.7 QRect QwtKnob::knobRect ( ) const

Calculate the bounding rectangle of the knob without the scale

**Returns**

Bounding rectangle of the knob

**See Also**

knobWidth(), alignment(), QWidget::contentsRect()

#### 12.37.4.8 QwtKnob::KnobStyle QwtKnob::knobStyle ( ) const

**Returns**

Marker type of the knob

**See Also**

setKnobStyle(), setBorderWidth()

#### 12.37.4.9 int QwtKnob::markerSize ( ) const

**Returns**

Marker size

**See Also**

setMarkerSize()

#### 12.37.4.10 QwtKnob::MarkerStyle QwtKnob::markerStyle ( ) const

**Returns**

Marker type of the knob

**See Also**

setMarkerStyle(), setMarkerSize()

#### 12.37.4.11 QSize QwtKnob::minimumSizeHint ( ) const [virtual]

**Returns**

Minimum size hint

**See Also**

sizeHint()

#### 12.37.4.12 int QwtKnob::numTurns ( ) const

**Returns**

Number of turns.

When the total angle is below 360° numTurns() is ceiled to 1.

**See Also**

setNumTurns(), setTotalAngle(), totalAngle()

#### 12.37.4.13 void QwtKnob::paintEvent ( QPaintEvent * *event* ) [protected], [virtual]

Repaint the knob

**Parameters**

| | |
|---|---|
| *event* | Paint event |

#### 12.37.4.14 const QwtRoundScaleDraw ∗ QwtKnob::scaleDraw ( ) const

**Returns**

the scale draw of the knob

**See Also**

setScaleDraw()

#### 12.37.4.15 QwtRoundScaleDraw ∗ QwtKnob::scaleDraw ( )

**Returns**

the scale draw of the knob

**See Also**

setScaleDraw()

#### 12.37.4.16 double QwtKnob::scrolledTo ( const QPoint & *pos* ) const [protected], [virtual]

Determine the value for a new position of the mouse.

**Parameters**

| | |
|---|---|
| *pos* | Mouse position |

**Returns**

Value for the mouse position

**See Also**

isScrollPosition()

Implements QwtAbstractSlider.

#### 12.37.4.17 void QwtKnob::setAlignment ( Qt::Alignment *alignment* )

Set the alignment of the knob.

Similar to a QLabel::alignment() the flags decide how to align the knob inside of contentsRect().

The default setting is Qt::AlignCenter

**Parameters**

| | |
|---|---|
| *alignment* | Or'd alignment flags |

**See Also**

alignment(), setKnobWidth(), knobRect()

#### 12.37.4.18 void QwtKnob::setBorderWidth ( int *borderWidth* )

Set the knob's border width.

**Parameters**

| | |
|---|---|
| *borderWidth* | new border width |

#### 12.37.4.19 void QwtKnob::setKnobStyle ( KnobStyle *knobStyle* )

Set the knob type.

**Parameters**

| | |
|---|---|
| *knobStyle* | Knob type |

**See Also**

knobStyle(), setBorderWidth()

#### 12.37.4.20 void QwtKnob::setKnobWidth ( int *width* )

Change the knob's width.

Setting a fixed value for the diameter of the knob is helpful for aligning several knobs in a row.

**Parameters**

| | |
|---|---|
| *width* | New width |

**See Also**

knobWidth(), setAlignment()

**Note**

Modifies the sizePolicy()

#### 12.37.4.21 void QwtKnob::setMarkerSize ( int *size* )

Set the size of the marker.

When setting a size $<=$ 0 the marker will automatically scaled to 40% of the radius of the knob.

**See Also**

markerSize(), markerStyle()

#### 12.37.4.22 void QwtKnob::setMarkerStyle ( MarkerStyle *markerStyle* )

Set the marker type of the knob.

**Parameters**

| | |
|---|---|
| *markerStyle* | Marker type |

**See Also**

markerStyle(), setMarkerSize()

#### 12.37.4.23 void QwtKnob::setNumTurns ( int *numTurns* )

Set the number of turns.

When numTurns $>$ 1 the knob can be turned several times around its axis

- otherwise the total angle is floored to 360°.

**See Also**

numTurns(), totalAngle(), setTotalAngle()

#### 12.37.4.24 void QwtKnob::setScaleDraw ( QwtRoundScaleDraw * *scaleDraw* )

Change the scale draw of the knob

For changing the labels of the scales, it is necessary to derive from QwtRoundScaleDraw and overload QwtRoundScaleDraw::label().

**See Also**

scaleDraw()

#### 12.37.4.25 void QwtKnob::setTotalAngle ( double *angle* )

Set the total angle by which the knob can be turned.

**Parameters**

| | |
|---|---|
| *angle* | Angle in degrees. |

The angle has to be between [10, 360] degrees. Angles above 360 ( so that the knob can be turned several times around its axis ) have to be set using setNumTurns().

The default angle is 270 degrees.

**See Also**

totalAngle(), setNumTurns()

#### 12.37.4.26 QSize QwtKnob::sizeHint ( ) const [virtual]

**Returns**

sizeHint()

#### 12.37.4.27 double QwtKnob::totalAngle ( ) const

**Returns**

the total angle

**See Also**

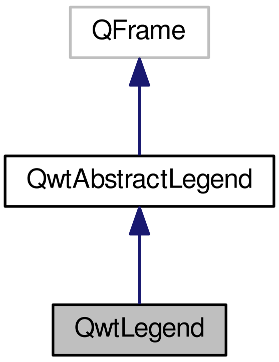
setTotalAngle(), setNumTurns(), numTurns()

## 12.38 QwtLegend Class Reference

The legend widget.

`#include <qwt_legend.h>`

Inheritance diagram for QwtLegend:



**Public Slots**

- virtual void updateLegend (const QVariant &, const QList< QwtLegendData > &)

  *Update the entries for an item.*

**Signals**

- void clicked (const QVariant &itemInfo, int index)
- void checked (const QVariant &itemInfo, bool on, int index)

**Public Member Functions**

- QwtLegend (QWidget ∗parent=NULL)
- virtual ∼QwtLegend ()

  *Destructor.*
- void setMaxColumns (uint numColums)

  *Set the maximum number of entries in a row.*
- uint maxColumns () const
- void setDefaultItemMode (QwtLegendData::Mode)

  *Set the default mode for legend labels.*
- QwtLegendData::Mode defaultItemMode () const
- QWidget ∗ contentsWidget ()
- const QWidget ∗ contentsWidget () const
- QWidget ∗ legendWidget (const QVariant &) const

- QList< QWidget ∗ > legendWidgets (const QVariant &) const
- QVariant itemInfo (const QWidget ∗) const
- virtual bool eventFilter (QObject ∗, QEvent ∗)
- virtual QSize sizeHint () const

  *Return a size hint.*
- virtual int heightForWidth (int w) const
- QScrollBar ∗ horizontalScrollBar () const
- QScrollBar ∗ verticalScrollBar () const
- virtual void renderLegend (QPainter ∗, const QRectF &, bool fillBackground) const
- virtual void renderItem (QPainter ∗, const QWidget ∗, const QRectF &, bool fillBackground) const
- virtual bool isEmpty () const
- virtual int scrollExtent (Qt::Orientation) const

**Protected Slots**

- void itemClicked ()
- void itemChecked (bool)

**Protected Member Functions**

- virtual QWidget ∗ createWidget (const QwtLegendData &) const

  *Create a widget to be inserted into the legend.*
- virtual void updateWidget (QWidget ∗widget, const QwtLegendData &data)

  *Update the widget.*

### 12.38.1 Detailed Description

The legend widget.

The QwtLegend widget is a tabular arrangement of legend items. Legend items might be any type of widget, but in general they will be a QwtLegendLabel.

**See Also**

QwtLegendLabel, QwtPlotItem, QwtPlot

### 12.38.2 Constructor & Destructor Documentation

#### 12.38.2.1 QwtLegend::QwtLegend ( QWidget ∗ *parent* = NULL ) [explicit]

Constructor

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

### 12.38.3 Member Function Documentation

#### 12.38.3.1 void QwtLegend::checked ( const QVariant & *itemInfo*, bool *on*, int *index* ) [signal]

A signal which is emitted when the user has clicked on a legend label, which is in QwtLegendData::Checkable mode

**Parameters**

| | |
|---|---|
| *itemInfo* | Info for the item of the selected legend label |
| *index* | Index of the legend label in the list of widgets that are associated with the plot item |
| *on* | True when the legend label is checked |

**Note**

clicks are disabled as default

**See Also**

setDefaultItemMode(), defaultItemMode(), QwtPlot::itemToInfo()

#### 12.38.3.2 void QwtLegend::clicked ( const QVariant & *itemInfo*, int *index* ) [signal]

A signal which is emitted when the user has clicked on a legend label, which is in QwtLegendData::Clickable mode.

**Parameters**

| | |
|---|---|
| *itemInfo* | Info for the item item of the selected legend item |
| *index* | Index of the legend label in the list of widgets that are associated with the plot item |

**Note**

clicks are disabled as default

**See Also**

setDefaultItemMode(), defaultItemMode(), QwtPlot::itemToInfo()

#### 12.38.3.3 QWidget ∗ QwtLegend::contentsWidget ( )

The contents widget is the only child of the viewport of the internal QScrollArea and the parent widget of all legend items.

**Returns**

Container widget of the legend items

#### 12.38.3.4 const QWidget ∗ QwtLegend::contentsWidget ( ) const

The contents widget is the only child of the viewport of the internal QScrollArea and the parent widget of all legend items.

**Returns**

Container widget of the legend items

#### 12.38.3.5 QWidget ∗ QwtLegend::createWidget ( const QwtLegendData & *data* ) const [protected], [virtual]

Create a widget to be inserted into the legend.

The default implementation returns a QwtLegendLabel.

**Parameters**

| | |
|---|---|
| *data* | Attributes of the legend entry |

**Returns**

Widget representing data on the legend

**Note**

updateWidget() will called soon after createWidget() with the same attributes.

#### 12.38.3.6 QwtLegendData::Mode QwtLegend::defaultItemMode ( ) const

**Returns**

Default item mode

**See Also**

setDefaultItemMode()

#### 12.38.3.7 bool QwtLegend::eventFilter ( QObject ∗ *object,* QEvent ∗ *event* ) [virtual]

Handle QEvent::ChildRemoved andQEvent::LayoutRequest events for the contentsWidget().

**Parameters**

| | |
|---|---|
| *object* | Object to be filtered |
| *event* | Event |

**Returns**

Forwarded to QwtAbstractLegend::eventFilter()

#### 12.38.3.8 int QwtLegend::heightForWidth ( int *width* ) const [virtual]

**Returns**

The preferred height, for a width.

**Parameters**

| | |
|---|---|
| *width* | Width |

#### 12.38.3.9 QScrollBar ∗ QwtLegend::horizontalScrollBar ( ) const

**Returns**

Horizontal scrollbar

**See Also**

verticalScrollBar()

#### 12.38.3.10 bool QwtLegend::isEmpty ( ) const [virtual]

**Returns**

True, when no item is inserted

Implements QwtAbstractLegend.

#### 12.38.3.11 void QwtLegend::itemChecked ( bool *on* ) [protected], [slot]

Called internally when the legend has been checked Emits a checked() signal.

#### 12.38.3.12 void QwtLegend::itemClicked ( ) [protected], [slot]

Called internally when the legend has been clicked on. Emits a clicked() signal.

#### 12.38.3.13 QVariant QwtLegend::itemInfo ( const QWidget ∗ *widget* ) const

Find the item that is associated to a widget

**Parameters**

| | |
|---|---|
| *widget* | Widget on the legend |

**Returns**

Associated item info

**See Also**

legendWidget()

#### 12.38.3.14 QWidget ∗ QwtLegend::legendWidget ( const QVariant & *itemInfo* ) const

**Returns**

First widget in the list of widgets associated to an item

**Parameters**

| | |
|---|---|
| *itemInfo* | Info about an item |

**See Also**

itemInfo(), QwtPlot::itemToInfo()

**Note**

Almost all types of items have only one widget

#### 12.38.3.15 QList< QWidget ∗ > QwtLegend::legendWidgets ( const QVariant & *itemInfo* ) const

**Returns**

List of widgets associated to a item

**Parameters**

| | |
|---|---|
| *itemInfo* | Info about an item |

**See Also**

legendWidget(), itemInfo(), QwtPlot::itemToInfo()

#### 12.38.3.16 uint QwtLegend::maxColumns ( ) const

**Returns**

Maximum number of entries in a row

**See Also**

setMaxColumns(), QwtDynGridLayout::maxColumns()

#### 12.38.3.17 void QwtLegend::renderItem ( QPainter ∗ *painter,* const QWidget ∗ *widget,* const QRectF & *rect,* bool *fillBackground* ) const [virtual]

Render a legend entry into a given rectangle.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *widget* | Widget representing a legend entry |
| *rect* | Bounding rectangle |
| *fillBackground* | When true, fill rect with the widget background |

**Note**

When widget is not derived from QwtLegendLabel renderItem does nothing beside the background

#### 12.38.3.18 void QwtLegend::renderLegend ( QPainter ∗ *painter,* const QRectF & *rect,* bool *fillBackground* ) const [virtual]

Render the legend into a given rectangle.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Bounding rectangle |
| *fillBackground* | When true, fill rect with the widget background |

**See Also**

renderLegend() is used by QwtPlotRenderer - not by QwtLegend itself

Implements QwtAbstractLegend.

#### 12.38.3.19 int QwtLegend::scrollExtent ( Qt::Orientation *orientation* ) const [virtual]

Return the extent, that is needed for the scrollbars

**Parameters**

| | |
|---|---|
| *orientation* | Orientation ( |

**Returns**

The width of the vertical scrollbar for Qt::Horizontal and v.v.

Reimplemented from QwtAbstractLegend.

#### 12.38.3.20 void QwtLegend::setDefaultItemMode ( QwtLegendData::Mode *mode* )

Set the default mode for legend labels.

Legend labels will be constructed according to the attributes in a QwtLegendData object. When it doesn't contain a value for the QwtLegendData::ModeRole the label will be initialized with the default mode of the legend.

**Parameters**

| | |
|---|---|
| *mode* | Default item mode |

**See Also**

itemMode(), QwtLegendData::value(), QwtPlotItem::legendData()

**Note**

Changing the mode doesn't have any effect on existing labels.

#### 12.38.3.21 void QwtLegend::setMaxColumns ( uint *numColums* )

Set the maximum number of entries in a row.

F.e when the maximum is set to 1 all items are aligned vertically. 0 means unlimited

**Parameters**

| | |
|---|---|
| *numColums* | Maximum number of entries in a row |

**See Also**

maxColumns(), QwtDynGridLayout::setMaxColumns()

#### 12.38.3.22 void QwtLegend::updateLegend ( const QVariant & *itemInfo,* const QList< QwtLegendData > & *data* ) [virtual], [slot]

Update the entries for an item.

**Parameters**

| | |
|---|---|
| *itemInfo* | Info for an item |
| *data* | List of legend entry attributes for the item |

#### 12.38.3.23 void QwtLegend::updateWidget ( QWidget ∗ *widget,* const QwtLegendData & *data* ) [protected], [virtual]

Update the widget.

**Parameters**

| | |
|---|---|
| *widget* | Usually a QwtLegendLabel |
| *data* | Attributes to be displayed |

**See Also**

createWidget()

**Note**

When widget is no QwtLegendLabel updateWidget() does nothing.

#### 12.38.3.24 QScrollBar ∗ QwtLegend::verticalScrollBar ( ) const

**Returns**

Vertical scrollbar

**See Also**

horizontalScrollBar()

## 12.39 QwtLegendData Class Reference

Attributes of an entry on a legend.

`#include <qwt_legend_data.h>`

### Public Types

- enum Mode { ReadOnly, Clickable, Checkable }

  *Mode defining how a legend entry interacts.*
- enum Role { **ModeRole**, **TitleRole**, **IconRole**, **UserRole** = 32 }

  *Identifier how to interprete a QVariant.*

### Public Member Functions

- QwtLegendData ()

  *Constructor.*
- ∼QwtLegendData ()

  *Destructor.*
- void setValues (const QMap< int, QVariant > &)
- const QMap< int, QVariant > & values () const
- void setValue (int role, const QVariant &)
- QVariant value (int role) const
- bool hasRole (int role) const
- bool isValid () const
- QwtGraphic icon () const
- QwtText title () const
- Mode mode () const

### 12.39.1 Detailed Description

Attributes of an entry on a legend.

QwtLegendData is an abstract container ( like QAbstractModel ) to exchange attributes, that are only known between to the plot item and the legend.

By overloading QwtPlotItem::legendData() any other set of attributes could be used, that can be handled by a modified ( or completely different ) implementation of a legend.

**See Also**

QwtLegend, QwtPlotLegendItem

**Note**

The stockchart example implements a legend as a tree with checkable items

### 12.39.2 Member Enumeration Documentation

#### 12.39.2.1 enum QwtLegendData::Mode

Mode defining how a legend entry interacts.

**Enumerator**

***ReadOnly*** The legend item is not interactive, like a label.

***Clickable*** The legend item is clickable, like a push button.

***Checkable*** The legend item is checkable, like a checkable button.

### 12.39.3 Member Function Documentation

#### 12.39.3.1 bool QwtLegendData::hasRole ( int *role* ) const

**Parameters**

| | |
|---|---|
| *role* | Attribute role |

**Returns**

True, when the internal map has an entry for role

#### 12.39.3.2 QwtGraphic QwtLegendData::icon ( ) const

**Returns**

Value of the IconRole attribute

#### 12.39.3.3 bool QwtLegendData::isValid ( ) const

**Returns**

True, when the internal map is empty

#### 12.39.3.4 QwtLegendData::Mode QwtLegendData::mode ( ) const

**Returns**

Value of the ModeRole attribute

#### 12.39.3.5 void QwtLegendData::setValue ( int *role,* const QVariant & *data* )

Set an attribute value

**Parameters**

| | |
|---|---|
| *role* | Attribute role |
| *data* | Attribute value |

**See Also**

value()

#### 12.39.3.6 void QwtLegendData::setValues ( const QMap< int, QVariant > & *map* )

Set the legend attributes

QwtLegendData actually is a QMap<int, QVariant> with some convenience interfaces

**Parameters**

| | |
|---|---|
| *map* | Values |

**See Also**

values()

#### 12.39.3.7 QwtText QwtLegendData::title ( ) const

**Returns**

Value of the TitleRole attribute

#### 12.39.3.8 QVariant QwtLegendData::value ( int *role* ) const

**Parameters**

| | |
|---|---|
| *role* | Attribute role |

**Returns**

Attribute value for a specific role

#### 12.39.3.9 const QMap< int, QVariant > & QwtLegendData::values ( ) const

**Returns**

Legend attributes

**See Also**

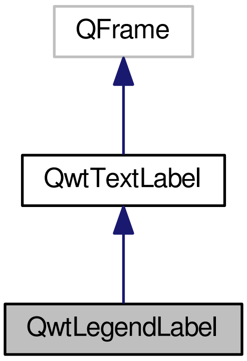
setValues()

## 12.40 QwtLegendLabel Class Reference

A widget representing something on a QwtLegend.

```
#include <qwt_legend_label.h>
```

Inheritance diagram for QwtLegendLabel:



**Public Slots**

- void setChecked (bool on)

**Signals**

- void clicked ()

  *Signal, when the legend item has been clicked.*
- void pressed ()

  *Signal, when the legend item has been pressed.*
- void released ()

*Signal, when the legend item has been released.*
- void checked (bool)

  *Signal, when the legend item has been toggled.*

### Public Member Functions

- QwtLegendLabel (QWidget ∗parent=0)
- virtual ∼QwtLegendLabel ()

  *Destructor.*
- void setData (const QwtLegendData &)
- const QwtLegendData & data () const
- void setItemMode (QwtLegendData::Mode)
- QwtLegendData::Mode itemMode () const
- void setSpacing (int spacing)

  *Change the spacing between icon and text.*
- int spacing () const
- virtual void setText (const QwtText &)
- void setIcon (const QPixmap &)
- QPixmap icon () const
- virtual QSize sizeHint () const

  *Return a size hint.*
- bool isChecked () const

  *Return true, if the item is checked.*

### Protected Member Functions

- void setDown (bool)

  *Set the item being down.*
- bool isDown () const

  *Return true, if the item is down.*
- virtual void paintEvent (QPaintEvent ∗)

  *Paint event.*
- virtual void mousePressEvent (QMouseEvent ∗)

  *Handle mouse press events.*
- virtual void mouseReleaseEvent (QMouseEvent ∗)

  *Handle mouse release events.*
- virtual void keyPressEvent (QKeyEvent ∗)

  *Handle key press events.*
- virtual void keyReleaseEvent (QKeyEvent ∗)

  *Handle key release events.*

### 12.40.1 Detailed Description

A widget representing something on a QwtLegend.

### 12.40.2 Constructor & Destructor Documentation

#### 12.40.2.1 QwtLegendLabel::QwtLegendLabel ( QWidget ∗ *parent* = 0 ) [explicit]

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

### 12.40.3 Member Function Documentation

#### 12.40.3.1 const QwtLegendData & QwtLegendLabel::data ( ) const

**Returns**

Attributes of the label

**See Also**

setData(), QwtPlotItem::legendData()

#### 12.40.3.2 QPixmap QwtLegendLabel::icon ( ) const

**Returns**

Pixmap representing a plot item

**See Also**

setIcon()

#### 12.40.3.3 QwtLegendData::Mode QwtLegendLabel::itemMode ( ) const

**Returns**

Item mode

**See Also**

setItemMode()

#### 12.40.3.4 void QwtLegendLabel::setChecked ( bool *on* ) [slot]

Check/Uncheck a the item

**Parameters**

| | |
|---|---|
| *on* | check/uncheck |

**See Also**

setItemMode()

#### 12.40.3.5 void QwtLegendLabel::setData ( const QwtLegendData & *legendData* )

Set the attributes of the legend label

**Parameters**

| | |
|---|---|
| *legendData* | Attributes of the label |

**See Also**

data()

#### 12.40.3.6 void QwtLegendLabel::setIcon ( const QPixmap & *icon* )

Assign the icon

**Parameters**

| | |
|---|---|
| *icon* | Pixmap representing a plot item |

**See Also**

icon(), QwtPlotItem::legendIcon()

#### 12.40.3.7 void QwtLegendLabel::setItemMode ( QwtLegendData::Mode *mode* )

Set the item mode The default is QwtLegendData::ReadOnly

**Parameters**

| | |
|---|---|
| *mode* | Item mode |

**See Also**

itemMode()

#### 12.40.3.8 void QwtLegendLabel::setSpacing ( int *spacing* )

Change the spacing between icon and text.

**Parameters**

| | |
|---|---|
| *spacing* | Spacing |

**See Also**

spacing(), QwtTextLabel::margin()

#### 12.40.3.9 void QwtLegendLabel::setText ( const QwtText & *text* ) [virtual]

Set the text to the legend item

**Parameters**

| | |
|---|---|
| *text* | Text label |

**See Also**

QwtTextLabel::text()

Reimplemented from QwtTextLabel.

#### 12.40.3.10 int QwtLegendLabel::spacing ( ) const

**Returns**

Spacing between icon and text

**See Also**

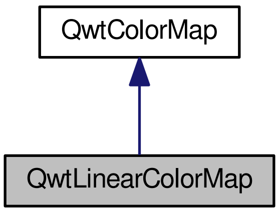
setSpacing(), QwtTextLabel::margin()

## 12.41 QwtLinearColorMap Class Reference

QwtLinearColorMap builds a color map from color stops.

```
#include <qwt_color_map.h>
```

Inheritance diagram for QwtLinearColorMap:



**Public Types**

- enum Mode { FixedColors, ScaledColors }

**Public Member Functions**

- QwtLinearColorMap (QwtColorMap::Format=QwtColorMap::RGB)
- QwtLinearColorMap (const QColor &from, const QColor &to, QwtColorMap::Format=QwtColorMap::RGB)
- virtual ∼QwtLinearColorMap ()

    *Destructor.*
- void setMode (Mode)

    *Set the mode of the color map.*
- Mode mode () const
- void setColorInterval (const QColor &color1, const QColor &color2)
- void addColorStop (double value, const QColor &)
- QVector< double > colorStops () const
- QColor color1 () const
- QColor color2 () const
- virtual QRgb rgb (const QwtInterval &, double value) const
- virtual unsigned char colorIndex (const QwtInterval &, double value) const

    *Map a value of a given interval into a color index.*

### 12.41.1 Detailed Description

QwtLinearColorMap builds a color map from color stops.

A color stop is a color at a specific position. The valid range for the positions is [0.0, 1.0]. When mapping a value into a color it is translated into this interval according to mode().

### 12.41.2 Member Enumeration Documentation

#### 12.41.2.1 enum QwtLinearColorMap::Mode

Mode of color map

**See Also**

setMode(), mode()

**Enumerator**

***FixedColors*** Return the color from the next lower color stop.

***ScaledColors*** Interpolating the colors of the adjacent stops.

### 12.41.3 Constructor & Destructor Documentation

#### 12.41.3.1 QwtLinearColorMap::QwtLinearColorMap ( QwtColorMap::Format *format* = QwtColorMap::RGB )

Build a color map with two stops at 0.0 and 1.0. The color at 0.0 is Qt::blue, at 1.0 it is Qt::yellow.

**Parameters**

| | |
|---|---|
| *format* | Preferred format of the color map |

#### 12.41.3.2 QwtLinearColorMap::QwtLinearColorMap ( const QColor & *color1*, const QColor & *color2*, QwtColorMap::Format *format* = QwtColorMap::RGB )

Build a color map with two stops at 0.0 and 1.0.

**Parameters**

| | |
|---|---|
| *color1* | Color used for the minimum value of the value interval |
| *color2* | Color used for the maximum value of the value interval |
| *format* | Preferred format for the color map |

### 12.41.4 Member Function Documentation

#### 12.41.4.1 void QwtLinearColorMap::addColorStop ( double *value*, const QColor & *color* )

Add a color stop

The value has to be in the range [0.0, 1.0]. F.e. a stop at position 17.0 for a range [10.0,20.0] must be passed as: (17.0 - 10.0) / (20.0 - 10.0)

**Parameters**

| | |
|---|---|
| *value* | Value between [0.0, 1.0] |
| *color* | Color stop |

#### 12.41.4.2 QColor QwtLinearColorMap::color1 ( ) const

**Returns**

the first color of the color range

**See Also**

setColorInterval()

#### 12.41.4.3 QColor QwtLinearColorMap::color2 ( ) const

**Returns**

the second color of the color range

**See Also**

setColorInterval()

#### 12.41.4.4 unsigned char QwtLinearColorMap::colorIndex ( const QwtInterval & *interval,* double *value* ) const [virtual]

Map a value of a given interval into a color index.

**Parameters**

| | |
|---|---|
| *interval* | Range for all values |
| *value* | Value to map into a color index |

**Returns**

Index, between 0 and 255

Implements QwtColorMap.

#### 12.41.4.5 QVector< double > QwtLinearColorMap::colorStops ( ) const

**Returns**

Positions of color stops in increasing order

#### 12.41.4.6 QwtLinearColorMap::Mode QwtLinearColorMap::mode ( ) const

**Returns**

Mode of the color map

**See Also**

setMode()

#### 12.41.4.7 QRgb QwtLinearColorMap::rgb ( const QwtInterval & *interval,* double *value* ) const [virtual]

Map a value of a given interval into a RGB value

**Parameters**

| | |
|---|---|
| *interval* | Range for all values |
| *value* | Value to map into a RGB value |

**Returns**

RGB value for value

Implements QwtColorMap.

#### 12.41.4.8 void QwtLinearColorMap::setColorInterval ( const QColor & *color1,* const QColor & *color2* )

Set the color range

Add stops at 0.0 and 1.0.

**Parameters**

| | |
|---|---|
| *color1* | Color used for the minimum value of the value interval |
| *color2* | Color used for the maximum value of the value interval |

**See Also**

color1(), color2()

#### 12.41.4.9 void QwtLinearColorMap::setMode ( Mode *mode* )

Set the mode of the color map.

FixedColors means the color is calculated from the next lower color stop. ScaledColors means the color is calculated by interpolating the colors of the adjacent stops.

**See Also**

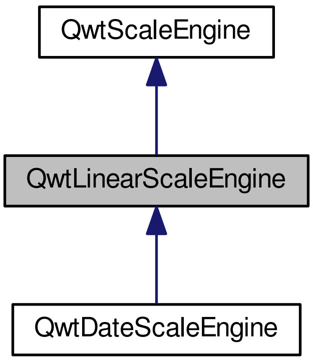
mode()

## 12.42 QwtLinearScaleEngine Class Reference

A scale engine for linear scales.

```
#include <qwt_scale_engine.h>
```

Inheritance diagram for QwtLinearScaleEngine:



**Public Member Functions**

- QwtLinearScaleEngine (uint base=10)
- virtual ~QwtLinearScaleEngine ()

  *Destructor.*
- virtual void autoScale (int maxSteps, double &x1, double &x2, double &stepSize) const
- virtual QwtScaleDiv divideScale (double x1, double x2, int numMajorSteps, int numMinorSteps, double stepSize=0.0) const

  *Calculate a scale division for an interval.*

**Protected Member Functions**

- QwtInterval align (const QwtInterval &, double stepSize) const

    *Align an interval to a step size.*
- void buildTicks (const QwtInterval &, double stepSize, int maxMinSteps, QList< double > ticks[QwtScaleDiv::NTickTypes]) const

    *Calculate ticks for an interval.*
- QList< double > buildMajorTicks (const QwtInterval &interval, double stepSize) const

    *Calculate major ticks for an interval.*
- void buildMinorTicks (const QList< double > &majorTicks, int maxMinorSteps, double stepSize, QList< double > &minorTicks, QList< double > &mediumTicks) const

    *Calculate minor/medium ticks for major ticks.*

**Additional Inherited Members**

### 12.42.1 Detailed Description

A scale engine for linear scales.

The step size will fit into the pattern $\{1,2,5\} \cdot 10^n$, where n is an integer.

### 12.42.2 Constructor & Destructor Documentation

#### 12.42.2.1 QwtLinearScaleEngine::QwtLinearScaleEngine ( uint *base* = `10` )

Constructor

**Parameters**

| | |
|---|---|
| *base* | Base of the scale engine |

**See Also**

setBase()

### 12.42.3 Member Function Documentation

#### 12.42.3.1 QwtInterval QwtLinearScaleEngine::align ( const QwtInterval & *interval,* double *stepSize* ) const `[protected]`

Align an interval to a step size.

The limits of an interval are aligned that both are integer multiples of the step size.

**Parameters**

| | |
|---|---|
| *interval* | Interval |
| *stepSize* | Step size |

**Returns**

Aligned interval

#### 12.42.3.2 void QwtLinearScaleEngine::autoScale ( int *maxNumSteps,* double & *x1,* double & *x2,* double & *stepSize* ) const `[virtual]`

Align and divide an interval

**Parameters**

| | |
|---:|---|
| *maxNumSteps* | Max. number of steps |
| *x1* | First limit of the interval (In/Out) |
| *x2* | Second limit of the interval (In/Out) |
| *stepSize* | Step size (Out) |

**See Also**

setAttribute()

Implements QwtScaleEngine.

Reimplemented in QwtDateScaleEngine.

#### 12.42.3.3 QList< double > QwtLinearScaleEngine::buildMajorTicks ( const QwtInterval & *interval,* double *stepSize* ) const `[protected]`

Calculate major ticks for an interval.

**Parameters**

| | |
|---:|---|
| *interval* | Interval |
| *stepSize* | Step size |

**Returns**

Calculated ticks

#### 12.42.3.4 void QwtLinearScaleEngine::buildMinorTicks ( const QList< double > & *majorTicks,* int *maxMinorSteps,* double *stepSize,* QList< double > & *minorTicks,* QList< double > & *mediumTicks* ) const `[protected]`

Calculate minor/medium ticks for major ticks.

**Parameters**

| | |
|---:|---|
| *majorTicks* | Major ticks |
| *maxMinorSteps* | Maximum number of minor steps |
| *stepSize* | Step size |
| *minorTicks* | Array to be filled with the calculated minor ticks |
| *mediumTicks* | Array to be filled with the calculated medium ticks |

#### 12.42.3.5 void QwtLinearScaleEngine::buildTicks ( const QwtInterval & *interval,* double *stepSize,* int *maxMinorSteps,* QList< double > *ticks[QwtScaleDiv::NTickTypes]* ) const `[protected]`

Calculate ticks for an interval.

**Parameters**

| | |
|---:|---|
| *interval* | Interval |
| *stepSize* | Step size |
| *maxMinorSteps* | Maximum number of minor steps |
| *ticks* | Arrays to be filled with the calculated ticks |

**See Also**

buildMajorTicks(), buildMinorTicks

#### 12.42.3.6 QwtScaleDiv QwtLinearScaleEngine::divideScale ( double *x1,* double *x2,* int *maxMajorSteps,* int *maxMinorSteps,* double *stepSize* = `0.0` ) const `[virtual]`

Calculate a scale division for an interval.

#### Parameters

| | |
|---|---|
| *x1* | First interval limit |
| *x2* | Second interval limit |
| *maxMajorSteps* | Maximum for the number of major steps |
| *maxMinorSteps* | Maximum number of minor steps |
| *stepSize* | Step size. If stepSize == 0, the engine calculates one. |

#### Returns

Calculated scale division

Implements QwtScaleEngine.

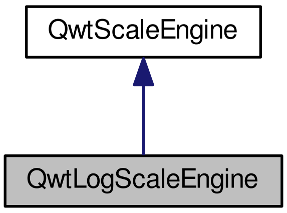
Reimplemented in QwtDateScaleEngine.

## 12.43 QwtLogScaleEngine Class Reference

A scale engine for logarithmic scales.

`#include <qwt_scale_engine.h>`

Inheritance diagram for QwtLogScaleEngine:



#### Public Member Functions

- QwtLogScaleEngine (uint base=10)
- virtual ~QwtLogScaleEngine ()

  *Destructor.*
- virtual void autoScale (int maxSteps, double &x1, double &x2, double &stepSize) const
- virtual QwtScaleDiv divideScale (double x1, double x2, int numMajorSteps, int numMinorSteps, double step-Size=0.0) const

  *Calculate a scale division for an interval.*

#### Protected Member Functions

- QwtInterval align (const QwtInterval &, double stepSize) const

  *Align an interval to a step size.*
- void buildTicks (const QwtInterval &, double stepSize, int maxMinSteps, QList< double > ticks[QwtScaleDiv-::NTickTypes]) const

  *Calculate ticks for an interval.*

- QList< double > buildMajorTicks (const QwtInterval &interval, double stepSize) const

    *Calculate major ticks for an interval.*
- void buildMinorTicks (const QList< double > &majorTicks, int maxMinorSteps, double stepSize, QList< double > &minorTicks, QList< double > &mediumTicks) const

    *Calculate minor/medium ticks for major ticks.*

#### Additional Inherited Members

### 12.43.1 Detailed Description

A scale engine for logarithmic scales.

The step size is measured in *decades* and the major step size will be adjusted to fit the pattern $\{1,2,3,5\} \cdot 10^n$, where n is a natural number including zero.

**Warning**

the step size as well as the margins are measured in *decades*.

### 12.43.2 Constructor & Destructor Documentation

#### 12.43.2.1 QwtLogScaleEngine::QwtLogScaleEngine ( uint *base* = 10 )

Constructor

**Parameters**

| | |
|---|---|
| *base* | Base of the scale engine |

**See Also**

setBase()

### 12.43.3 Member Function Documentation

#### 12.43.3.1 QwtInterval QwtLogScaleEngine::align ( const QwtInterval & *interval,* double *stepSize* ) const [protected]

Align an interval to a step size.

The limits of an interval are aligned that both are integer multiples of the step size.

**Parameters**

| | |
|---|---|
| *interval* | Interval |
| *stepSize* | Step size |

**Returns**

Aligned interval

#### 12.43.3.2 void QwtLogScaleEngine::autoScale ( int *maxNumSteps,* double & *x1,* double & *x2,* double & *stepSize* ) const [virtual]

Align and divide an interval

**Parameters**

| | |
|---|---|
| *maxNumSteps* | Max. number of steps |
| *x1* | First limit of the interval (In/Out) |
| *x2* | Second limit of the interval (In/Out) |
| *stepSize* | Step size (Out) |

**See Also**

QwtScaleEngine::setAttribute()

Implements QwtScaleEngine.

#### 12.43.3.3 QList< double > QwtLogScaleEngine::buildMajorTicks ( const QwtInterval & *interval*, double *stepSize* ) const `[protected]`

Calculate major ticks for an interval.

**Parameters**

| | |
|---|---|
| *interval* | Interval |
| *stepSize* | Step size |

**Returns**

Calculated ticks

#### 12.43.3.4 void QwtLogScaleEngine::buildMinorTicks ( const QList< double > & *majorTicks*, int *maxMinorSteps*, double *stepSize*, QList< double > & *minorTicks*, QList< double > & *mediumTicks* ) const `[protected]`

Calculate minor/medium ticks for major ticks.

**Parameters**

| | |
|---|---|
| *majorTicks* | Major ticks |
| *maxMinorSteps* | Maximum number of minor steps |
| *stepSize* | Step size |
| *minorTicks* | Array to be filled with the calculated minor ticks |
| *mediumTicks* | Array to be filled with the calculated medium ticks |

#### 12.43.3.5 void QwtLogScaleEngine::buildTicks ( const QwtInterval & *interval*, double *stepSize*, int *maxMinorSteps*, QList< double > *ticks[QwtScaleDiv::NTickTypes]* ) const `[protected]`

Calculate ticks for an interval.

**Parameters**

| | |
|---|---|
| *interval* | Interval |
| *maxMinorSteps* | Maximum number of minor steps |
| *stepSize* | Step size |
| *ticks* | Arrays to be filled with the calculated ticks |

**See Also**

buildMajorTicks(), buildMinorTicks

#### 12.43.3.6 QwtScaleDiv QwtLogScaleEngine::divideScale ( double *x1*, double *x2*, int *maxMajorSteps*, int *maxMinorSteps*, double *stepSize* = `0.0` ) const `[virtual]`

Calculate a scale division for an interval.

**Parameters**

| | |
|---|---|
| *x1* | First interval limit |
| *x2* | Second interval limit |
| *maxMajorSteps* | Maximum for the number of major steps |
| *maxMinorSteps* | Maximum number of minor steps |
| *stepSize* | Step size. If stepSize == 0, the engine calculates one. |

**Returns**

Calculated scale division

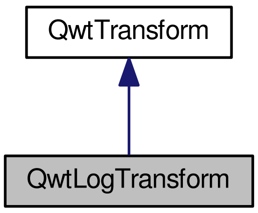
Implements QwtScaleEngine.

## 12.44 QwtLogTransform Class Reference

Logarithmic transformation.

`#include <qwt_transform.h>`

Inheritance diagram for QwtLogTransform:



**Public Member Functions**

- QwtLogTransform ()

  *Constructor.*
- virtual ∼QwtLogTransform ()

  *Destructor.*
- virtual double transform (double value) const
- virtual double invTransform (double value) const
- virtual double bounded (double value) const
- virtual QwtTransform ∗ copy () const

**Public Attributes**

- QT_STATIC_CONST double LogMin = 1.0e-150

  *Smallest allowed value for logarithmic scales: 1.0e-150.*
- QT_STATIC_CONST double LogMax = 1.0e150

  *Largest allowed value for logarithmic scales: 1.0e150.*

#### 12.44.1 Detailed Description

Logarithmic transformation.

QwtLogTransform modifies the values using log() and exp().

**Note**

In the calculations of QwtScaleMap the base of the log function has no effect on the mapping. So QwtLog-Transform can be used for log2(), log10() or any other logarithmic scale.

#### 12.44.2 Member Function Documentation

##### 12.44.2.1 double QwtLogTransform::bounded ( double *value* ) const [virtual]

**Parameters**

| | |
|---|---|
| *value* | Value to be bounded |

**Returns**

qBound( LogMin, value, LogMax )

Reimplemented from QwtTransform.

##### 12.44.2.2 QwtTransform ∗ QwtLogTransform::copy ( ) const [virtual]

**Returns**

Clone of the transformation

Implements QwtTransform.

##### 12.44.2.3 double QwtLogTransform::invTransform ( double *value* ) const [virtual]

**Parameters**

| | |
|---|---|
| *value* | Value to be transformed |

**Returns**

exp( value )

Implements QwtTransform.

##### 12.44.2.4 double QwtLogTransform::transform ( double *value* ) const [virtual]

**Parameters**

| | |
|---|---|
| *value* | Value to be transformed |

**Returns**

log( value )

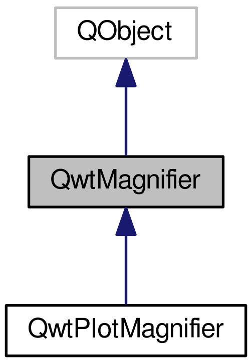
Implements QwtTransform.

### 12.45 QwtMagnifier Class Reference

QwtMagnifier provides zooming, by magnifying in steps.

```
#include <qwt_magnifier.h>
```

Inheritance diagram for QwtMagnifier:



**Public Member Functions**

- QwtMagnifier (QWidget ∗)
- virtual ∼QwtMagnifier ()

  *Destructor.*
- QWidget ∗ parentWidget ()
- const QWidget ∗ parentWidget () const
- void setEnabled (bool)

  *En/disable the magnifier.*
- bool isEnabled () const
- void setMouseFactor (double)

  *Change the mouse factor.*
- double mouseFactor () const
- void setMouseButton (Qt::MouseButton, Qt::KeyboardModifiers=Qt::NoModifier)
- void getMouseButton (Qt::MouseButton &, Qt::KeyboardModifiers &) const
- void setWheelFactor (double)

  *Change the wheel factor.*
- double wheelFactor () const
- void setWheelModifiers (Qt::KeyboardModifiers)
- Qt::KeyboardModifiers wheelModifiers () const
- void setKeyFactor (double)

  *Change the key factor.*
- double keyFactor () const
- void setZoomInKey (int key, Qt::KeyboardModifiers=Qt::NoModifier)
- void getZoomInKey (int &key, Qt::KeyboardModifiers &) const

  *Retrieve the settings of the zoom in key.*
- void setZoomOutKey (int key, Qt::KeyboardModifiers=Qt::NoModifier)
- void getZoomOutKey (int &key, Qt::KeyboardModifiers &) const

  *Retrieve the settings of the zoom out key.*
- virtual bool eventFilter (QObject ∗, QEvent ∗)

  *Event filter.*

#### Protected Member Functions

- virtual void rescale (double factor)=0
- virtual void widgetMousePressEvent (QMouseEvent ∗)
- virtual void widgetMouseReleaseEvent (QMouseEvent ∗)
- virtual void widgetMouseMoveEvent (QMouseEvent ∗)
- virtual void widgetWheelEvent (QWheelEvent ∗)
- virtual void widgetKeyPressEvent (QKeyEvent ∗)
- virtual void widgetKeyReleaseEvent (QKeyEvent ∗)

### 12.45.1 Detailed Description

QwtMagnifier provides zooming, by magnifying in steps.

Using QwtMagnifier a plot can be zoomed in/out in steps using keys, the mouse wheel or moving a mouse button in vertical direction.

### 12.45.2 Constructor & Destructor Documentation

#### 12.45.2.1 QwtMagnifier::QwtMagnifier ( QWidget ∗ *parent* ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *parent* | Widget to be magnified |

### 12.45.3 Member Function Documentation

#### 12.45.3.1 bool QwtMagnifier::eventFilter ( QObject ∗ *object,* QEvent ∗ *event* ) `[virtual]`

Event filter.

When isEnabled() is true, the mouse events of the observed widget are filtered.

**Parameters**

| | |
|---|---|
| *object* | Object to be filtered |
| *event* | Event |

**Returns**

Forwarded to QObject::eventFilter()

**See Also**

widgetMousePressEvent(), widgetMouseReleaseEvent(), widgetMouseMoveEvent(), widgetWheelEvent(), widgetKeyPressEvent() widgetKeyReleaseEvent()

#### 12.45.3.2 void QwtMagnifier::getMouseButton ( Qt::MouseButton & *button,* Qt::KeyboardModifiers & *modifiers* ) const

**See Also**

setMouseButton()

#### 12.45.3.3 void QwtMagnifier::getZoomInKey ( int & *key,* Qt::KeyboardModifiers & *modifiers* ) const

Retrieve the settings of the zoom in key.

**Parameters**

| | |
|---|---|
| *key* | Key code, see Qt::Key |
| *modifiers* | Keyboard modifiers |

**See Also**

setZoomInKey()

#### 12.45.3.4 void QwtMagnifier::getZoomOutKey ( int & *key,* Qt::KeyboardModifiers & *modifiers* ) const

Retrieve the settings of the zoom out key.

**Parameters**

| | |
|---|---|
| *key* | Key code, see Qt::Key |
| *modifiers* | Keyboard modifiers |

**See Also**

setZoomOutKey()

#### 12.45.3.5 bool QwtMagnifier::isEnabled ( ) const

**Returns**

true when enabled, false otherwise

**See Also**

setEnabled(), eventFilter()

#### 12.45.3.6 double QwtMagnifier::keyFactor ( ) const

**Returns**

Key factor

**See Also**

setKeyFactor()

#### 12.45.3.7 double QwtMagnifier::mouseFactor ( ) const

**Returns**

Mouse factor

**See Also**

setMouseFactor()

#### 12.45.3.8 QWidget ∗ QwtMagnifier::parentWidget ( )

**Returns**

Parent widget, where the rescaling happens

#### 12.45.3.9 const QWidget ∗ QwtMagnifier::parentWidget ( ) const

**Returns**

Parent widget, where the rescaling happens

#### 12.45.3.10 virtual void QwtMagnifier::rescale ( double *factor* ) `[protected]`, `[pure virtual]`

Rescale the parent widget

**Parameters**

| | |
|---|---|
| *factor* | Scale factor |

Implemented in QwtPlotMagnifier.

#### 12.45.3.11 void QwtMagnifier::setEnabled ( bool *on* )

En/disable the magnifier.

When enabled is true an event filter is installed for the observed widget, otherwise the event filter is removed.

**Parameters**

| | |
|---|---|
| *on* | true or false |

**See Also**

isEnabled(), eventFilter()

#### 12.45.3.12 void QwtMagnifier::setKeyFactor ( double *factor* )

Change the key factor.

The key factor defines the ratio between the current range on the parent widget and the zoomed range for each key press of the zoom in/out keys. The default value is 0.9.

**Parameters**

| | |
|---|---|
| *factor* | Key factor |

**See Also**

keyFactor(), setZoomInKey(), setZoomOutKey(), setWheelFactor, setMouseFactor()

#### 12.45.3.13 void QwtMagnifier::setMouseButton ( Qt::MouseButton *button*, Qt::KeyboardModifiers *modifiers* = `Qt::NoModifier` )

Assign the mouse button, that is used for zooming in/out. The default value is Qt::RightButton.

**Parameters**

| | |
|---|---|
| *button* | Button |
| *modifiers* | Keyboard modifiers |

**See Also**

getMouseButton()

#### 12.45.3.14 void QwtMagnifier::setMouseFactor ( double *factor* )

Change the mouse factor.

The mouse factor defines the ratio between the current range on the parent widget and the zoomed range for each vertical mouse movement. The default value is 0.95.

**Parameters**

| | |
|---|---|
| *factor* | Wheel factor |

**See Also**

mouseFactor(), setMouseButton(), setWheelFactor(), setKeyFactor()

#### 12.45.3.15 void QwtMagnifier::setWheelFactor ( double *factor* )

Change the wheel factor.

The wheel factor defines the ratio between the current range on the parent widget and the zoomed range for each step of the wheel.

Use values $>$ 1 for magnification (i.e. 2.0) and values $<$ 1 for scaling down (i.e. 1/2.0 = 0.5). You can use this feature for inverting the direction of the wheel.

The default value is 0.9.

**Parameters**

| | |
|---|---|
| *factor* | Wheel factor |

**See Also**

wheelFactor(), setWheelButtonState(), setMouseFactor(), setKeyFactor()

#### 12.45.3.16 void QwtMagnifier::setWheelModifiers ( Qt::KeyboardModifiers *modifiers* )

Assign keyboard modifiers for zooming in/out using the wheel. The default modifiers are Qt::NoModifiers.

**Parameters**

| | |
|---|---|
| *modifiers* | Keyboard modifiers |

**See Also**

wheelModifiers()

#### 12.45.3.17 void QwtMagnifier::setZoomInKey ( int *key*, Qt::KeyboardModifiers *modifiers* = `Qt::NoModifier` )

Assign the key, that is used for zooming in. The default combination is Qt::Key_Plus + Qt::NoModifier.

**Parameters**

| | |
|---|---|
| *key* | |
| *modifiers* | |

**See Also**

getZoomInKey(), setZoomOutKey()

#### 12.45.3.18 void QwtMagnifier::setZoomOutKey ( int *key*, Qt::KeyboardModifiers *modifiers* = `Qt::NoModifier` )

Assign the key, that is used for zooming out. The default combination is Qt::Key_Minus + Qt::NoModifier.

**Parameters**

| | |
|---|---|
| *key* | |
| *modifiers* | |

**See Also**

getZoomOutKey(), setZoomOutKey()

#### 12.45.3.19 double QwtMagnifier::wheelFactor ( ) const

**Returns**

Wheel factor

**See Also**

setWheelFactor()

#### 12.45.3.20 Qt::KeyboardModifiers QwtMagnifier::wheelModifiers ( ) const

**Returns**

Wheel modifiers

**See Also**

setWheelModifiers()

#### 12.45.3.21 void QwtMagnifier::widgetKeyPressEvent ( QKeyEvent ∗ *keyEvent* ) [protected], [virtual]

Handle a key press event for the observed widget.

**Parameters**

| | |
|---|---|
| *keyEvent* | Key event |

**See Also**

eventFilter(), widgetKeyReleaseEvent()

#### 12.45.3.22 void QwtMagnifier::widgetKeyReleaseEvent ( QKeyEvent ∗ *keyEvent* ) [protected], [virtual]

Handle a key release event for the observed widget.

**Parameters**

| | |
|---|---|
| *keyEvent* | Key event |

**See Also**

eventFilter(), widgetKeyReleaseEvent()

#### 12.45.3.23 void QwtMagnifier::widgetMouseMoveEvent ( QMouseEvent ∗ *mouseEvent* ) [protected], [virtual]

Handle a mouse move event for the observed widget.

**Parameters**

| | |
|---|---|
| *mouseEvent* | Mouse event |

**See Also**

eventFilter(), widgetMousePressEvent(), widgetMouseReleaseEvent(),

#### 12.45.3.24 void QwtMagnifier::widgetMousePressEvent ( QMouseEvent ∗ *mouseEvent* ) [protected], [virtual]

Handle a mouse press event for the observed widget.

**Parameters**

| | |
|---|---|
| *mouseEvent* | Mouse event |

**See Also**

eventFilter(), widgetMouseReleaseEvent(), widgetMouseMoveEvent()

#### 12.45.3.25 void QwtMagnifier::widgetMouseReleaseEvent ( QMouseEvent ∗ *mouseEvent* ) [protected], [virtual]

Handle a mouse release event for the observed widget.

**Parameters**

| | |
|---|---|
| *mouseEvent* | Mouse event |

**See Also**

eventFilter(), widgetMousePressEvent(), widgetMouseMoveEvent(),

#### 12.45.3.26 void QwtMagnifier::widgetWheelEvent ( QWheelEvent ∗ *wheelEvent* ) [protected], [virtual]

Handle a wheel event for the observed widget.

**Parameters**

| | |
|---|---|
| *wheelEvent* | Wheel event |

**See Also**

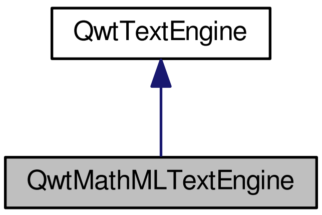
eventFilter()

## 12.46 QwtMathMLTextEngine Class Reference

Text Engine for the MathML renderer of the Qt solutions package.

```
#include <qwt_mathml_text_engine.h>
```

Inheritance diagram for QwtMathMLTextEngine:



**Public Member Functions**

- QwtMathMLTextEngine ()

*Constructor.*
- virtual ∼QwtMathMLTextEngine ()

  *Destructor.*
- virtual double heightForWidth (const QFont &font, int flags, const QString &text, double width) const
- virtual QSizeF textSize (const QFont &font, int flags, const QString &text) const
- virtual void draw (QPainter ∗painter, const QRectF &rect, int flags, const QString &text) const
- virtual bool mightRender (const QString &) const
- virtual void textMargins (const QFont &, const QString &, double &left, double &right, double &top, double &bottom) const

### Additional Inherited Members

### 12.46.1 Detailed Description

Text Engine for the MathML renderer of the Qt solutions package.

To enable MathML support the following code needs to be added to the application:

```
#include <qwt_mathml_text_engine.h>

QwtText::setTextEngine(QwtText::MathMLText, new QwtMathMLTextEngine());
```

**See Also**

QwtTextEngine, QwtText::setTextEngine

**Warning**

Unfortunately the MathML renderer doesn't support rotating of texts.

### 12.46.2 Member Function Documentation

#### 12.46.2.1 void QwtMathMLTextEngine::draw ( QPainter ∗ *painter,* const QRectF & *rect,* int *flags,* const QString & *text* ) const [virtual]

Draw the text in a clipping rectangle

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Clipping rectangle |
| *flags* | Bitwise OR of the flags like in for QPainter::drawText |
| *text* | Text to be rendered |

Implements QwtTextEngine.

#### 12.46.2.2 double QwtMathMLTextEngine::heightForWidth ( const QFont & *font,* int *flags,* const QString & *text,* double *width* ) const [virtual]

Find the height for a given width

**Parameters**

| | |
|---|---|
| *font* | Font of the text |

| | |
|---:|---|
| *flags* | Bitwise OR of the flags used like in QPainter::drawText |
| *text* | Text to be rendered |
| *width* | Width |

**Returns**

Calculated height

Implements QwtTextEngine.

#### 12.46.2.3 bool QwtMathMLTextEngine::mightRender ( const QString & *text* ) const [virtual]

Test if a string can be rendered by QwtMathMLTextEngine

**Parameters**

| | |
|---:|---|
| *text* | Text to be tested |

**Returns**

true, if text begins with "<math>".

Implements QwtTextEngine.

#### 12.46.2.4 void QwtMathMLTextEngine::textMargins ( const QFont & , const QString & , double & *left,* double & *right,* double & *top,* double & *bottom* ) const [virtual]

Return margins around the texts

**Parameters**

| | |
|---:|---|
| *left* | Return 0 |
| *right* | Return 0 |
| *top* | Return 0 |
| *bottom* | Return 0 |

Implements QwtTextEngine.

#### 12.46.2.5 QSizeF QwtMathMLTextEngine::textSize ( const QFont & *font,* int *flags,* const QString & *text* ) const [virtual]

Returns the size, that is needed to render text

**Parameters**

| | |
|---:|---|
| *font* | Font of the text |
| *flags* | Bitwise OR of the flags used like in QPainter::drawText |
| *text* | Text to be rendered |

**Returns**

Caluclated size

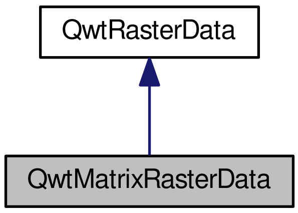
Implements QwtTextEngine.

## 12.47 QwtMatrixRasterData Class Reference

A class representing a matrix of values as raster data.

```
#include <qwt_matrix_raster_data.h>
```

Inheritance diagram for QwtMatrixRasterData:



### Public Types

- enum ResampleMode { NearestNeighbour, BilinearInterpolation }

  *Resampling algorithm The default setting is NearestNeighbour;.*

### Public Member Functions

- QwtMatrixRasterData ()

  *Constructor.*
- virtual ∼QwtMatrixRasterData ()

  *Destructor.*
- void setResampleMode (ResampleMode mode)

  *Set the resampling algorithm.*
- ResampleMode resampleMode () const
- virtual void setInterval (Qt::Axis, const QwtInterval &)

  *Assign the bounding interval for an axis.*
- void setValueMatrix (const QVector< double > &values, int numColumns)

  *Assign a value matrix.*
- const QVector< double > valueMatrix () const
- void setValue (int row, int col, double value)

  *Change a single value in the matrix.*
- int numColumns () const
- int numRows () const
- virtual QRectF pixelHint (const QRectF &) const

  *Calculate the pixel hint.*
- virtual double value (double x, double y) const

### 12.47.1 Detailed Description

A class representing a matrix of values as raster data.

QwtMatrixRasterData implements an interface for a matrix of equidistant values, that can be used by a QwtPlot-RasterItem. It implements a couple of resampling algorithms, to provide values for positions, that or not on the value matrix.

### 12.47.2 Member Enumeration Documentation

#### 12.47.2.1 enum QwtMatrixRasterData::ResampleMode

Resampling algorithm The default setting is NearestNeighbour;.

**Enumerator**

***NearestNeighbour*** Return the value from the matrix, that is nearest to the the requested position.

***BilinearInterpolation*** Interpolate the value from the distances and values of the 4 surrounding values in the matrix,

### 12.47.3 Member Function Documentation

#### 12.47.3.1 int QwtMatrixRasterData::numColumns ( ) const

**Returns**

Number of columns of the value matrix

**See Also**

valueMatrix(), numRows(), setValueMatrix()

#### 12.47.3.2 int QwtMatrixRasterData::numRows ( ) const

**Returns**

Number of rows of the value matrix

**See Also**

valueMatrix(), numColumns(), setValueMatrix()

#### 12.47.3.3 QRectF QwtMatrixRasterData::pixelHint ( const QRectF & *area* ) const [virtual]

Calculate the pixel hint.

pixelHint() returns the geometry of a pixel, that can be used to calculate the resolution and alignment of the plot item, that is representing the data.

- NearestNeighbour

  pixelHint() returns the surrounding pixel of the top left value in the matrix.

- BilinearInterpolation

  Returns an empty rectangle recommending to render in target device ( f.e. screen ) resolution.

**Parameters**

| | |
|---|---|
| *area* | Requested area, ignored |

**Returns**

Calculated hint

**See Also**

ResampleMode, setMatrix(), setInterval()

Reimplemented from QwtRasterData.

#### 12.47.3.4 QwtMatrixRasterData::ResampleMode QwtMatrixRasterData::resampleMode ( ) const

**Returns**

resampling algorithm

**See Also**

setResampleMode(), value()

#### 12.47.3.5 void QwtMatrixRasterData::setInterval ( Qt::Axis *axis*, const QwtInterval & *interval* ) [virtual]

Assign the bounding interval for an axis.

Setting the bounding intervals for the X/Y axis is mandatory to define the positions for the values of the value matrix. The interval in Z direction defines the possible range for the values in the matrix, what is f.e used by QwtPlot-Spectrogram to map values to colors. The Z-interval might be the bounding interval of the values in the matrix, but usually it isn't. ( f.e a interval of 0.0-100.0 for values in percentage )

**Parameters**

| | |
|---:|---|
| *axis* | X, Y or Z axis |
| *interval* | Interval |

**See Also**

QwtRasterData::interval(), setValueMatrix()

Reimplemented from QwtRasterData.

#### 12.47.3.6 void QwtMatrixRasterData::setResampleMode ( ResampleMode *mode* )

Set the resampling algorithm.

**Parameters**

| | |
|---:|---|
| *mode* | Resampling mode |

**See Also**

resampleMode(), value()

#### 12.47.3.7 void QwtMatrixRasterData::setValue ( int *row*, int *col*, double *value* )

Change a single value in the matrix.

**Parameters**

| | |
|---:|---|
| *row* | Row index |
| *col* | Column index |
| *value* | New value |

**See Also**

value(), setValueMatrix()

#### 12.47.3.8 void QwtMatrixRasterData::setValueMatrix ( const QVector$<$ double $>$ & *values*, int *numColumns* )

Assign a value matrix.

The positions of the values are calculated by dividing the bounding rectangle of the X/Y intervals into equidistant rectangles ( pixels ). Each value corresponds to the center of a pixel.

**Parameters**

| | |
|---:|---|
| *values* | Vector of values |
| *numColumns* | Number of columns |

**See Also**

valueMatrix(), numColumns(), numRows(), setInterval()()

#### 12.47.3.9 double QwtMatrixRasterData::value ( double *x*, double *y* ) const [virtual]

**Returns**

the value at a raster position

**Parameters**

| | |
|---:|---|
| *x* | X value in plot coordinates |
| *y* | Y value in plot coordinates |

**See Also**

ResampleMode

Implements QwtRasterData.

#### 12.47.3.10 const QVector< double > QwtMatrixRasterData::valueMatrix ( ) const

**Returns**

Value matrix

**See Also**

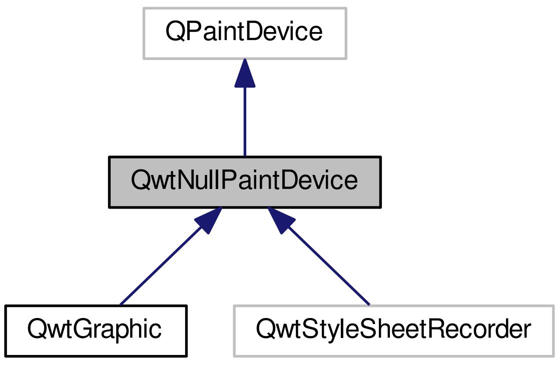
setValueMatrix(), numColumns(), numRows(), setInterval()

## 12.48 QwtNullPaintDevice Class Reference

A null paint device doing nothing.

`#include <qwt_null_paintdevice.h>`

Inheritance diagram for QwtNullPaintDevice:



### Public Types

- enum Mode { NormalMode, PolygonPathMode, PathMode }

  *Render mode.*

### Public Member Functions

- QwtNullPaintDevice ()

  *Constructor.*
- virtual ∼QwtNullPaintDevice ()

  *Destructor.*
- void setMode (Mode)
- Mode mode () const
- virtual QPaintEngine ∗ paintEngine () const

  *See QPaintDevice::paintEngine()*
- virtual int metric (PaintDeviceMetric metric) const
- virtual void drawRects (const QRect ∗, int)

  *See QPaintEngine::drawRects()*
- virtual void drawRects (const QRectF ∗, int)

  *See QPaintEngine::drawRects()*
- virtual void drawLines (const QLine ∗, int)

  *See QPaintEngine::drawLines()*
- virtual void drawLines (const QLineF ∗, int)

  *See QPaintEngine::drawLines()*
- virtual void drawEllipse (const QRectF &)

  *See QPaintEngine::drawEllipse()*
- virtual void drawEllipse (const QRect &)

  *See QPaintEngine::drawEllipse()*
- virtual void drawPath (const QPainterPath &)

  *See QPaintEngine::drawPath()*
- virtual void drawPoints (const QPointF ∗, int)

  *See QPaintEngine::drawPoints()*
- virtual void drawPoints (const QPoint ∗, int)

  *See QPaintEngine::drawPoints()*
- virtual void drawPolygon (const QPointF ∗, int, QPaintEngine::PolygonDrawMode)

  *See QPaintEngine::drawPolygon()*
- virtual void drawPolygon (const QPoint ∗, int, QPaintEngine::PolygonDrawMode)

  *See QPaintEngine::drawPolygon()*
- virtual void drawPixmap (const QRectF &, const QPixmap &, const QRectF &)

  *See QPaintEngine::drawPixmap()*
- virtual void drawTextItem (const QPointF &, const QTextItem &)

  *See QPaintEngine::drawTextItem()*
- virtual void drawTiledPixmap (const QRectF &, const QPixmap &, const QPointF &s)

  *See QPaintEngine::drawTiledPixmap()*
- virtual void drawImage (const QRectF &, const QImage &, const QRectF &, Qt::ImageConversionFlags)

  *See QPaintEngine::drawImage()*
- virtual void updateState (const QPaintEngineState &state)

  *See QPaintEngine::updateState()*

### Protected Member Functions

- virtual QSize sizeMetrics () const =0

### 12.48.1 Detailed Description

A null paint device doing nothing.

Sometimes important layout/rendering geometries are not available or changeable from the public Qt class interface. ( f.e hidden in the style implementation ).

QwtNullPaintDevice can be used to manipulate or filter out this information by analyzing the stream of paint primitives.

F.e. QwtNullPaintDevice is used by QwtPlotCanvas to identify styled backgrounds with rounded corners.

### 12.48.2 Member Enumeration Documentation

#### 12.48.2.1 enum QwtNullPaintDevice::Mode

Render mode.

**See Also**

setMode(), mode()

**Enumerator**

***NormalMode*** All vector graphic primitives are painted by the corresponding draw methods

***PolygonPathMode*** Vector graphic primitives ( beside polygons ) are mapped to a QPainterPath and are painted by drawPath. In PathMode mode only a few draw methods are called:

- drawPath()
- drawPixmap()
- drawImage()
- drawPolygon()

***PathMode*** Vector graphic primitives are mapped to a QPainterPath and are painted by drawPath. In PathMode mode only a few draw methods are called:

- drawPath()
- drawPixmap()
- drawImage()

### 12.48.3 Member Function Documentation

#### 12.48.3.1 int QwtNullPaintDevice::metric ( PaintDeviceMetric *deviceMetric* ) const `[virtual]`

See QPaintDevice::metric()

**Parameters**

| | |
|---|---|
| *deviceMetric* | Type of metric |

**Returns**

Metric information for the given paint device metric.

**See Also**

sizeMetrics()

#### 12.48.3.2 QwtNullPaintDevice::Mode QwtNullPaintDevice::mode ( ) const

**Returns**

Render mode

**See Also**

setMode()

#### 12.48.3.3 void QwtNullPaintDevice::setMode ( Mode *mode* )

Set the render mode

**Parameters**

| | |
|---|---|
| *mode* | New mode |

**See Also**

mode()

#### 12.48.3.4 virtual QSize QwtNullPaintDevice::sizeMetrics ( ) const `[protected]`, `[pure virtual]`

**Returns**

Size needed to implement metric()

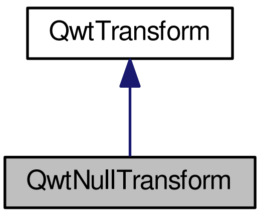
Implemented in QwtGraphic.

## 12.49 QwtNullTransform Class Reference

Null transformation.

`#include <qwt_transform.h>`

Inheritance diagram for QwtNullTransform:



**Public Member Functions**

- QwtNullTransform ()

  *Constructor.*
- virtual ~QwtNullTransform ()

  *Destructor.*

- virtual double transform (double value) const
- virtual double invTransform (double value) const
- virtual QwtTransform ∗ copy () const

#### 12.49.1 Detailed Description

Null transformation.

QwtNullTransform returns the values unmodified.

#### 12.49.2 Member Function Documentation

##### 12.49.2.1 QwtTransform ∗ QwtNullTransform::copy ( ) const [virtual]

**Returns**

Clone of the transformation

Implements QwtTransform.

##### 12.49.2.2 double QwtNullTransform::invTransform ( double *value* ) const [virtual]

**Parameters**

| | |
|---|---|
| *value* | Value to be transformed |

**Returns**

value unmodified

Implements QwtTransform.

##### 12.49.2.3 double QwtNullTransform::transform ( double *value* ) const [virtual]

**Parameters**

| | |
|---|---|
| *value* | Value to be transformed |

**Returns**

value unmodified

Implements QwtTransform.

### 12.50 QwtOHLCSample Class Reference

Open-High-Low-Close sample used in financial charts.

`#include <qwt_samples.h>`

#### Public Member Functions

- QwtOHLCSample (double time=0.0, double open=0.0, double high=0.0, double low=0.0, double close=0.0)
- QwtInterval boundingInterval () const

  *Calculate the bounding interval of the OHLC values.*
- bool isValid () const

  *Check if a sample is valid.*

#### Public Attributes

- double time
- double open

  *Opening price.*
- double high

  *Highest price.*
- double low

  *Lowest price.*
- double close

  *Closing price.*

### 12.50.1 Detailed Description

Open-High-Low-Close sample used in financial charts.

In financial charts the movement of a price in a time interval is often represented by the opening/closing prices and the lowest/highest prices in this interval.

#### See Also

QwtTradingChartData

### 12.50.2 Constructor & Destructor Documentation

#### 12.50.2.1 QwtOHLCSample::QwtOHLCSample ( double *t* = `0.0`, double *o* = `0.0`, double *h* = `0.0`, double *l* = `0.0`, double *c* = `0.0` ) `[inline]`

Constructor

**Parameters**

| | |
|---:|---|
| *t* | Time value |
| *o* | Open value |
| *h* | High value |
| *l* | Low value |
| *c* | Close value |

### 12.50.3 Member Function Documentation

#### 12.50.3.1 QwtInterval QwtOHLCSample::boundingInterval ( ) const `[inline]`

Calculate the bounding interval of the OHLC values.

For valid samples the limits of this interval are always low/high.

**Returns**

Bounding interval

**See Also**

isValid()

#### 12.50.3.2 bool QwtOHLCSample::isValid ( ) const [inline]

Check if a sample is valid.

A sample is valid, when all of the following checks are true:

- low <= high
- low <= open <= high
- low <= close <= high

**Returns**

True, when the sample is valid

### 12.50.4 Member Data Documentation

#### 12.50.4.1 double QwtOHLCSample::time

Time of the sample, usually a number representing a specific interval - like a day.

## 12.51 QwtPainter Class Reference

A collection of QPainter workarounds.

`#include <qwt_painter.h>`

**Static Public Member Functions**

- static void setPolylineSplitting (bool)

  *En/Disable line splitting for the raster paint engine.*
- static bool polylineSplitting ()
- static void setRoundingAlignment (bool)
- static bool roundingAlignment ()
- static bool roundingAlignment (QPainter ∗)
- static void drawText (QPainter ∗, double x, double y, const QString &)

  *Wrapper for QPainter::drawText()*
- static void drawText (QPainter ∗, const QPointF &, const QString &)

  *Wrapper for QPainter::drawText()*
- static void drawText (QPainter ∗, double x, double y, double w, double h, int flags, const QString &)

  *Wrapper for QPainter::drawText()*
- static void drawText (QPainter ∗, const QRectF &, int flags, const QString &)

  *Wrapper for QPainter::drawText()*
- static void drawSimpleRichText (QPainter ∗, const QRectF &, int flags, const QTextDocument &)
- static void drawRect (QPainter ∗, double x, double y, double w, double h)

  *Wrapper for QPainter::drawRect()*
- static void drawRect (QPainter ∗, const QRectF &rect)

  *Wrapper for QPainter::drawRect()*
- static void fillRect (QPainter ∗, const QRectF &, const QBrush &)

  *Wrapper for QPainter::fillRect()*
- static void drawEllipse (QPainter ∗, const QRectF &)

  *Wrapper for QPainter::drawEllipse()*
- static void drawPie (QPainter ∗, const QRectF &r, int a, int alen)

*Wrapper for QPainter::drawPie()*
- static void drawLine (QPainter ∗, double x1, double y1, double x2, double y2)

  *Wrapper for QPainter::drawLine()*
- static void drawLine (QPainter ∗, const QPointF &p1, const QPointF &p2)

  *Wrapper for QPainter::drawLine()*
- static void drawLine (QPainter ∗, const QLineF &)

  *Wrapper for QPainter::drawLine()*
- static void drawPolygon (QPainter ∗, const QPolygonF &)

  *Wrapper for QPainter::drawPolygon()*
- static void drawPolyline (QPainter ∗, const QPolygonF &)

  *Wrapper for QPainter::drawPolyline()*
- static void drawPolyline (QPainter ∗, const QPointF ∗, int pointCount)

  *Wrapper for QPainter::drawPolyline()*
- static void drawPolygon (QPainter ∗, const QPolygon &)

  *Wrapper for QPainter::drawPolygon()*
- static void drawPolyline (QPainter ∗, const QPolygon &)

  *Wrapper for QPainter::drawPolyline()*
- static void drawPolyline (QPainter ∗, const QPoint ∗, int pointCount)

  *Wrapper for QPainter::drawPolyline()*
- static void drawPoint (QPainter ∗, const QPoint &)

  *Wrapper for QPainter::drawPoint()*
- static void drawPoints (QPainter ∗, const QPolygon &)

  *Wrapper for QPainter::drawPoints()*
- static void drawPoints (QPainter ∗, const QPoint ∗, int pointCount)

  *Wrapper for QPainter::drawPoints()*
- static void drawPoint (QPainter ∗, double x, double y)

  *Wrapper for QPainter::drawPoint()*
- static void drawPoint (QPainter ∗, const QPointF &)

  *Wrapper for QPainter::drawPoint()*
- static void drawPoints (QPainter ∗, const QPolygonF &)

  *Wrapper for QPainter::drawPoints()*
- static void drawPoints (QPainter ∗, const QPointF ∗, int pointCount)

  *Wrapper for QPainter::drawPoints()*
- static void drawPath (QPainter ∗, const QPainterPath &)

  *Wrapper for QPainter::drawPath()*
- static void drawImage (QPainter ∗, const QRectF &, const QImage &)

  *Wrapper for QPainter::drawImage()*
- static void drawPixmap (QPainter ∗, const QRectF &, const QPixmap &)

  *Wrapper for QPainter::drawPixmap()*
- static void drawRoundFrame (QPainter ∗, const QRectF &, const QPalette &, int lineWidth, int frameStyle)
- static void drawRoundedFrame (QPainter ∗, const QRectF &, double xRadius, double yRadius, const QPalette &, int lineWidth, int frameStyle)
- static void drawFrame (QPainter ∗, const QRectF &rect, const QPalette &palette, QPalette::ColorRole foregroundRole, int lineWidth, int midLineWidth, int frameStyle)
- static void drawFocusRect (QPainter ∗, const QWidget ∗)

  *Draw a focus rectangle on a widget using its style.*
- static void drawFocusRect (QPainter ∗, const QWidget ∗, const QRect &)

  *Draw a focus rectangle on a widget using its style.*
- static void drawColorBar (QPainter ∗painter, const QwtColorMap &, const QwtInterval &, const QwtScaleMap &, Qt::Orientation, const QRectF &)
- static bool isAligning (QPainter ∗painter)
- static bool isX11GraphicsSystem ()
- static void fillPixmap (const QWidget ∗, QPixmap &, const QPoint &offset=QPoint())
- static void drawBackgound (QPainter ∗painter, const QRectF &rect, const QWidget ∗widget)
- static QPixmap backingStore (QWidget ∗, const QSize &)

#### 12.51.1 Detailed Description

A collection of QPainter workarounds.

#### 12.51.2 Member Function Documentation

##### 12.51.2.1 QPixmap QwtPainter::backingStore ( QWidget ∗ *widget,* const QSize & *size* ) [static]

**Returns**

A pixmap that can be used as backing store

**Parameters**

| | |
|---|---|
| *widget* | Widget, for which the backinstore is intended |
| *size* | Size of the pixmap |

##### 12.51.2.2 void QwtPainter::drawBackgound ( QPainter ∗ *painter,* const QRectF & *rect,* const QWidget ∗ *widget* ) [static]

Fill rect with the background of a widget

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Rectangle to be filled |
| *widget* | Widget |

**See Also**

QStyle::PE_Widget, QWidget::backgroundRole()

##### 12.51.2.3 void QwtPainter::drawColorBar ( QPainter ∗ *painter,* const QwtColorMap & *colorMap,* const QwtInterval & *interval,* const QwtScaleMap & *scaleMap,* Qt::Orientation *orientation,* const QRectF & *rect* ) [static]

Draw a color bar into a rectangle

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *colorMap* | Color map |
| *interval* | Value range |
| *scaleMap* | Scale map |
| *orientation* | Orientation |
| *rect* | Traget rectangle |

##### 12.51.2.4 void QwtPainter::drawFrame ( QPainter ∗ *painter,* const QRectF & *rect,* const QPalette & *palette,* QPalette::ColorRole *foregroundRole,* int *frameWidth,* int *midLineWidth,* int *frameStyle* ) [static]

Draw a rectangular frame

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Frame rectangle |

| | |
|---:|---|
| *palette* | Palette |
| *foregroundRole* | Foreground role used for QFrame::Plain |
| *frameWidth* | Frame width |
| *midLineWidth* | Used for QFrame::Box |
| *frameStyle* | bitwise OR´ed value of QFrame::Shape and QFrame::Shadow |

#### 12.51.2.5 void QwtPainter::drawRoundedFrame ( QPainter ∗ *painter*, const QRectF & *rect*, double *xRadius*, double *yRadius*, const QPalette & *palette*, int *lineWidth*, int *frameStyle* ) `[static]`

Draw a rectangular frame with rounded borders

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *rect* | Frame rectangle |
| *xRadius* | x-radius of the ellipses defining the corners |
| *yRadius* | y-radius of the ellipses defining the corners |
| *palette* | QPalette::WindowText is used for plain borders QPalette::Dark and QPalette::Light for raised or sunken borders |
| *lineWidth* | Line width |
| *frameStyle* | bitwise OR´ed value of QFrame::Shape and QFrame::Shadow |

#### 12.51.2.6 void QwtPainter::drawRoundFrame ( QPainter ∗ *painter*, const QRectF & *rect*, const QPalette & *palette*, int *lineWidth*, int *frameStyle* ) `[static]`

Draw a round frame

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *rect* | Frame rectangle |
| *palette* | QPalette::WindowText is used for plain borders QPalette::Dark and QPalette::Light for raised or sunken borders |
| *lineWidth* | Line width |
| *frameStyle* | bitwise OR´ed value of QFrame::Shape and QFrame::Shadow |

#### 12.51.2.7 void QwtPainter::drawSimpleRichText ( QPainter ∗ *painter*, const QRectF & *rect*, int *flags*, const QTextDocument & *text* ) `[static]`

Draw a text document into a rectangle

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *rect* | Traget rectangle |
| *flags* | Alignments/Text flags, see QPainter::drawText() |
| *text* | Text document |

#### 12.51.2.8 void QwtPainter::fillPixmap ( const QWidget ∗ *widget*, QPixmap & *pixmap*, const QPoint & *offset* = `QPoint()` ) `[static]`

Fill a pixmap with the content of a widget

In Qt >= 5.0 QPixmap::fill() is a nop, in Qt 4.x it is buggy for backgrounds with gradients. Thus fillPixmap() offers an alternative implementation.

**Parameters**

| | |
|---:|---|
| *widget* | Widget |
| *pixmap* | Pixmap to be filled |
| *offset* | Offset |

**See Also**

QPixmap::fill()

#### 12.51.2.9 bool QwtPainter::isAligning ( QPainter ∗ *painter* ) [static]

Check if the painter is using a paint engine, that aligns coordinates to integers. Today these are all paint engines beside QPaintEngine::Pdf and QPaintEngine::SVG.

If we have an integer based paint engine it is also checked if the painter has a transformation matrix, that rotates or scales.

**Parameters**

| | |
|---:|---|
| *painter* | Painter |

**Returns**

true, when the painter is aligning

**See Also**

setRoundingAlignment()

#### 12.51.2.10 bool QwtPainter::isX11GraphicsSystem ( ) [static]

Check is the application is running with the X11 graphics system that has some special capabilities that can be used for incremental painting to a widget.

**Returns**

True, when the graphics system is X11

#### 12.51.2.11 bool QwtPainter::polylineSplitting ( ) [inline], [static]

**Returns**

True, when line splitting for the raster paint engine is enabled.

**See Also**

setPolylineSplitting()

#### 12.51.2.12 bool QwtPainter::roundingAlignment ( ) [inline], [static]

Check whether coordinates should be rounded, before they are painted to a paint engine that rounds to integer values. For other paint engines ( PDF, SVG ), this flag has no effect.

**Returns**

True, when rounding is enabled

**See Also**

setRoundingAlignment(), isAligning()

#### 12.51.2.13 bool QwtPainter::roundingAlignment ( QPainter * *painter* ) [inline], [static]

**Returns**

roundingAlignment() && isAligning(painter);

**Parameters**

| | |
|---|---|
| *painter* | Painter |

#### 12.51.2.14 void QwtPainter::setPolylineSplitting ( bool *enable* ) [static]

En/Disable line splitting for the raster paint engine.

In some Qt versions the raster paint engine paints polylines of many points much faster when they are split in smaller chunks: f.e all supported Qt versions >= Qt 5.0 when drawing an antialiased polyline with a pen width >=2.

The default setting is true.

**See Also**

polylineSplitting()

#### 12.51.2.15 void QwtPainter::setRoundingAlignment ( bool *enable* ) [static]

Enable whether coordinates should be rounded, before they are painted to a paint engine that floors to integer values. For other paint engines this ( PDF, SVG ), this flag has no effect. QwtPainter stores this flag only, the rounding itself is done in the painting code ( f.e the plot items ).

The default setting is true.

**See Also**

roundingAlignment(), isAligning()

## 12.52 QwtPainterCommand Class Reference

```
#include <qwt_painter_command.h>
```

**Classes**

- struct **ImageData**

  *Attributes how to paint a QImage.*
- struct **PixmapData**

  *Attributes how to paint a QPixmap.*
- struct **StateData**

  *Attributes of a state change.*

**Public Types**

- enum Type {
  Invalid = -1, Path, Pixmap, Image,
  State }

  *Type of the paint command.*

**Public Member Functions**

- QwtPainterCommand ()

  *Construct an invalid command.*
- QwtPainterCommand (const QwtPainterCommand &)
- QwtPainterCommand (const QPainterPath &)

  *Copy constructor.*
- QwtPainterCommand (const QRectF &rect, const QPixmap &, const QRectF &subRect)
- QwtPainterCommand (const QRectF &rect, const QImage &, const QRectF &subRect, Qt::ImageConversion-Flags)
- QwtPainterCommand (const QPaintEngineState &)
- ∼QwtPainterCommand ()

  *Destructor.*
- QwtPainterCommand & operator= (const QwtPainterCommand &)
- Type type () const
- QPainterPath ∗ path ()
- const QPainterPath ∗ path () const
- PixmapData ∗ pixmapData ()
- const PixmapData ∗ pixmapData () const
- ImageData ∗ imageData ()
- const ImageData ∗ imageData () const
- StateData ∗ stateData ()
- const StateData ∗ stateData () const

### 12.52.1 Detailed Description

QwtPainterCommand represents the attributes of a paint operation how it is used between QPainter and QPaint-Device

It is used by QwtGraphic to record and replay paint operations

**See Also**

QwtGraphic::commands()

### 12.52.2 Member Enumeration Documentation

#### 12.52.2.1 enum QwtPainterCommand::Type

Type of the paint command.

**Enumerator**

***Invalid*** Invalid command.

***Path*** Draw a QPainterPath.

***Pixmap*** Draw a QPixmap.

***Image*** Draw a QImage.

***State*** QPainter state change.

### 12.52.3 Constructor & Destructor Documentation

#### 12.52.3.1 QwtPainterCommand::QwtPainterCommand ( const QwtPainterCommand & *other* )

Copy constructor

**Parameters**

| | |
|---|---|
| *other* | Command to be copied |

#### 12.52.3.2 QwtPainterCommand::QwtPainterCommand ( const QRectF & *rect,* const QPixmap & *pixmap,* const QRectF & *subRect* )

Constructor for Pixmap paint operation

**Parameters**

| | |
|---|---|
| *rect* | Target rectangle |
| *pixmap* | Pixmap |
| *subRect* | Rectangle inside the pixmap |

**See Also**

QPainter::drawPixmap()

#### 12.52.3.3 QwtPainterCommand::QwtPainterCommand ( const QRectF & *rect,* const QImage & *image,* const QRectF & *subRect,* Qt::ImageConversionFlags *flags* )

Constructor for Image paint operation

**Parameters**

| | |
|---|---|
| *rect* | Target rectangle |
| *image* | Image |
| *subRect* | Rectangle inside the image |
| *flags* | Conversion flags |

**See Also**

QPainter::drawImage()

#### 12.52.3.4 QwtPainterCommand::QwtPainterCommand ( const QPaintEngineState & *state* )

Constructor for State paint operation

**Parameters**

| | |
|---|---|
| *state* | Paint engine state |

### 12.52.4 Member Function Documentation

#### 12.52.4.1 QwtPainterCommand::ImageData $*$ QwtPainterCommand::imageData ( )

**Returns**

Attributes how to paint a QImage

#### 12.52.4.2 const QwtPainterCommand::ImageData $*$ QwtPainterCommand::imageData ( ) const [inline]

**Returns**

Attributes how to paint a QImage

#### 12.52.4.3 QwtPainterCommand & QwtPainterCommand::operator= ( const QwtPainterCommand & *other* )

Assignment operator

**Parameters**

| | |
|---|---|
| *other* | Command to be copied |

**Returns**

Modified command

#### 12.52.4.4 QPainterPath ∗ QwtPainterCommand::path ( )

**Returns**

Painter path to be painted

#### 12.52.4.5 const QPainterPath ∗ QwtPainterCommand::path ( ) const `[inline]`

**Returns**

Painter path to be painted

#### 12.52.4.6 QwtPainterCommand::PixmapData ∗ QwtPainterCommand::pixmapData ( )

**Returns**

Attributes how to paint a QPixmap

#### 12.52.4.7 const QwtPainterCommand::PixmapData ∗ QwtPainterCommand::pixmapData ( ) const `[inline]`

**Returns**

Attributes how to paint a QPixmap

#### 12.52.4.8 QwtPainterCommand::StateData ∗ QwtPainterCommand::stateData ( )

**Returns**

Attributes of a state change

#### 12.52.4.9 const QwtPainterCommand::StateData ∗ QwtPainterCommand::stateData ( ) const `[inline]`

**Returns**

Attributes of a state change

#### 12.52.4.10 QwtPainterCommand::Type QwtPainterCommand::type ( ) const `[inline]`

**Returns**

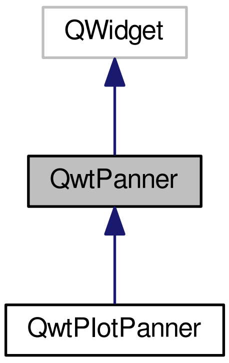
Type of the command

## 12.53 QwtPanner Class Reference

QwtPanner provides panning of a widget.

`#include <qwt_panner.h>`

Inheritance diagram for QwtPanner:



### Signals

- void panned (int dx, int dy)
- void moved (int dx, int dy)

### Public Member Functions

- QwtPanner (QWidget ∗parent)
- virtual ∼QwtPanner ()

  *Destructor.*
- void setEnabled (bool)

  *En/disable the panner.*
- bool isEnabled () const
- void setMouseButton (Qt::MouseButton, Qt::KeyboardModifiers=Qt::NoModifier)
- void getMouseButton (Qt::MouseButton &button, Qt::KeyboardModifiers &) const

  *Get mouse button and modifiers used for panning.*
- void setAbortKey (int key, Qt::KeyboardModifiers=Qt::NoModifier)
- void getAbortKey (int &key, Qt::KeyboardModifiers &) const

  *Get the abort key and modifiers.*
- void setCursor (const QCursor &)
- const QCursor cursor () const
- void setOrientations (Qt::Orientations)
- Qt::Orientations orientations () const

  *Return the orientation, where paning is enabled.*
- bool isOrientationEnabled (Qt::Orientation) const
- virtual bool eventFilter (QObject ∗, QEvent ∗)

  *Event filter.*

#### Protected Member Functions

- virtual void widgetMousePressEvent (QMouseEvent ∗)
- virtual void widgetMouseReleaseEvent (QMouseEvent ∗)
- virtual void widgetMouseMoveEvent (QMouseEvent ∗)
- virtual void widgetKeyPressEvent (QKeyEvent ∗)
- virtual void widgetKeyReleaseEvent (QKeyEvent ∗)
- virtual void paintEvent (QPaintEvent ∗)

    *Paint event.*
- virtual QBitmap contentsMask () const

    *Calculate a mask for the contents of the panned widget.*
- virtual QPixmap grab () const

### 12.53.1 Detailed Description

QwtPanner provides panning of a widget.

QwtPanner grabs the contents of a widget, that can be dragged in all directions. The offset between the start and the end position is emitted by the panned signal.

QwtPanner grabs the content of the widget into a pixmap and moves the pixmap around, without initiating any repaint events for the widget. Areas, that are not part of content are not painted while panning. This makes panning fast enough for widgets, where repaints are too slow for mouse movements.

For widgets, where repaints are very fast it might be better to implement panning manually by mapping mouse events into paint events.

### 12.53.2 Constructor & Destructor Documentation

#### 12.53.2.1 QwtPanner::QwtPanner ( QWidget ∗ *parent* )

Creates an panner that is enabled for the left mouse button.

**Parameters**

| | |
|---|---|
| *parent* | Parent widget to be panned |

### 12.53.3 Member Function Documentation

#### 12.53.3.1 QBitmap QwtPanner::contentsMask ( ) const `[protected], [virtual]`

Calculate a mask for the contents of the panned widget.

Sometimes only parts of the contents of a widget should be panned. F.e. for a widget with a styled background with rounded borders only the area inside of the border should be panned.

**Returns**

An empty bitmap, indicating no mask

Reimplemented in QwtPlotPanner.

#### 12.53.3.2 const QCursor QwtPanner::cursor ( ) const

**Returns**

Cursor that is active while panning

**See Also**

setCursor()

#### 12.53.3.3 bool QwtPanner::eventFilter ( QObject ∗ *object*, QEvent ∗ *event* ) `[virtual]`

Event filter.

When isEnabled() is true mouse events of the observed widget are filtered.

**Parameters**

| | |
|---|---|
| *object* | Object to be filtered |
| *event* | Event |

**Returns**

Always false, beside for paint events for the parent widget.

**See Also**

widgetMousePressEvent(), widgetMouseReleaseEvent(), widgetMouseMoveEvent()

#### 12.53.3.4 QPixmap QwtPanner::grab ( ) const `[protected]`, `[virtual]`

Grab the widget into a pixmap.

**Returns**

Grabbed pixmap

Reimplemented in QwtPlotPanner.

#### 12.53.3.5 bool QwtPanner::isEnabled ( ) const

**Returns**

true when enabled, false otherwise

**See Also**

setEnabled, eventFilter()

#### 12.53.3.6 bool QwtPanner::isOrientationEnabled ( Qt::Orientation *o* ) const

**Returns**

True if an orientation is enabled

**See Also**

orientations(), setOrientations()

#### 12.53.3.7 void QwtPanner::moved ( int *dx*, int *dy* ) `[signal]`

Signal emitted, while the widget moved, but panning is not finished.

**Parameters**

| | |
|---|---|
| *dx* | Offset in horizontal direction |
| *dy* | Offset in vertical direction |

#### 12.53.3.8 void QwtPanner::paintEvent ( QPaintEvent * *pe* ) `[protected]`, `[virtual]`

Paint event.

Repaint the grabbed pixmap on its current position and fill the empty spaces by the background of the parent widget.

**Parameters**

| | |
|---|---|
| *pe* | Paint event |

#### 12.53.3.9 void QwtPanner::panned ( int *dx*, int *dy* ) `[signal]`

Signal emitted, when panning is done

**Parameters**

| | |
|---|---|
| *dx* | Offset in horizontal direction |
| *dy* | Offset in vertical direction |

#### 12.53.3.10 void QwtPanner::setAbortKey ( int *key*, Qt::KeyboardModifiers *modifiers* = `Qt::NoModifier` )

Change the abort key The defaults are Qt::Key_Escape and Qt::NoModifiers

**Parameters**

| | |
|---|---|
| *key* | Key ( See Qt::Keycode ) |
| *modifiers* | Keyboard modifiers |

#### 12.53.3.11 void QwtPanner::setCursor ( const QCursor & *cursor* )

Change the cursor, that is active while panning The default is the cursor of the parent widget.

**Parameters**

| | |
|---|---|
| *cursor* | New cursor |

**See Also**

setCursor()

#### 12.53.3.12 void QwtPanner::setEnabled ( bool *on* )

En/disable the panner.

When enabled is true an event filter is installed for the observed widget, otherwise the event filter is removed.

**Parameters**

| | |
|---|---|
| *on* | true or false |

**See Also**

isEnabled(), eventFilter()

#### 12.53.3.13 void QwtPanner::setMouseButton ( Qt::MouseButton *button*, Qt::KeyboardModifiers *modifiers* = `Qt::NoModifier` )

Change the mouse button and modifiers used for panning The defaults are Qt::LeftButton and Qt::NoModifier

#### 12.53.3.14 void QwtPanner::setOrientations ( Qt::Orientations *o* )

Set the orientations, where panning is enabled The default value is in both directions: Qt::Horizontal | Qt::Vertical

/param o Orientation

#### 12.53.3.15 void QwtPanner::widgetKeyPressEvent ( QKeyEvent ∗ *keyEvent* ) `[protected]`, `[virtual]`

Handle a key press event for the observed widget.

**Parameters**

| | |
|---|---|
| *keyEvent* | Key event |

**See Also**

eventFilter(), widgetKeyReleaseEvent()

#### 12.53.3.16 void QwtPanner::widgetKeyReleaseEvent ( QKeyEvent ∗ *keyEvent* ) `[protected]`, `[virtual]`

Handle a key release event for the observed widget.

**Parameters**

| | |
|---|---|
| *keyEvent* | Key event |

**See Also**

eventFilter(), widgetKeyReleaseEvent()

#### 12.53.3.17 void QwtPanner::widgetMouseMoveEvent ( QMouseEvent ∗ *mouseEvent* ) `[protected]`, `[virtual]`

Handle a mouse move event for the observed widget.

**Parameters**

| | |
|---|---|
| *mouseEvent* | Mouse event |

**See Also**

eventFilter(), widgetMousePressEvent(), widgetMouseReleaseEvent()

#### 12.53.3.18 void QwtPanner::widgetMousePressEvent ( QMouseEvent ∗ *mouseEvent* ) `[protected]`, `[virtual]`

Handle a mouse press event for the observed widget.

**Parameters**

| | |
|---|---|
| *mouseEvent* | Mouse event |

**See Also**

eventFilter(), widgetMouseReleaseEvent(), widgetMouseMoveEvent(),

#### 12.53.3.19 void QwtPanner::widgetMouseReleaseEvent ( QMouseEvent ∗ *mouseEvent* ) `[protected]`, `[virtual]`

Handle a mouse release event for the observed widget.

**Parameters**

| | |
|---|---|
| *mouseEvent* | Mouse event |

**See Also**

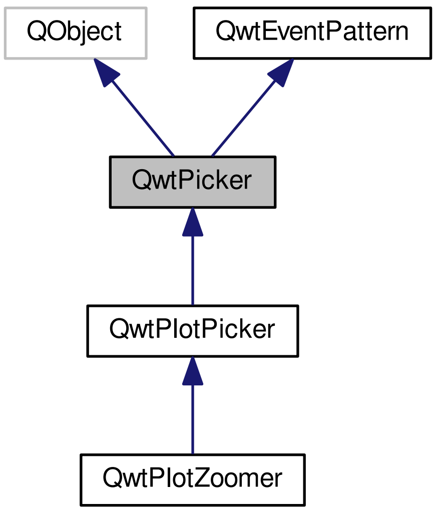
eventFilter(), widgetMousePressEvent(), widgetMouseMoveEvent(),

## 12.54 QwtPicker Class Reference

QwtPicker provides selections on a widget.

`#include <qwt_picker.h>`

Inheritance diagram for QwtPicker:



**Public Types**

- enum RubberBand {
  NoRubberBand = 0, HLineRubberBand, VLineRubberBand, CrossRubberBand,
  RectRubberBand, EllipseRubberBand, PolygonRubberBand, UserRubberBand = 100 }
- enum DisplayMode { AlwaysOff, AlwaysOn, ActiveOnly }

  *Display mode.*
- enum ResizeMode { Stretch, KeepSize }

**Public Slots**

- void setEnabled (bool)

  *En/disable the picker.*

### Signals

- void activated (bool on)
- void selected (const QPolygon &polygon)
- void appended (const QPoint &pos)
- void moved (const QPoint &pos)
- void removed (const QPoint &pos)
- void changed (const QPolygon &selection)

### Public Member Functions

- QwtPicker (QWidget ∗parent)
- QwtPicker (RubberBand rubberBand, DisplayMode trackerMode, QWidget ∗)
- virtual ∼QwtPicker ()

  *Destructor.*
- void setStateMachine (QwtPickerMachine ∗)
- const QwtPickerMachine ∗ stateMachine () const
- QwtPickerMachine ∗ stateMachine ()
- void setRubberBand (RubberBand)
- RubberBand rubberBand () const
- void setTrackerMode (DisplayMode)

  *Set the display mode of the tracker.*
- DisplayMode trackerMode () const
- void setResizeMode (ResizeMode)

  *Set the resize mode.*
- ResizeMode resizeMode () const
- void setRubberBandPen (const QPen &)
- QPen rubberBandPen () const
- void setTrackerPen (const QPen &)
- QPen trackerPen () const
- void setTrackerFont (const QFont &)
- QFont trackerFont () const
- bool isEnabled () const
- bool isActive () const
- virtual bool eventFilter (QObject ∗, QEvent ∗)

  *Event filter.*
- QWidget ∗ parentWidget ()

  *Return the parent widget, where the selection happens.*
- const QWidget ∗ parentWidget () const

  *Return the parent widget, where the selection happens.*
- virtual QPainterPath pickArea () const
- virtual void drawRubberBand (QPainter ∗) const
- virtual void drawTracker (QPainter ∗) const
- virtual QRegion rubberBandMask () const
- virtual QwtText trackerText (const QPoint &pos) const

  *Return the label for a position.*
- QPoint trackerPosition () const
- virtual QRect trackerRect (const QFont &) const
- QPolygon selection () const

### Protected Member Functions

- virtual QPolygon adjustedPoints (const QPolygon &) const

    *Map the pickedPoints() into a selection()*
- virtual void transition (const QEvent ∗)
- virtual void begin ()
- virtual void append (const QPoint &)
- virtual void move (const QPoint &)
- virtual void remove ()
- virtual bool end (bool ok=true)

    *Close a selection setting the state to inactive.*
- virtual bool accept (QPolygon &) const

    *Validate and fix up the selection.*
- virtual void reset ()
- virtual void widgetMousePressEvent (QMouseEvent ∗)
- virtual void widgetMouseReleaseEvent (QMouseEvent ∗)
- virtual void widgetMouseDoubleClickEvent (QMouseEvent ∗)
- virtual void widgetMouseMoveEvent (QMouseEvent ∗)
- virtual void widgetWheelEvent (QWheelEvent ∗)
- virtual void widgetKeyPressEvent (QKeyEvent ∗)
- virtual void widgetKeyReleaseEvent (QKeyEvent ∗)
- virtual void widgetEnterEvent (QEvent ∗)
- virtual void widgetLeaveEvent (QEvent ∗)
- virtual void stretchSelection (const QSize &oldSize, const QSize &newSize)
- virtual void updateDisplay ()

    *Update the state of rubber band and tracker label.*
- const QwtWidgetOverlay ∗ rubberBandOverlay () const
- const QwtWidgetOverlay ∗ trackerOverlay () const
- const QPolygon & pickedPoints () const

### 12.54.1 Detailed Description

QwtPicker provides selections on a widget.

QwtPicker filters all enter, leave, mouse and keyboard events of a widget and translates them into an array of selected points.

The way how the points are collected depends on type of state machine that is connected to the picker. Qwt offers a couple of predefined state machines for selecting:

- Nothing

    QwtPickerTrackerMachine
- Single points

    QwtPickerClickPointMachine, QwtPickerDragPointMachine
- Rectangles

    QwtPickerClickRectMachine, QwtPickerDragRectMachine
- Polygons

    QwtPickerPolygonMachine

While these state machines cover the most common ways to collect points it is also possible to implement individual machines as well.

QwtPicker translates the picked points into a selection using the adjustedPoints() method. adjustedPoints() is intended to be reimplemented to fix up the selection according to application specific requirements. (F.e. when an application accepts rectangles of a fixed aspect ratio only.)

Optionally QwtPicker support the process of collecting points by a rubber band and tracker displaying a text for the current mouse position.

**Example**

```
#include <qwt_picker.h>
#include <qwt_picker_machine.h>

QwtPicker *picker = new QwtPicker(widget);
picker->setStateMachine(new QwtPickerDragRectMachine);
picker->setTrackerMode(QwtPicker::ActiveOnly);
picker->setRubberBand(QwtPicker::RectRubberBand);
```

The state machine triggers the following commands:

- begin()

  Activate/Initialize the selection.

- append()

  Add a new point

- move()

  Change the position of the last point.

- remove()

  Remove the last point.

- end()

  Terminate the selection and call accept to validate the picked points.

The picker is active (isActive()), between begin() and end(). In active state the rubber band is displayed, and the tracker is visible in case of trackerMode is ActiveOnly or AlwaysOn.

The cursor can be moved using the arrow keys. All selections can be aborted using the abort key. (QwtEventPattern::KeyPatternCode)

**Warning**

In case of QWidget::NoFocus the focus policy of the observed widget is set to QWidget::WheelFocus and mouse tracking will be manipulated while the picker is active, or if trackerMode() is AlwayOn.

### 12.54.2 Member Enumeration Documentation

#### 12.54.2.1 enum QwtPicker::DisplayMode

Display mode.

**See Also**

setTrackerMode(), trackerMode(), isActive()

**Enumerator**

***AlwaysOff*** Display never.

***AlwaysOn*** Display always.

***ActiveOnly*** Display only when the selection is active.

#### 12.54.2.2 enum QwtPicker::ResizeMode

Controls what to do with the selected points of an active selection when the observed widget is resized.

The default value is QwtPicker::Stretch.

**See Also**

setResizeMode()

**Enumerator**

***Stretch*** All points are scaled according to the new size,.

***KeepSize*** All points remain unchanged.

#### 12.54.2.3 enum QwtPicker::RubberBand

Rubber band style

The default value is QwtPicker::NoRubberBand.

**See Also**

setRubberBand(), rubberBand()

**Enumerator**

***NoRubberBand*** No rubberband.

***HLineRubberBand*** A horizontal line ( only for QwtPickerMachine::PointSelection )

***VLineRubberBand*** A vertical line ( only for QwtPickerMachine::PointSelection )

***CrossRubberBand*** A crosshair ( only for QwtPickerMachine::PointSelection )

***RectRubberBand*** A rectangle ( only for QwtPickerMachine::RectSelection )

***EllipseRubberBand*** An ellipse ( only for QwtPickerMachine::RectSelection )

***PolygonRubberBand*** A polygon ( only for QwtPickerMachine::PolygonSelection )

***UserRubberBand*** Values >= UserRubberBand can be used to define additional rubber bands.

### 12.54.3 Constructor & Destructor Documentation

#### 12.54.3.1 QwtPicker::QwtPicker ( QWidget * *parent* ) `[explicit]`

Constructor

Creates an picker that is enabled, but without a state machine. rubber band and tracker are disabled.

**Parameters**

| | |
|---|---|
| *parent* | Parent widget, that will be observed |

#### 12.54.3.2 QwtPicker::QwtPicker ( RubberBand *rubberBand,* DisplayMode *trackerMode,* QWidget * *parent* ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *rubberBand* | Rubber band style |
| *trackerMode* | Tracker mode |
| *parent* | Parent widget, that will be observed |

### 12.54.4 Member Function Documentation

#### 12.54.4.1 bool QwtPicker::accept ( QPolygon & *selection* ) const [protected], [virtual]

Validate and fix up the selection.

Accepts all selections unmodified

**Parameters**

| | |
|---|---|
| *selection* | Selection to validate and fix up |

**Returns**

true, when accepted, false otherwise

Reimplemented in QwtPlotZoomer.

#### 12.54.4.2 void QwtPicker::activated ( bool *on* ) [signal]

A signal indicating, when the picker has been activated. Together with setEnabled() it can be used to implement selections with more than one picker.

**Parameters**

| | |
|---|---|
| *on* | True, when the picker has been activated |

#### 12.54.4.3 QPolygon QwtPicker::adjustedPoints ( const QPolygon & *points* ) const [protected], [virtual]

Map the pickedPoints() into a selection()

adjustedPoints() maps the points, that have been collected on the parentWidget() into a selection(). The default implementation simply returns the points unmodified.

The reason, why a selection() differs from the picked points depends on the application requirements. F.e. :

- A rectangular selection might need to have a specific aspect ratio only.
- A selection could accept non intersecting polygons only.
- ...

  The example below is for a rectangular selection, where the first point is the center of the selected rectangle.

**Example**

```
QPolygon MyPicker::adjustedPoints(const QPolygon &points) const
{
    QPolygon adjusted;
    if ( points.size() == 2 )
    {
        const int width = qAbs(points[1].x() - points[0].x());
        const int height = qAbs(points[1].y() - points[0].y());

        QRect rect(0, 0, 2 * width, 2 * height);
        rect.moveCenter(points[0]);

        adjusted += rect.topLeft();
        adjusted += rect.bottomRight();
    }
    return adjusted;
}
```

**Parameters**

|  |  |
|---|---|
| *points* | Selected points |

**Returns**

Selected points unmodified

#### 12.54.4.4 void QwtPicker::append ( const QPoint & *pos* ) [protected], [virtual]

Append a point to the selection and update rubber band and tracker. The appended() signal is emitted.

**Parameters**

|  |  |
|---|---|
| *pos* | Additional point |

**See Also**

isActive(), begin(), end(), move(), appended()

Reimplemented in QwtPlotPicker.

#### 12.54.4.5 void QwtPicker::appended ( const QPoint & *pos* ) [signal]

A signal emitted when a point has been appended to the selection

**Parameters**

|  |  |
|---|---|
| *pos* | Position of the appended point. |

**See Also**

append(). moved()

#### 12.54.4.6 void QwtPicker::begin ( ) [protected], [virtual]

Open a selection setting the state to active

**See Also**

isActive(), end(), append(), move()

Reimplemented in QwtPlotZoomer.

#### 12.54.4.7 void QwtPicker::changed ( const QPolygon & *selection* ) [signal]

A signal emitted when the active selection has been changed. This might happen when the observed widget is resized.

**Parameters**

|  |  |
|---|---|
| *selection* | Changed selection |

**See Also**

stretchSelection()

#### 12.54.4.8 void QwtPicker::drawRubberBand ( QPainter ∗ *painter* ) const [virtual]

Draw a rubber band, depending on rubberBand()

**Parameters**

| | |
|---|---|
| *painter* | Painter, initialized with a clip region |

**See Also**

rubberBand(), RubberBand

#### 12.54.4.9 void QwtPicker::drawTracker ( QPainter ∗ *painter* ) const [virtual]

Draw the tracker

**Parameters**

| | |
|---|---|
| *painter* | Painter |

**See Also**

trackerRect(), trackerText()

#### 12.54.4.10 bool QwtPicker::end ( bool *ok* = true ) [protected], [virtual]

Close a selection setting the state to inactive.

The selection is validated and maybe fixed by accept().

**Parameters**

| | |
|---|---|
| *ok* | If true, complete the selection and emit a selected signal otherwise discard the selection. |

**Returns**

true if the selection is accepted, false otherwise

**See Also**

isActive(), begin(), append(), move(), selected(), accept()

Reimplemented in QwtPlotZoomer, and QwtPlotPicker.

#### 12.54.4.11 bool QwtPicker::eventFilter ( QObject ∗ *object,* QEvent ∗ *event* ) [virtual]

Event filter.

When isEnabled() is true all events of the observed widget are filtered. Mouse and keyboard events are translated into widgetMouse- and widgetKey- and widgetWheel-events. Paint and Resize events are handled to keep rubber band and tracker up to date.

**Parameters**

| | |
|---|---|
| *object* | Object to be filtered |
| *event* | Event |

**Returns**

Always false.

**See Also**

widgetEnterEvent(), widgetLeaveEvent(), widgetMousePressEvent(), widgetMouseReleaseEvent(), widgetMouseDoubleClickEvent(), widgetMouseMoveEvent(), widgetWheelEvent(), widgetKeyPressEvent(), widgetKeyReleaseEvent(), QObject::installEventFilter(), QObject::event()

#### 12.54.4.12 bool QwtPicker::isActive ( ) const

A picker is active between begin() and end().

**Returns**

true if the selection is active.

#### 12.54.4.13 bool QwtPicker::isEnabled ( ) const

**Returns**

true when enabled, false otherwise

**See Also**

setEnabled(), eventFilter()

#### 12.54.4.14 void QwtPicker::move ( const QPoint & *pos* ) [protected], [virtual]

Move the last point of the selection The moved() signal is emitted.

**Parameters**

| | |
|---|---|
| *pos* | New position |

**See Also**

isActive(), begin(), end(), append()

Reimplemented in QwtPlotPicker.

#### 12.54.4.15 void QwtPicker::moved ( const QPoint & *pos* ) [signal]

A signal emitted whenever the last appended point of the selection has been moved.

**Parameters**

| | |
|---|---|
| *pos* | Position of the moved last point of the selection. |

**See Also**

move(), appended()

#### 12.54.4.16 QPainterPath QwtPicker::pickArea ( ) const [virtual]

Find the area of the observed widget, where selection might happen.

**Returns**

parentWidget()->contentsRect()

#### 12.54.4.17 const QPolygon & QwtPicker::pickedPoints ( ) const [protected]

Return the points, that have been collected so far. The selection() is calculated from the pickedPoints() in adjusted-Points().

**Returns**

Picked points

#### 12.54.4.18 void QwtPicker::remove ( ) [protected], [virtual]

Remove the last point of the selection The removed() signal is emitted.

**See Also**

isActive(), begin(), end(), append(), move()

#### 12.54.4.19 void QwtPicker::removed ( const QPoint & *pos* ) [signal]

A signal emitted whenever the last appended point of the selection has been removed.

**Parameters**

| | |
|---|---|
| *pos* | Position of the point, that has been removed |

**See Also**

remove(), appended()

#### 12.54.4.20 void QwtPicker::reset ( ) [protected], [virtual]

Reset the state machine and terminate ( end(false) ) the selection

#### 12.54.4.21 QwtPicker::ResizeMode QwtPicker::resizeMode ( ) const

**Returns**

Resize mode

**See Also**

setResizeMode(), ResizeMode

#### 12.54.4.22 QwtPicker::RubberBand QwtPicker::rubberBand ( ) const

**Returns**

Rubber band style

**See Also**

setRubberBand(), RubberBand, rubberBandPen()

#### 12.54.4.23 QRegion QwtPicker::rubberBandMask ( ) const [virtual]

Calculate the mask for the rubber band overlay

**Returns**

Region for the mask

**See Also**

QWidget::setMask()

#### 12.54.4.24 const QwtWidgetOverlay * QwtPicker::rubberBandOverlay ( ) const [protected]

**Returns**

Overlay displaying the rubber band

#### 12.54.4.25 QPen QwtPicker::rubberBandPen ( ) const

**Returns**

Rubber band pen

**See Also**

setRubberBandPen(), rubberBand()

#### 12.54.4.26 void QwtPicker::selected ( const QPolygon & *polygon* ) [signal]

A signal emitting the selected points, at the end of a selection.

**Parameters**

| | |
|---|---|
| *polygon* | Selected points |

#### 12.54.4.27 QPolygon QwtPicker::selection ( ) const

**Returns**

Selected points

**See Also**

pickedPoints(), adjustedPoints()

#### 12.54.4.28 void QwtPicker::setEnabled ( bool *enabled* ) [slot]

En/disable the picker.

When enabled is true an event filter is installed for the observed widget, otherwise the event filter is removed.

**Parameters**

| | |
|---|---|
| *enabled* | true or false |

**See Also**

isEnabled(), eventFilter()

#### 12.54.4.29 void QwtPicker::setResizeMode ( ResizeMode *mode* )

Set the resize mode.

The resize mode controls what to do with the selected points of an active selection when the observed widget is resized.

Stretch means the points are scaled according to the new size, KeepSize means the points remain unchanged.

The default mode is Stretch.

**Parameters**

| | |
|---|---|
| *mode* | Resize mode |

**See Also**

resizeMode(), ResizeMode

#### 12.54.4.30 void QwtPicker::setRubberBand ( RubberBand *rubberBand* )

Set the rubber band style

**Parameters**

| | |
|---|---|
| *rubberBand* | Rubber band style The default value is NoRubberBand. |

**See Also**

rubberBand(), RubberBand, setRubberBandPen()

#### 12.54.4.31 void QwtPicker::setRubberBandPen ( const QPen & *pen* )

Set the pen for the rubberband

**Parameters**

| | |
|---|---|
| *pen* | Rubber band pen |

**See Also**

rubberBandPen(), setRubberBand()

#### 12.54.4.32 void QwtPicker::setStateMachine ( QwtPickerMachine $*$ *stateMachine* )

Set a state machine and delete the previous one

**Parameters**

| | |
|---|---|
| *stateMachine* | State machine |

**See Also**

stateMachine()

#### 12.54.4.33 void QwtPicker::setTrackerFont ( const QFont & *font* )

Set the font for the tracker

**Parameters**

| | |
|---|---|
| *font* | Tracker font |

**See Also**

trackerFont(), setTrackerMode(), setTrackerPen()

#### 12.54.4.34 void QwtPicker::setTrackerMode ( DisplayMode *mode* )

Set the display mode of the tracker.

A tracker displays information about current position of the cursor as a string. The display mode controls if the tracker has to be displayed whenever the observed widget has focus and cursor (AlwaysOn), never (AlwaysOff), or only when the selection is active (ActiveOnly).

**Parameters**

| | |
|---|---|
| *mode* | Tracker display mode |

**Warning**

In case of AlwaysOn, mouseTracking will be enabled for the observed widget.

**See Also**

trackerMode(), DisplayMode

#### 12.54.4.35 void QwtPicker::setTrackerPen ( const QPen & *pen* )

Set the pen for the tracker

**Parameters**

| | |
|---|---|
| *pen* | Tracker pen |

**See Also**

trackerPen(), setTrackerMode(), setTrackerFont()

#### 12.54.4.36 const QwtPickerMachine ∗ QwtPicker::stateMachine ( ) const

**Returns**

Assigned state machine

**See Also**

setStateMachine()

#### 12.54.4.37 QwtPickerMachine ∗ QwtPicker::stateMachine ( )

**Returns**

Assigned state machine

**See Also**

setStateMachine()

#### 12.54.4.38 void QwtPicker::stretchSelection ( const QSize & *oldSize*, const QSize & *newSize* ) [protected], [virtual]

Scale the selection by the ratios of oldSize and newSize The changed() signal is emitted.

**Parameters**

| | |
|---|---|
| *oldSize* | Previous size |
| *newSize* | Current size |

**See Also**

ResizeMode, setResizeMode(), resizeMode()

#### 12.54.4.39 QFont QwtPicker::trackerFont ( ) const

**Returns**

Tracker font

**See Also**

setTrackerFont(), trackerMode(), trackerPen()

#### 12.54.4.40 QwtPicker::DisplayMode QwtPicker::trackerMode ( ) const

**Returns**

Tracker display mode

**See Also**

setTrackerMode(), DisplayMode

#### 12.54.4.41 const QwtWidgetOverlay ∗ QwtPicker::trackerOverlay ( ) const [protected]

**Returns**

Overlay displaying the tracker text

#### 12.54.4.42 QPen QwtPicker::trackerPen ( ) const

**Returns**

Tracker pen

**See Also**

setTrackerPen(), trackerMode(), trackerFont()

#### 12.54.4.43 QPoint QwtPicker::trackerPosition ( ) const

**Returns**

Current position of the tracker

#### 12.54.4.44 QRect QwtPicker::trackerRect ( const QFont & *font* ) const [virtual]

Calculate the bounding rectangle for the tracker text from the current position of the tracker

**Parameters**

| | |
|---|---|
| *font* | Font of the tracker text |

**Returns**

Bounding rectangle of the tracker text

**See Also**

trackerPosition()

#### 12.54.4.45 QwtText QwtPicker::trackerText ( const QPoint & *pos* ) const [virtual]

Return the label for a position.

In case of HLineRubberBand the label is the value of the y position, in case of VLineRubberBand the value of the x position. Otherwise the label contains x and y position separated by a ',' .

The format for the string conversion is "%d".

**Parameters**

| | |
|---|---|
| *pos* | Position |

**Returns**

Converted position as string

Reimplemented in QwtPlotPicker.

#### 12.54.4.46 void QwtPicker::transition ( const QEvent ∗ *event* ) [protected], [virtual]

Passes an event to the state machine and executes the resulting commands. Append and Move commands use the current position of the cursor ( QCursor::pos() ).

**Parameters**

| | |
|---|---|
| *event* | Event |

#### 12.54.4.47 void QwtPicker::widgetEnterEvent ( QEvent ∗ *event* ) [protected], [virtual]

Handle a enter event for the observed widget.

**Parameters**

| | |
|---|---|
| *event* | Qt event |

**See Also**

eventFilter(), widgetMousePressEvent(), widgetMouseReleaseEvent(), widgetMouseDoubleClickEvent(), widgetWheelEvent(), widgetKeyPressEvent(), widgetKeyReleaseEvent()

#### 12.54.4.48 void QwtPicker::widgetKeyPressEvent ( QKeyEvent ∗ *keyEvent* ) [protected], [virtual]

Handle a key press event for the observed widget.

Selections can be completely done by the keyboard. The arrow keys move the cursor, the abort key aborts a selection. All other keys are handled by the current state machine.

**Parameters**

| | |
|---|---|
| *keyEvent* | Key event |

**See Also**

eventFilter(), widgetMousePressEvent(), widgetMouseReleaseEvent(), widgetMouseDoubleClickEvent(), widgetMouseMoveEvent(), widgetWheelEvent(), widgetKeyReleaseEvent(), stateMachine(), QwtEventPattern::KeyPatternCode

Reimplemented in QwtPlotZoomer.

#### 12.54.4.49 void QwtPicker::widgetKeyReleaseEvent ( QKeyEvent ∗ *keyEvent* ) [protected], [virtual]

Handle a key release event for the observed widget.

Passes the event to the state machine.

**Parameters**

| | |
|---|---|
| *keyEvent* | Key event |

**See Also**

eventFilter(), widgetMousePressEvent(), widgetMouseReleaseEvent(), widgetMouseDoubleClickEvent(), widgetMouseMoveEvent(), widgetWheelEvent(), widgetKeyPressEvent(), stateMachine()

#### 12.54.4.50 void QwtPicker::widgetLeaveEvent ( QEvent ∗ *event* ) [protected], [virtual]

Handle a leave event for the observed widget.

**Parameters**

| | |
|---|---|
| *event* | Qt event |

**See Also**

eventFilter(), widgetMousePressEvent(), widgetMouseReleaseEvent(), widgetMouseDoubleClickEvent(), widgetWheelEvent(), widgetKeyPressEvent(), widgetKeyReleaseEvent()

#### 12.54.4.51 void QwtPicker::widgetMouseDoubleClickEvent ( QMouseEvent $*$ *mouseEvent* ) [protected], [virtual]

Handle mouse double click event for the observed widget.

**Parameters**

| | |
|---|---|
| *mouseEvent* | Mouse event |

**See Also**

eventFilter(), widgetMousePressEvent(), widgetMouseReleaseEvent(), widgetMouseMoveEvent(), widgetWheelEvent(), widgetKeyPressEvent(), widgetKeyReleaseEvent()

#### 12.54.4.52 void QwtPicker::widgetMouseMoveEvent ( QMouseEvent ∗ *mouseEvent* ) [protected], [virtual]

Handle a mouse move event for the observed widget.

**Parameters**

| | |
|---|---|
| *mouseEvent* | Mouse event |

**See Also**

eventFilter(), widgetMousePressEvent(), widgetMouseReleaseEvent(), widgetMouseDoubleClickEvent(), widgetWheelEvent(), widgetKeyPressEvent(), widgetKeyReleaseEvent()

#### 12.54.4.53 void QwtPicker::widgetMousePressEvent ( QMouseEvent ∗ *mouseEvent* ) [protected], [virtual]

Handle a mouse press event for the observed widget.

**Parameters**

| | |
|---|---|
| *mouseEvent* | Mouse event |

**See Also**

eventFilter(), widgetMouseReleaseEvent(), widgetMouseDoubleClickEvent(), widgetMouseMoveEvent(), widgetWheelEvent(), widgetKeyPressEvent(), widgetKeyReleaseEvent()

#### 12.54.4.54 void QwtPicker::widgetMouseReleaseEvent ( QMouseEvent ∗ *mouseEvent* ) [protected], [virtual]

Handle a mouse release event for the observed widget.

**Parameters**

| | |
|---|---|
| *mouseEvent* | Mouse event |

**See Also**

eventFilter(), widgetMousePressEvent(), widgetMouseDoubleClickEvent(), widgetMouseMoveEvent(), widgetWheelEvent(), widgetKeyPressEvent(), widgetKeyReleaseEvent()

Reimplemented in QwtPlotZoomer.

#### 12.54.4.55 void QwtPicker::widgetWheelEvent ( QWheelEvent ∗ *wheelEvent* ) [protected], [virtual]

Handle a wheel event for the observed widget.

Move the last point of the selection in case of isActive() == true

**Parameters**

| | |
|---|---|
| *wheelEvent* | Wheel event |

**See Also**

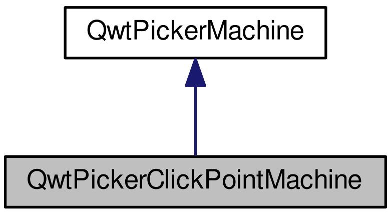
eventFilter(), widgetMousePressEvent(), widgetMouseReleaseEvent(), widgetMouseDoubleClickEvent(), widgetMouseMoveEvent(), widgetKeyPressEvent(), widgetKeyReleaseEvent()

## 12.55 QwtPickerClickPointMachine Class Reference

A state machine for point selections.

```
#include <qwt_picker_machine.h>
```

Inheritance diagram for QwtPickerClickPointMachine:



**Public Member Functions**

- QwtPickerClickPointMachine ()

    *Constructor.*
- virtual QList< Command > transition (const QwtEventPattern &, const QEvent ∗)

    *Transition.*

**Additional Inherited Members**

### 12.55.1 Detailed Description

A state machine for point selections.

Pressing QwtEventPattern::MouseSelect1 or QwtEventPattern::KeySelect1 selects a point.

**See Also**

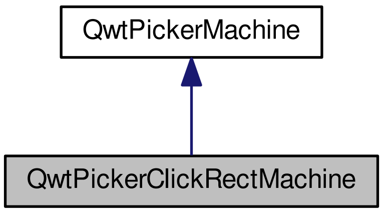
QwtEventPattern::MousePatternCode, QwtEventPattern::KeyPatternCode

## 12.56 QwtPickerClickRectMachine Class Reference

A state machine for rectangle selections.

```
#include <qwt_picker_machine.h>
```

Inheritance diagram for QwtPickerClickRectMachine:



#### Public Member Functions

- QwtPickerClickRectMachine ()

  *Constructor.*

- virtual QList< Command > transition (const QwtEventPattern &, const QEvent ∗)

  *Transition.*

#### Additional Inherited Members

### 12.56.1 Detailed Description

A state machine for rectangle selections.

Pressing QwtEventPattern::MouseSelect1 starts the selection, releasing it selects the first point. Pressing it again selects the second point and terminates the selection. Pressing QwtEventPattern::KeySelect1 also starts the selection, a second press selects the first point. A third one selects the second point and terminates the selection.

#### See Also

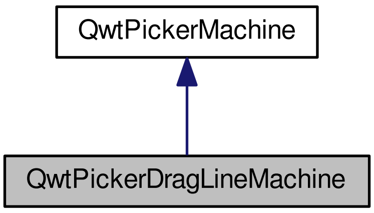
QwtEventPattern::MousePatternCode, QwtEventPattern::KeyPatternCode

## 12.57 QwtPickerDragLineMachine Class Reference

A state machine for line selections.

`#include <qwt_picker_machine.h>`

Inheritance diagram for QwtPickerDragLineMachine:



#### Public Member Functions

- QwtPickerDragLineMachine ()

  *Constructor.*
- virtual QList< Command > transition (const QwtEventPattern &, const QEvent ∗)

  *Transition.*

#### Additional Inherited Members

### 12.57.1 Detailed Description

A state machine for line selections.

Pressing QwtEventPattern::MouseSelect1 selects the first point, releasing it the second point. Pressing QwtEvent-Pattern::KeySelect1 also selects the first point, a second press selects the second point and terminates the selection.

A common use case of QwtPickerDragLineMachine are pickers for distance measurements.

#### See Also

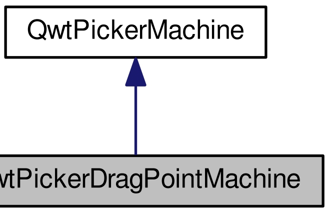
QwtEventPattern::MousePatternCode, QwtEventPattern::KeyPatternCode

## 12.58 QwtPickerDragPointMachine Class Reference

A state machine for point selections.

`#include <qwt_picker_machine.h>`

Inheritance diagram for QwtPickerDragPointMachine:



#### Public Member Functions

- QwtPickerDragPointMachine ()

    *Constructor.*
- virtual QList< Command > transition (const QwtEventPattern &, const QEvent ∗)

    *Transition.*

#### Additional Inherited Members

### 12.58.1 Detailed Description

A state machine for point selections.

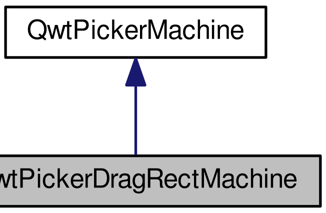
Pressing QwtEventPattern::MouseSelect1 or QwtEventPattern::KeySelect1 starts the selection, releasing QwtEventPattern::MouseSelect1 or a second press of QwtEventPattern::KeySelect1 terminates it.

## 12.59 QwtPickerDragRectMachine Class Reference

A state machine for rectangle selections.

`#include <qwt_picker_machine.h>`

Inheritance diagram for QwtPickerDragRectMachine:



#### Public Member Functions

- QwtPickerDragRectMachine ()

  *Constructor.*
- virtual QList< Command > transition (const QwtEventPattern &, const QEvent ∗)

  *Transition.*

#### Additional Inherited Members

### 12.59.1 Detailed Description

A state machine for rectangle selections.

Pressing QwtEventPattern::MouseSelect1 selects the first point, releasing it the second point. Pressing QwtEvent-Pattern::KeySelect1 also selects the first point, a second press selects the second point and terminates the selection.

#### See Also

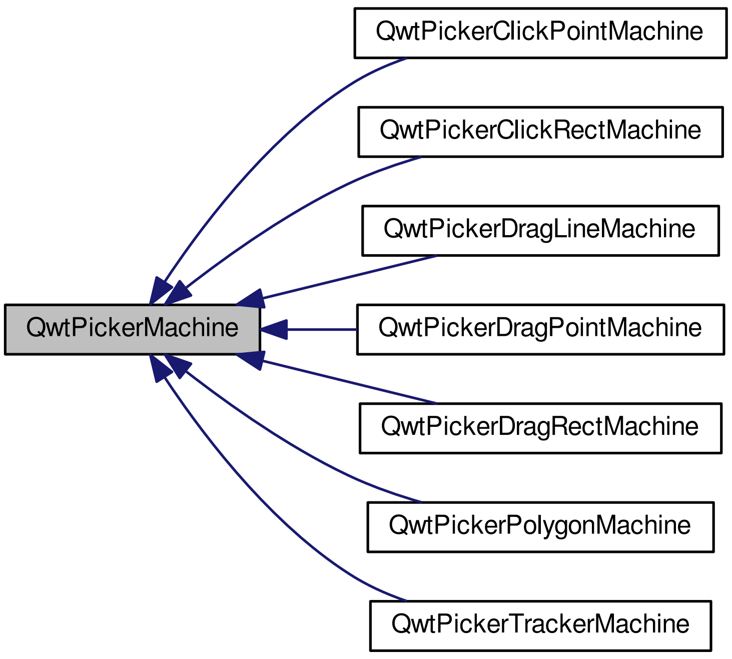
QwtEventPattern::MousePatternCode, QwtEventPattern::KeyPatternCode

## 12.60 QwtPickerMachine Class Reference

A state machine for QwtPicker selections.

`#include <qwt_picker_machine.h>`

Inheritance diagram for QwtPickerMachine:



#### Public Types

- enum SelectionType { NoSelection = -1, PointSelection, RectSelection, PolygonSelection }
- enum Command {
  **Begin**, **Append**, **Move**, **Remove**,
  **End** }

  *Commands - the output of a state machine.*

#### Public Member Functions

- QwtPickerMachine (SelectionType)

  *Constructor.*
- virtual ∼QwtPickerMachine ()

  *Destructor.*
- virtual QList< Command > transition (const QwtEventPattern &, const QEvent ∗)=0

  *Transition.*
- void reset ()

  *Set the current state to 0.*
- int state () const

  *Return the current state.*
- void setState (int)

  *Change the current state.*
- SelectionType selectionType () const

  *Return the selection type.*

### 12.60.1 Detailed Description

A state machine for QwtPicker selections.

QwtPickerMachine accepts key and mouse events and translates them into selection commands.

**See Also**

QwtEventPattern::MousePatternCode, QwtEventPattern::KeyPatternCode

### 12.60.2 Member Enumeration Documentation

#### 12.60.2.1 enum QwtPickerMachine::SelectionType

Type of a selection.

**See Also**

selectionType()

**Enumerator**

***NoSelection*** The state machine not usable for any type of selection.

***PointSelection*** The state machine is for selecting a single point.

***RectSelection*** The state machine is for selecting a rectangle (2 points).

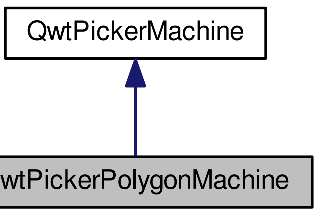
***PolygonSelection*** The state machine is for selecting a polygon (many points).

## 12.61 QwtPickerPolygonMachine Class Reference

A state machine for polygon selections.

`#include <qwt_picker_machine.h>`

Inheritance diagram for QwtPickerPolygonMachine:



### Public Member Functions

- QwtPickerPolygonMachine ()

  *Constructor.*

- virtual QList< Command > transition (const QwtEventPattern &, const QEvent ∗)

  *Transition.*

### Additional Inherited Members

### 12.61.1 Detailed Description

A state machine for polygon selections.

Pressing QwtEventPattern::MouseSelect1 or QwtEventPattern::KeySelect1 starts the selection and selects the first point, or appends a point. Pressing QwtEventPattern::MouseSelect2 or QwtEventPattern::KeySelect2 appends the last point and terminates the selection.

#### See Also

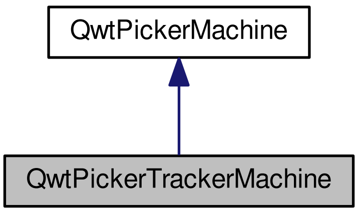
QwtEventPattern::MousePatternCode, QwtEventPattern::KeyPatternCode

## 12.62 QwtPickerTrackerMachine Class Reference

A state machine for indicating mouse movements.

`#include <qwt_picker_machine.h>`

Inheritance diagram for QwtPickerTrackerMachine:



#### Public Member Functions

- QwtPickerTrackerMachine ()

  *Constructor.*

- virtual QList< Command > transition (const QwtEventPattern &, const QEvent ∗)

  *Transition.*

#### Additional Inherited Members

### 12.62.1 Detailed Description

A state machine for indicating mouse movements.

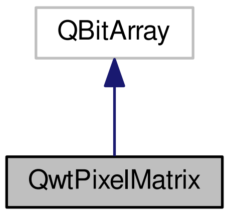
QwtPickerTrackerMachine supports displaying information corresponding to mouse movements, but is not intended for selecting anything. Begin/End are related to Enter/Leave events.

## 12.63 QwtPixelMatrix Class Reference

A bit field corresponding to the pixels of a rectangle.

`#include <qwt_pixel_matrix.h>`

Inheritance diagram for QwtPixelMatrix:



**Public Member Functions**

- QwtPixelMatrix (const QRect &rect)

  *Constructor.*
- ∼QwtPixelMatrix ()

  *Destructor.*
- void setRect (const QRect &rect)
- QRect rect () const
- bool testPixel (int x, int y) const

  *Test if a pixel has been set.*
- bool testAndSetPixel (int x, int y, bool on)

  *Set a pixel and test if a pixel has been set before.*
- int index (int x, int y) const

  *Calculate the index in the bit field corresponding to a position.*

### 12.63.1 Detailed Description

A bit field corresponding to the pixels of a rectangle.

QwtPixelMatrix is intended to filter out duplicates in an unsorted array of points.

### 12.63.2 Constructor & Destructor Documentation

#### 12.63.2.1 QwtPixelMatrix::QwtPixelMatrix ( const QRect & *rect* )

Constructor.

**Parameters**

| | |
|---|---|
| *rect* | Bounding rectangle for the matrix |

### 12.63.3 Member Function Documentation

#### 12.63.3.1 int QwtPixelMatrix::index ( int *x*, int *y* ) const [inline]

Calculate the index in the bit field corresponding to a position.

**Parameters**

| | |
|---:|---|
| *x* | X-coordinate |
| *y* | Y-coordinate |

**Returns**

Index, when rect() contains pos - otherwise -1.

#### 12.63.3.2 QRect QwtPixelMatrix::rect ( ) const

**Returns**

Bounding rectangle

#### 12.63.3.3 void QwtPixelMatrix::setRect ( const QRect & *rect* )

Set the bounding rectangle of the matrix

**Parameters**

| | |
|---:|---|
| *rect* | Bounding rectangle |

**Note**

All bits are cleared

#### 12.63.3.4 bool QwtPixelMatrix::testAndSetPixel ( int *x*, int *y*, bool *on* ) `[inline]`

Set a pixel and test if a pixel has been set before.

**Parameters**

| | |
|---:|---|
| *x* | X-coordinate |
| *y* | Y-coordinate |
| *on* | Set/Clear the pixel |

**Returns**

true, when pos is outside of rect(), or when the pixel was set before.

#### 12.63.3.5 bool QwtPixelMatrix::testPixel ( int *x*, int *y* ) const `[inline]`

Test if a pixel has been set.

**Parameters**

| | |
|---:|---|
| *x* | X-coordinate |
| *y* | Y-coordinate |

**Returns**

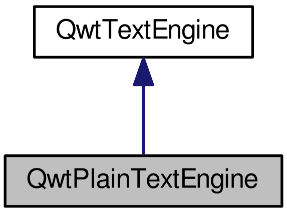
true, when pos is outside of rect(), or when the pixel has already been set.

## 12.64 QwtPlainTextEngine Class Reference

A text engine for plain texts.

```
#include <qwt_text_engine.h>
```

Inheritance diagram for QwtPlainTextEngine:



#### Public Member Functions

- QwtPlainTextEngine ()

  *Constructor.*
- virtual ∼QwtPlainTextEngine ()

  *Destructor.*
- virtual double heightForWidth (const QFont &font, int flags, const QString &text, double width) const
- virtual QSizeF textSize (const QFont &font, int flags, const QString &text) const
- virtual void draw (QPainter ∗painter, const QRectF &rect, int flags, const QString &text) const

  *Draw the text in a clipping rectangle.*
- virtual bool mightRender (const QString &) const
- virtual void textMargins (const QFont &, const QString &, double &left, double &right, double &top, double &bottom) const

#### Additional Inherited Members

### 12.64.1 Detailed Description

A text engine for plain texts.

QwtPlainTextEngine renders texts using the basic Qt classes QPainter and QFontMetrics.

### 12.64.2 Member Function Documentation

#### 12.64.2.1 void QwtPlainTextEngine::draw ( QPainter ∗ *painter,* const QRectF & *rect,* int *flags,* const QString & *text* ) const `[virtual]`

Draw the text in a clipping rectangle.

A wrapper for QPainter::drawText.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Clipping rectangle |

| | |
|---:|---|
| *flags* | Bitwise OR of the flags used like in QPainter::drawText |
| *text* | Text to be rendered |

Implements QwtTextEngine.

#### 12.64.2.2 double QwtPlainTextEngine::heightForWidth ( const QFont & *font,* int *flags,* const QString & *text,* double *width* ) const [virtual]

Find the height for a given width

**Parameters**

| | |
|---:|---|
| *font* | Font of the text |
| *flags* | Bitwise OR of the flags used like in QPainter::drawText |
| *text* | Text to be rendered |
| *width* | Width |

**Returns**

Calculated height

Implements QwtTextEngine.

#### 12.64.2.3 bool QwtPlainTextEngine::mightRender ( const QString & ) const [virtual]

Test if a string can be rendered by this text engine.

**Returns**

Always true. All texts can be rendered by QwtPlainTextEngine

Implements QwtTextEngine.

#### 12.64.2.4 void QwtPlainTextEngine::textMargins ( const QFont & *font,* const QString & , double & *left,* double & *right,* double & *top,* double & *bottom* ) const [virtual]

Return margins around the texts

**Parameters**

| | |
|---:|---|
| *font* | Font of the text |
| *left* | Return 0 |
| *right* | Return 0 |
| *top* | Return value for the top margin |
| *bottom* | Return value for the bottom margin |

Implements QwtTextEngine.

#### 12.64.2.5 QSizeF QwtPlainTextEngine::textSize ( const QFont & *font,* int *flags,* const QString & *text* ) const [virtual]

Returns the size, that is needed to render text

**Parameters**

| | |
|---:|---|
| *font* | Font of the text |
| *flags* | Bitwise OR of the flags used like in QPainter::drawText |
| *text* | Text to be rendered |

**Returns**

Caluclated size

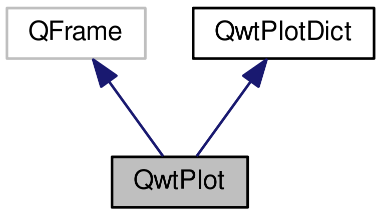
Implements QwtTextEngine.

## 12.65 QwtPlot Class Reference

A 2-D plotting widget.

`#include <qwt_plot.h>`

Inheritance diagram for QwtPlot:



### Public Types

- enum Axis {
  yLeft, yRight, xBottom, xTop,
  axisCnt }

  *Axis index.*
- enum LegendPosition { LeftLegend, RightLegend, BottomLegend, TopLegend }

### Public Slots

- virtual void replot ()

  *Redraw the plot.*
- void autoRefresh ()

  *Replots the plot if autoReplot() is `true`.*

### Signals

- void itemAttached (QwtPlotItem ∗plotItem, bool on)
- void legendDataChanged (const QVariant &itemInfo, const QList< QwtLegendData > &data)

### Public Member Functions

- QwtPlot (QWidget ∗=NULL)

  *Constructor.*
- QwtPlot (const QwtText &title, QWidget ∗=NULL)

  *Constructor.*
- virtual ∼QwtPlot ()

  *Destructor.*
- void applyProperties (const QString &)
- QString grabProperties () const
- void setAutoReplot (bool=true)

*Set or reset the autoReplot option.*
- bool autoReplot () const
- void setPlotLayout (QwtPlotLayout ∗)

  *Assign a new plot layout.*
- QwtPlotLayout ∗ plotLayout ()
- const QwtPlotLayout ∗ plotLayout () const
- void setTitle (const QString &)
- void setTitle (const QwtText &t)
- QwtText title () const
- QwtTextLabel ∗ titleLabel ()
- const QwtTextLabel ∗ titleLabel () const
- void setFooter (const QString &)
- void setFooter (const QwtText &t)
- QwtText footer () const
- QwtTextLabel ∗ footerLabel ()
- const QwtTextLabel ∗ footerLabel () const
- void setCanvas (QWidget ∗)

  *Set the drawing canvas of the plot widget.*
- QWidget ∗ canvas ()
- const QWidget ∗ canvas () const
- void setCanvasBackground (const QBrush &)

  *Change the background of the plotting area.*
- QBrush canvasBackground () const
- virtual QwtScaleMap canvasMap (int axisId) const
- double invTransform (int axisId, int pos) const
- double transform (int axisId, double value) const

  *Transform a value into a coordinate in the plotting region.*
- QwtScaleEngine ∗ axisScaleEngine (int axisId)
- const QwtScaleEngine ∗ axisScaleEngine (int axisId) const
- void setAxisScaleEngine (int axisId, QwtScaleEngine ∗)
- void setAxisAutoScale (int axisId, bool on=true)

  *Enable autoscaling for a specified axis.*
- bool axisAutoScale (int axisId) const
- void enableAxis (int axisId, bool tf=true)

  *Enable or disable a specified axis.*
- bool axisEnabled (int axisId) const
- void setAxisFont (int axisId, const QFont &f)

  *Change the font of an axis.*
- QFont axisFont (int axisId) const
- void setAxisScale (int axisId, double min, double max, double step=0)

  *Disable autoscaling and specify a fixed scale for a selected axis.*
- void setAxisScaleDiv (int axisId, const QwtScaleDiv &)

  *Disable autoscaling and specify a fixed scale for a selected axis.*
- void setAxisScaleDraw (int axisId, QwtScaleDraw ∗)

  *Set a scale draw.*
- double axisStepSize (int axisId) const

  *Return the step size parameter that has been set in setAxisScale.*
- QwtInterval axisInterval (int axisId) const

  *Return the current interval of the specified axis.*
- const QwtScaleDiv & axisScaleDiv (int axisId) const

  *Return the scale division of a specified axis.*
- const QwtScaleDraw ∗ axisScaleDraw (int axisId) const

*Return the scale draw of a specified axis.*
- QwtScaleDraw ∗ axisScaleDraw (int axisId)

  *Return the scale draw of a specified axis.*
- const QwtScaleWidget ∗ axisWidget (int axisId) const
- QwtScaleWidget ∗ axisWidget (int axisId)
- void setAxisLabelAlignment (int axisId, Qt::Alignment)
- void setAxisLabelRotation (int axisId, double rotation)
- void setAxisTitle (int axisId, const QString &)

  *Change the title of a specified axis.*
- void setAxisTitle (int axisId, const QwtText &)

  *Change the title of a specified axis.*
- QwtText axisTitle (int axisId) const
- void setAxisMaxMinor (int axisId, int maxMinor)
- int axisMaxMinor (int axisId) const
- void setAxisMaxMajor (int axisId, int maxMajor)
- int axisMaxMajor (int axisId) const
- void insertLegend (QwtAbstractLegend ∗, LegendPosition=QwtPlot::RightLegend, double ratio=-1.0)

  *Insert a legend.*
- QwtAbstractLegend ∗ legend ()
- const QwtAbstractLegend ∗ legend () const
- void updateLegend ()
- void updateLegend (const QwtPlotItem ∗)
- virtual QSize sizeHint () const
- virtual QSize minimumSizeHint () const

  *Return a minimum size hint.*
- virtual void updateLayout ()

  *Adjust plot content to its current size.*
- virtual void drawCanvas (QPainter ∗)
- void updateAxes ()

  *Rebuild the axes scales.*
- void updateCanvasMargins ()

  *Update the canvas margins.*
- virtual void getCanvasMarginsHint (const QwtScaleMap maps[ ], const QRectF &canvasRect, double &left, double &top, double &right, double &bottom) const

  *Calculate the canvas margins.*
- virtual bool event (QEvent ∗)

  *Adds handling of layout requests.*
- virtual bool eventFilter (QObject ∗, QEvent ∗)

  *Event filter.*
- virtual void drawItems (QPainter ∗, const QRectF &, const QwtScaleMap maps[axisCnt]) const
- virtual QVariant itemToInfo (QwtPlotItem ∗) const

  *Build an information, that can be used to identify a plot item on the legend.*
- virtual QwtPlotItem ∗ infoToItem (const QVariant &) const

  *Identify the plot item according to an item info object, that has bee generated from itemToInfo().*

## Protected Member Functions

- virtual void resizeEvent (QResizeEvent ∗e)

## Static Protected Member Functions

- static bool axisValid (int axisId)

### Friends

- class **QwtPlotItem**

### 12.65.1 Detailed Description

A 2-D plotting widget.

QwtPlot is a widget for plotting two-dimensional graphs. An unlimited number of plot items can be displayed on its canvas. Plot items might be curves (QwtPlotCurve), markers (QwtPlotMarker), the grid (QwtPlotGrid), or anything else derived from QwtPlotItem. A plot can have up to four axes, with each plot item attached to an x- and a y axis. The scales at the axes can be explicitly set (QwtScaleDiv), or are calculated from the plot items, using algorithms (QwtScaleEngine) which can be configured separately for each axis.

The simpleplot example is a good starting point to see how to set up a plot widget.

**Example**

The following example shows (schematically) the most simple way to use QwtPlot. By default, only the left and bottom axes are visible and their scales are computed automatically.

```
#include <qwt_plot.h>
#include <qwt_plot_curve.h>

QwtPlot *myPlot = new QwtPlot("Two Curves", parent);

// add curves
QwtPlotCurve *curve1 = new QwtPlotCurve("Curve 1");
QwtPlotCurve *curve2 = new QwtPlotCurve("Curve 2");

// connect or copy the data to the curves
curve1->setData(...);
curve2->setData(...);

curve1->attach(myPlot);
curve2->attach(myPlot);

// finally, refresh the plot
myPlot->replot();
```

### 12.65.2 Member Enumeration Documentation

#### 12.65.2.1 enum QwtPlot::Axis

Axis index.

**Enumerator**

***yLeft*** Y axis left of the canvas.

***yRight*** Y axis right of the canvas.

***xBottom*** X axis below the canvas.

***xTop*** X axis above the canvas.

***axisCnt*** Number of axes.

#### 12.65.2.2 enum QwtPlot::LegendPosition

Position of the legend, relative to the canvas.

**See Also**

insertLegend()

**Enumerator**

***LeftLegend*** The legend will be left from the QwtPlot::yLeft axis.

***RightLegend*** The legend will be right from the QwtPlot::yRight axis.

***BottomLegend*** The legend will be below the footer.

***TopLegend*** The legend will be above the title.

### 12.65.3 Constructor & Destructor Documentation

#### 12.65.3.1 QwtPlot::QwtPlot ( QWidget * *parent* = `NULL` ) `[explicit]`

Constructor.

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

#### 12.65.3.2 QwtPlot::QwtPlot ( const QwtText & *title*, QWidget * *parent* = `NULL` ) `[explicit]`

Constructor.

**Parameters**

| | |
|---|---|
| *title* | Title text |
| *parent* | Parent widget |

### 12.65.4 Member Function Documentation

#### 12.65.4.1 void QwtPlot::applyProperties ( const QString & )

This method is intended for manipulating the plot widget from a specific editor in the Qwt designer plugin.

**Warning**

The plot editor has never been implemented.

#### 12.65.4.2 bool QwtPlot::autoReplot ( ) const

**Returns**

true if the autoReplot option is set.

**See Also**

setAutoReplot()

#### 12.65.4.3 bool QwtPlot::axisAutoScale ( int *axisId* ) const

**Returns**

`True`, if autoscaling is enabled

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

#### 12.65.4.4 bool QwtPlot::axisEnabled ( int *axisId* ) const

**Returns**

`True`, if a specified axis is enabled

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

#### 12.65.4.5 QFont QwtPlot::axisFont ( int *axisId* ) const

**Returns**

The font of the scale labels for a specified axis

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

#### 12.65.4.6 QwtInterval QwtPlot::axisInterval ( int *axisId* ) const

Return the current interval of the specified axis.

This is only a convenience function for axisScaleDiv( axisId )->interval();

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

**Returns**

Scale interval

**See Also**

QwtScaleDiv, axisScaleDiv()

#### 12.65.4.7 int QwtPlot::axisMaxMajor ( int *axisId* ) const

**Returns**

The maximum number of major ticks for a specified axis

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

**See Also**

setAxisMaxMajor(), QwtScaleEngine::divideScale()

#### 12.65.4.8 int QwtPlot::axisMaxMinor ( int *axisId* ) const

**Returns**

the maximum number of minor ticks for a specified axis

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

**See Also**

setAxisMaxMinor(), QwtScaleEngine::divideScale()

#### 12.65.4.9 const QwtScaleDiv & QwtPlot::axisScaleDiv ( int *axisId* ) const

Return the scale division of a specified axis.

axisScaleDiv(axisId).lowerBound(), axisScaleDiv(axisId).upperBound() are the current limits of the axis scale.

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

**Returns**

Scale division

**See Also**

QwtScaleDiv, setAxisScaleDiv(), QwtScaleEngine::divideScale()

#### 12.65.4.10 const QwtScaleDraw ∗ QwtPlot::axisScaleDraw ( int *axisId* ) const

Return the scale draw of a specified axis.

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

**Returns**

Specified scaleDraw for axis, or NULL if axis is invalid.

#### 12.65.4.11 QwtScaleDraw ∗ QwtPlot::axisScaleDraw ( int *axisId* )

Return the scale draw of a specified axis.

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

**Returns**

Specified scaleDraw for axis, or NULL if axis is invalid.

#### 12.65.4.12 QwtScaleEngine ∗ QwtPlot::axisScaleEngine ( int *axisId* )

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

**Returns**

Scale engine for a specific axis

#### 12.65.4.13 const QwtScaleEngine ∗ QwtPlot::axisScaleEngine ( int *axisId* ) const

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

**Returns**

Scale engine for a specific axis

#### 12.65.4.14 double QwtPlot::axisStepSize ( int *axisId* ) const

Return the step size parameter that has been set in setAxisScale.

This doesn't need to be the step size of the current scale.

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

**Returns**

step size parameter value

**See Also**

setAxisScale(), QwtScaleEngine::divideScale()

#### 12.65.4.15 QwtText QwtPlot::axisTitle ( int *axisId* ) const

**Returns**

Title of a specified axis

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

#### 12.65.4.16 bool QwtPlot::axisValid ( int *axisId* ) `[static]`, `[protected]`

**Returns**

`true` if the specified axis exists, otherwise `false`

**Parameters**

| | |
|---|---|
| *axisId* | axis index |

#### 12.65.4.17 const QwtScaleWidget ∗ QwtPlot::axisWidget ( int *axisId* ) const

**Returns**

Scale widget of the specified axis, or NULL if axisId is invalid.

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

#### 12.65.4.18 QwtScaleWidget ∗ QwtPlot::axisWidget ( int *axisId* )

**Returns**

Scale widget of the specified axis, or NULL if axisId is invalid.

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

#### 12.65.4.19 QWidget ∗ QwtPlot::canvas ( )

**Returns**

the plot's canvas

#### 12.65.4.20 const QWidget ∗ QwtPlot::canvas ( ) const

**Returns**

the plot's canvas

#### 12.65.4.21 QBrush QwtPlot::canvasBackground ( ) const

Nothing else than: canvas()->palette().brush( QPalette::Normal, QPalette::Window);

**Returns**

Background brush of the plotting area.

**See Also**

setCanvasBackground()

#### 12.65.4.22 QwtScaleMap QwtPlot::canvasMap ( int *axisId* ) const [virtual]

**Parameters**

| | |
|---|---|
| *axisId* | Axis |

**Returns**

Map for the axis on the canvas. With this map pixel coordinates can translated to plot coordinates and vice versa.

**See Also**

QwtScaleMap, transform(), invTransform()

#### 12.65.4.23 void QwtPlot::drawCanvas ( QPainter ∗ *painter* ) [virtual]

Redraw the canvas.

**Parameters**

| | |
|---|---|
| *painter* | Painter used for drawing |

**Warning**

drawCanvas calls drawItems what is also used for printing. Applications that like to add individual plot items better overload drawItems()

**See Also**

drawItems()

#### 12.65.4.24 void QwtPlot::drawItems ( QPainter ∗ *painter*, const QRectF & *canvasRect*, const QwtScaleMap *maps[axisCnt]* ) const [virtual]

Redraw the canvas items.

**Parameters**

| | |
|---|---|
| *painter* | Painter used for drawing |
| *canvasRect* | Bounding rectangle where to paint |
| *maps* | QwtPlot::axisCnt maps, mapping between plot and paint device coordinates |

**Note**

Usually canvasRect is contentsRect() of the plot canvas. Due to a bug in Qt this rectangle might be wrong for certain frame styles ( f.e QFrame::Box ) and it might be necessary to fix the margins manually using QWidget::setContentsMargins()

#### 12.65.4.25 void QwtPlot::enableAxis ( int *axisId*, bool *tf* = `true` )

Enable or disable a specified axis.

When an axis is disabled, this only means that it is not visible on the screen. Curves, markers and can be attached to disabled axes, and transformation of screen coordinates into values works as normal.

Only xBottom and yLeft are enabled by default.

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |
| *tf* | `true` (enabled) or `false` (disabled) |

#### 12.65.4.26 bool QwtPlot::event ( QEvent ∗ *event* ) `[virtual]`

Adds handling of layout requests.

**Parameters**

| | |
|---|---|
| *event* | Event |

**Returns**

See QFrame::event()

#### 12.65.4.27 bool QwtPlot::eventFilter ( QObject ∗ *object*, QEvent ∗ *event* ) `[virtual]`

Event filter.

The plot handles the following events for the canvas:

- QEvent::Resize The canvas margins might depend on its size
- QEvent::ContentsRectChange The layout needs to be recalculated

**Parameters**

| | |
|---|---|
| *object* | Object to be filtered |
| *event* | Event |

**Returns**

See QFrame::eventFilter()

**See Also**

updateCanvasMargins(), updateLayout()

#### 12.65.4.28 QwtText QwtPlot::footer ( ) const

**Returns**

Text of the footer

#### 12.65.4.29 QwtTextLabel ∗ QwtPlot::footerLabel ( )

**Returns**

Footer label widget.

#### 12.65.4.30 const QwtTextLabel ∗ QwtPlot::footerLabel ( ) const

**Returns**

Footer label widget.

#### 12.65.4.31 void QwtPlot::getCanvasMarginsHint ( const QwtScaleMap *maps[]*, const QRectF & *canvasRect*, double & *left*, double & *top*, double & *right*, double & *bottom* ) const [virtual]

Calculate the canvas margins.

**Parameters**

| | |
|---:|---|
| *maps* | QwtPlot::axisCnt maps, mapping between plot and paint device coordinates |
| *canvasRect* | Bounding rectangle where to paint |
| *left* | Return parameter for the left margin |
| *top* | Return parameter for the top margin |
| *right* | Return parameter for the right margin |
| *bottom* | Return parameter for the bottom margin |

Plot items might indicate, that they need some extra space at the borders of the canvas by the QwtPlotItem::Margins flag.

updateCanvasMargins(), QwtPlotItem::getCanvasMarginHint()

#### 12.65.4.32 QString QwtPlot::grabProperties ( ) const

This method is intended for manipulating the plot widget from a specific editor in the Qwt designer plugin.

**Returns**

QString::null

**Warning**

The plot editor has never been implemented.

#### 12.65.4.33 QwtPlotItem ∗ QwtPlot::infoToItem ( const QVariant & *itemInfo* ) const [virtual]

Identify the plot item according to an item info object, that has bee generated from itemToInfo().

The default implementation simply tries to unwrap a QwtPlotItem pointer:

```
if ( itemInfo.canConvert<QwtPlotItem *>() )
    return qvariant_cast<QwtPlotItem *>( itemInfo );
```

**Parameters**

| | |
|---:|---|
| *itemInfo* | Plot item |

**Returns**

A plot item, when successful, otherwise a NULL pointer.

**See Also**

itemToInfo()

#### 12.65.4.34 void QwtPlot::insertLegend ( QwtAbstractLegend ∗ *legend*, QwtPlot::LegendPosition *pos* = QwtPlot::RightLegend, double *ratio* = `-1.0` )

Insert a legend.

If the position legend is `QwtPlot::LeftLegend` or `QwtPlot::RightLegend` the legend will be organized in one column from top to down. Otherwise the legend items will be placed in a table with a best fit number of columns from left to right.

insertLegend() will set the plot widget as parent for the legend. The legend will be deleted in the destructor of the plot or when another legend is inserted.

Legends, that are not inserted into the layout of the plot widget need to connect to the legendDataChanged() signal. Calling updateLegend() initiates this signal for an initial update. When the application code wants to implement its own layout this also needs to be done for rendering plots to a document ( see QwtPlotRenderer ).

**Parameters**

| | |
|---:|---|
| *legend* | Legend |
| *pos* | The legend's position. For top/left position the number of columns will be limited to 1, otherwise it will be set to unlimited. |
| *ratio* | Ratio between legend and the bounding rectangle of title, canvas and axes. The legend will be shrunk if it would need more space than the given ratio. The ratio is limited to ]0.0 .. 1.0]. In case of <= 0.0 it will be reset to the default ratio. The default vertical/horizontal ratio is 0.33/0.5. |

**See Also**

legend(), QwtPlotLayout::legendPosition(), QwtPlotLayout::setLegendPosition()

#### 12.65.4.35 double QwtPlot::invTransform ( int *axisId*, int *pos* ) const

Transform the x or y coordinate of a position in the drawing region into a value.

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *pos* | position |

**Returns**

Position as axis coordinate

**Warning**

The position can be an x or a y coordinate, depending on the specified axis.

#### 12.65.4.36 void QwtPlot::itemAttached ( QwtPlotItem ∗ *plotItem*, bool *on* ) `[signal]`

A signal indicating, that an item has been attached/detached

**Parameters**

| | |
|---:|---|
| *plotItem* | Plot item |
| *on* | Attached/Detached |

#### 12.65.4.37 QVariant QwtPlot::itemToInfo ( **QwtPlotItem** ∗ *plotItem* ) const [virtual]

Build an information, that can be used to identify a plot item on the legend.

The default implementation simply wraps the plot item into a QVariant object. When overloading itemToInfo() usually infoToItem() needs to reimplemeted too.

```
QVariant itemInfo;
qVariantSetValue( itemInfo, plotItem );
```

**Parameters**

| | |
|---:|---|
| *plotItem* | Plot item |

**Returns**

Plot item embedded in a QVariant

**See Also**

infoToItem()

#### 12.65.4.38 QwtAbstractLegend ∗ QwtPlot::legend ( )

**Returns**

the plot's legend

**See Also**

insertLegend()

#### 12.65.4.39 const QwtAbstractLegend ∗ QwtPlot::legend ( ) const

**Returns**

the plot's legend

**See Also**

insertLegend()

#### 12.65.4.40 void QwtPlot::legendDataChanged ( const QVariant & *itemInfo,* const QList< **QwtLegendData** > & *data* ) [signal]

A signal with the attributes how to update the legend entries for a plot item.

**Parameters**

| | |
|---:|---|
| *itemInfo* | Info about a plot item, build from itemToInfo() |

| | |
|---|---|
| *data* | Attributes of the entries ( usually <= 1 ) for the plot item. |

**See Also**

itemToInfo(), infoToItem(), QwtAbstractLegend::updateLegend()

#### 12.65.4.41 QwtPlotLayout * QwtPlot::plotLayout ( )

**Returns**

the plot's layout

#### 12.65.4.42 const QwtPlotLayout * QwtPlot::plotLayout ( ) const

**Returns**

the plot's layout

#### 12.65.4.43 void QwtPlot::replot ( ) `[virtual]`, `[slot]`

Redraw the plot.

If the autoReplot option is not set (which is the default) or if any curves are attached to raw data, the plot has to be refreshed explicitly in order to make changes visible.

**See Also**

updateAxes(), setAutoReplot()

#### 12.65.4.44 void QwtPlot::resizeEvent ( QResizeEvent * *e* ) `[protected]`, `[virtual]`

Resize and update internal layout

**Parameters**

| | |
|---|---|
| *e* | Resize event |

#### 12.65.4.45 void QwtPlot::setAutoReplot ( bool *tf* = `true` )

Set or reset the autoReplot option.

If the autoReplot option is set, the plot will be updated implicitly by manipulating member functions. Since this may be time-consuming, it is recommended to leave this option switched off and call replot() explicitly if necessary.

The autoReplot option is set to false by default, which means that the user has to call replot() in order to make changes visible.

**Parameters**

| | |
|---|---|
| *tf* | `true` or `false`. Defaults to `true`. |

**See Also**

replot()

#### 12.65.4.46 void QwtPlot::setAxisAutoScale ( int *axisId*, bool *on* = `true` )

Enable autoscaling for a specified axis.

This member function is used to switch back to autoscaling mode after a fixed scale has been set. Autoscaling is enabled by default.

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *on* | On/Off |

**See Also**

setAxisScale(), setAxisScaleDiv(), updateAxes()

**Note**

The autoscaling flag has no effect until updateAxes() is executed ( called by replot() ).

#### 12.65.4.47 void QwtPlot::setAxisFont ( int *axisId*, const QFont & *font* )

Change the font of an axis.

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *font* | Font |

**Warning**

This function changes the font of the tick labels, not of the axis title.

#### 12.65.4.48 void QwtPlot::setAxisLabelAlignment ( int *axisId*, Qt::Alignment *alignment* )

Change the alignment of the tick labels

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *alignment* | Or'd Qt::AlignmentFlags see <qnamespace.h> |

**See Also**

QwtScaleDraw::setLabelAlignment()

#### 12.65.4.49 void QwtPlot::setAxisLabelRotation ( int *axisId*, double *rotation* )

Rotate all tick labels

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *rotation* | Angle in degrees. When changing the label rotation, the label alignment might be adjusted too. |

**See Also**

QwtScaleDraw::setLabelRotation(), setAxisLabelAlignment()

#### 12.65.4.50 void QwtPlot::setAxisMaxMajor ( int *axisId*, int *maxMajor* )

Set the maximum number of major scale intervals for a specified axis

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *maxMajor* | Maximum number of major steps |

**See Also**

axisMaxMajor()

#### 12.65.4.51 void QwtPlot::setAxisMaxMinor ( int *axisId*, int *maxMinor* )

Set the maximum number of minor scale intervals for a specified axis

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *maxMinor* | Maximum number of minor steps |

**See Also**

axisMaxMinor()

#### 12.65.4.52 void QwtPlot::setAxisScale ( int *axisId*, double *min*, double *max*, double *stepSize* = `0` )

Disable autoscaling and specify a fixed scale for a selected axis.

In updateAxes() the scale engine calculates a scale division from the specified parameters, that will be assigned to the scale widget. So updates of the scale widget usually happen delayed with the next replot.

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *min* | Minimum of the scale |
| *max* | Maximum of the scale |
| *stepSize* | Major step size. If `step == 0`, the step size is calculated automatically using the maxMajor setting. |

**See Also**

setAxisMaxMajor(), setAxisAutoScale(), axisStepSize(), QwtScaleEngine::divideScale()

#### 12.65.4.53 void QwtPlot::setAxisScaleDiv ( int *axisId*, const **QwtScaleDiv** & *scaleDiv* )

Disable autoscaling and specify a fixed scale for a selected axis.

The scale division will be stored locally only until the next call of updateAxes(). So updates of the scale widget usually happen delayed with the next replot.

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *scaleDiv* | Scale division |

**See Also**

setAxisScale(), setAxisAutoScale()

#### 12.65.4.54 void QwtPlot::setAxisScaleDraw ( int *axisId*, **QwtScaleDraw** ∗ *scaleDraw* )

Set a scale draw.

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *scaleDraw* | Object responsible for drawing scales. |

By passing scaleDraw it is possible to extend QwtScaleDraw functionality and let it take place in QwtPlot. Please note that scaleDraw has to be created with new and will be deleted by the corresponding QwtScale member ( like a child object ).

**See Also**

QwtScaleDraw, QwtScaleWidget

**Warning**

The attributes of scaleDraw will be overwritten by those of the previous QwtScaleDraw.

#### 12.65.4.55 void QwtPlot::setAxisScaleEngine ( int *axisId*, QwtScaleEngine ∗ *scaleEngine* )

Change the scale engine for an axis

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *scaleEngine* | Scale engine |

**See Also**

axisScaleEngine()

#### 12.65.4.56 void QwtPlot::setAxisTitle ( int *axisId*, const QString & *title* )

Change the title of a specified axis.

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *title* | axis title |

#### 12.65.4.57 void QwtPlot::setAxisTitle ( int *axisId*, const QwtText & *title* )

Change the title of a specified axis.

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |
| *title* | Axis title |

#### 12.65.4.58 void QwtPlot::setCanvas ( QWidget ∗ *canvas* )

Set the drawing canvas of the plot widget.

QwtPlot invokes methods of the canvas as meta methods ( see QMetaObject ). In opposite to using conventional C++ techniques like virtual methods they allow to use canvas implementations that are derived from QWidget or QGLWidget.

The following meta methods could be implemented:

- replot() When the canvas doesn't offer a replot method, QwtPlot calls update() instead.
- borderPath() The border path is necessary to clip the content of the canvas When the canvas doesn't have any special border ( f.e rounded corners ) it is o.k. not to implement this method.

The default canvas is a QwtPlotCanvas

**Parameters**

| | |
|---|---|
| *canvas* | Canvas Widget |

**See Also**

canvas()

#### 12.65.4.59 void QwtPlot::setCanvasBackground ( const QBrush & *brush* )

Change the background of the plotting area.

Sets brush to QPalette::Window of all color groups of the palette of the canvas. Using canvas()->setPalette() is a more powerful way to set these colors.

**Parameters**

| | |
|---|---|
| *brush* | New background brush |

**See Also**

canvasBackground()

#### 12.65.4.60 void QwtPlot::setFooter ( const QString & *text* )

Change the text the footer

**Parameters**

| | |
|---|---|
| *text* | New text of the footer |

#### 12.65.4.61 void QwtPlot::setFooter ( const QwtText & *text* )

Change the text the footer

**Parameters**

| | |
|---|---|
| *text* | New text of the footer |

#### 12.65.4.62 void QwtPlot::setPlotLayout ( QwtPlotLayout ∗ *layout* )

Assign a new plot layout.

**Parameters**

| | |
|---|---|
| *layout* | Layout() |

**See Also**

plotLayout()

#### 12.65.4.63 void QwtPlot::setTitle ( const QString & *title* )

Change the plot's title

**Parameters**

| | |
|---|---|
| *title* | New title |

#### 12.65.4.64 void QwtPlot::setTitle ( const QwtText & *title* )

Change the plot's title

**Parameters**

| | |
|---|---|
| *title* | New title |

#### 12.65.4.65 QSize QwtPlot::sizeHint ( ) const [virtual]

**Returns**

Size hint for the plot widget

**See Also**

minimumSizeHint()

#### 12.65.4.66 QwtText QwtPlot::title ( ) const

**Returns**

Title of the plot

#### 12.65.4.67 QwtTextLabel ∗ QwtPlot::titleLabel ( )

**Returns**

Title label widget.

#### 12.65.4.68 const QwtTextLabel ∗ QwtPlot::titleLabel ( ) const

**Returns**

Title label widget.

#### 12.65.4.69 double QwtPlot::transform ( int *axisId*, double *value* ) const

Transform a value into a coordinate in the plotting region.

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |
| *value* | value |

**Returns**

X or Y coordinate in the plotting region corresponding to the value.

#### 12.65.4.70 void QwtPlot::updateAxes ( )

Rebuild the axes scales.

In case of autoscaling the boundaries of a scale are calculated from the bounding rectangles of all plot items, having the QwtPlotItem::AutoScale flag enabled ( QwtScaleEngine::autoScale() ). Then a scale division is calculated ( QwtScaleEngine::didvideScale() ) and assigned to scale widget.

When the scale boundaries have been assigned with setAxisScale() a scale division is calculated ( QwtScaleEngine::didvideScale() ) for this interval and assigned to the scale widget.

When the scale has been set explicitly by setAxisScaleDiv() the locally stored scale division gets assigned to the scale widget.

The scale widget indicates modifications by emitting a QwtScaleWidget::scaleDivChanged() signal.

updateAxes() is usually called by replot().

**See Also**

setAxisAutoScale(), setAxisScale(), setAxisScaleDiv(), replot() QwtPlotItem::boundingRect()

#### 12.65.4.71 void QwtPlot::updateCanvasMargins ( )

Update the canvas margins.

Plot items might indicate, that they need some extra space at the borders of the canvas by the QwtPlotItem::Margins flag.

getCanvasMarginsHint(), QwtPlotItem::getCanvasMarginHint()

#### 12.65.4.72 void QwtPlot::updateLayout ( ) [virtual]

Adjust plot content to its current size.

**See Also**

resizeEvent()

#### 12.65.4.73 void QwtPlot::updateLegend ( )

Emit legendDataChanged() for all plot item

**See Also**

QwtPlotItem::legendData(), legendDataChanged()

#### 12.65.4.74 void QwtPlot::updateLegend ( const QwtPlotItem ∗ *plotItem* )

Emit legendDataChanged() for a plot item

**Parameters**

| | |
|---|---|
| *plotItem* | Plot item |

#### See Also

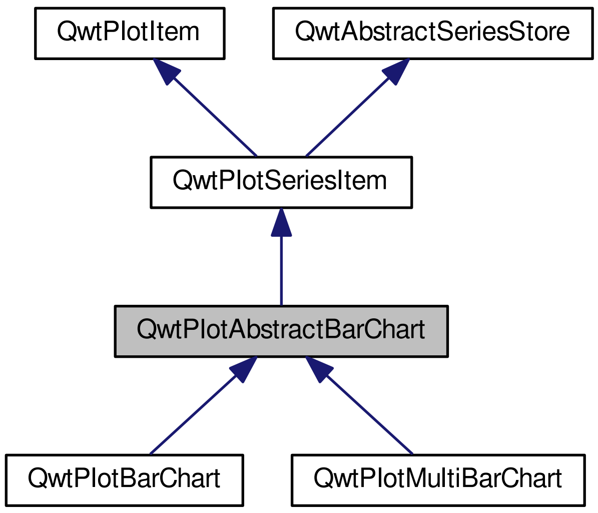
QwtPlotItem::legendData(), legendDataChanged()

## 12.66 QwtPlotAbstractBarChart Class Reference

Abstract base class for bar chart items.

`#include <qwt_plot_abstract_barchart.h>`

Inheritance diagram for QwtPlotAbstractBarChart:



#### Public Types

- enum LayoutPolicy { AutoAdjustSamples, ScaleSamplesToAxes, ScaleSampleToCanvas, FixedSampleSize }

  *Mode how to calculate the bar width.*

#### Public Member Functions

- QwtPlotAbstractBarChart (const QwtText &title)
- virtual ∼QwtPlotAbstractBarChart ()

  *Destructor.*
- void setLayoutPolicy (LayoutPolicy)
- LayoutPolicy layoutPolicy () const
- void setLayoutHint (double)
- double layoutHint () const
- void setSpacing (int)

  *Set the spacing.*
- int spacing () const
- void setMargin (int)

  *Set the margin.*
- int margin () const

- void setBaseline (double)

  *Set the baseline.*
- double baseline () const
- virtual void getCanvasMarginHint (const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, double &left, double &top, double &right, double &bottom) const

  *Calculate a hint for the canvas margin.*

#### Protected Member Functions

- double sampleWidth (const QwtScaleMap &map, double canvasSize, double dataSize, double value) const

### 12.66.1 Detailed Description

Abstract base class for bar chart items.

In opposite to almost all other plot items bar charts can't be displayed inside of their bounding rectangle and need a special API how to calculate the width of the bars and how they affect the layout of the attached plot.

### 12.66.2 Member Enumeration Documentation

#### 12.66.2.1 enum QwtPlotAbstractBarChart::LayoutPolicy

Mode how to calculate the bar width.

setLayoutPolicy(), setLayoutHint(), barWidthHint()

**Enumerator**

***AutoAdjustSamples*** The sample width is calculated by dividing the bounding rectangle by the number of samples. The layoutHint() is used as a minimum width in paint device coordinates.

**See Also**

boundingRectangle()

***ScaleSamplesToAxes*** layoutHint() defines an interval in axis coordinates

***ScaleSampleToCanvas*** The bar width is calculated by multiplying layoutHint() with the height or width of the canvas.

**See Also**

boundingRectangle()

***FixedSampleSize*** layoutHint() defines a fixed width in paint device coordinates.

### 12.66.3 Constructor & Destructor Documentation

#### 12.66.3.1 QwtPlotAbstractBarChart::QwtPlotAbstractBarChart ( const QwtText & *title* ) [explicit]

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the chart |

### 12.66.4 Member Function Documentation

#### 12.66.4.1 double QwtPlotAbstractBarChart::baseline ( ) const

**Returns**

Value for the origin of the bar chart

**See Also**

setBaseline(), QwtPlotSeriesItem::orientation()

#### 12.66.4.2 void QwtPlotAbstractBarChart::getCanvasMarginHint ( const **QwtScaleMap** & *xMap*, const **QwtScaleMap** & *yMap*, const QRectF & *canvasRect*, double & *left*, double & *top*, double & *right*, double & *bottom* ) const [virtual]

Calculate a hint for the canvas margin.

Bar charts need to reserve some space for displaying the bars for the first and the last sample. The hint is calculated from the layoutHint() depending on the layoutPolicy().

The margins are in target device coordinates ( pixels on screen )

**Parameters**

| | |
|---|---|
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas in painter coordinates |
| *left* | Returns the left margin |
| *top* | Returns the top margin |
| *right* | Returns the right margin |
| *bottom* | Returns the bottom margin |

**Returns**

Margin

**See Also**

layoutPolicy(), layoutHint(), QwtPlotItem::Margins QwtPlot::getCanvasMarginsHint(), QwtPlot::updateCanvas-Margins()

Reimplemented from QwtPlotItem.

#### 12.66.4.3 double QwtPlotAbstractBarChart::layoutHint ( ) const

The combination of layoutPolicy() and layoutHint() define how the width of the bars is calculated

**Returns**

Layout policy of the chart item

**See Also**

LayoutPolicy, setLayoutHint(), layoutPolicy()

#### 12.66.4.4 QwtPlotAbstractBarChart::LayoutPolicy QwtPlotAbstractBarChart::layoutPolicy ( ) const

The combination of layoutPolicy() and layoutHint() define how the width of the bars is calculated

**Returns**

Layout policy of the chart item

**See Also**

setLayoutPolicy(), layoutHint()

#### 12.66.4.5 int QwtPlotAbstractBarChart::margin ( ) const

**Returns**

Margin between the outmost bars and the contentsRect() of the canvas.

**See Also**

setMargin(), spacing()

#### 12.66.4.6 double QwtPlotAbstractBarChart::sampleWidth ( const QwtScaleMap & *map*, double *canvasSize*, double *boundingSize*, double *value* ) const [protected]

Calculate the width for a sample in paint device coordinates

**Parameters**

| | |
|---|---|
| *map* | Scale map for the corresponding scale |
| *canvasSize* | Size of the canvas in paint device coordinates |
| *boundingSize* | Bounding size of the chart in plot coordinates ( used in AutoAdjustSamples mode ) |
| *value* | Value of the sample |

**Returns**

Sample width

**See Also**

layoutPolicy(), layoutHint()

#### 12.66.4.7 void QwtPlotAbstractBarChart::setBaseline ( double *value* )

Set the baseline.

The baseline is the origin for the chart. Each bar is painted from the baseline in the direction of the sample value. In case of a horizontal orientation() the baseline is interpreted as x - otherwise as y - value.

The default value for the baseline is 0.

**Parameters**

| | |
|---|---|
| *value* | Value for the baseline |

**See Also**

baseline(), QwtPlotSeriesItem::orientation()

#### 12.66.4.8 void QwtPlotAbstractBarChart::setLayoutHint ( double *hint* )

The combination of layoutPolicy() and layoutHint() define how the width of the bars is calculated

**Parameters**

| | |
|---|---|
| *hint* | Layout hint |

**See Also**

LayoutPolicy, layoutPolicy(), layoutHint()

#### 12.66.4.9 void QwtPlotAbstractBarChart::setLayoutPolicy ( LayoutPolicy *policy* )

The combination of layoutPolicy() and layoutHint() define how the width of the bars is calculated

**Parameters**

| | |
|---|---|
| *policy* | Layout policy |

**See Also**

layoutPolicy(), layoutHint()

#### 12.66.4.10 void QwtPlotAbstractBarChart::setMargin ( int *margin* )

Set the margin.

The margin is the distance between the outmost bars and the contentsRect() of the canvas. The default setting is 5 pixels.

**Parameters**

| | |
|---|---|
| *margin* | Margin |

**See Also**

spacing(), margin()

#### 12.66.4.11 void QwtPlotAbstractBarChart::setSpacing ( int *spacing* )

Set the spacing.

The spacing is the distance between 2 samples ( bars for QwtPlotBarChart or a group of bars for QwtPlotMultiBarChart ) in paint device coordinates.

**See Also**

spacing()

#### 12.66.4.12 int QwtPlotAbstractBarChart::spacing ( ) const

**Returns**

Spacing between 2 samples ( bars or groups of bars )

#### See Also

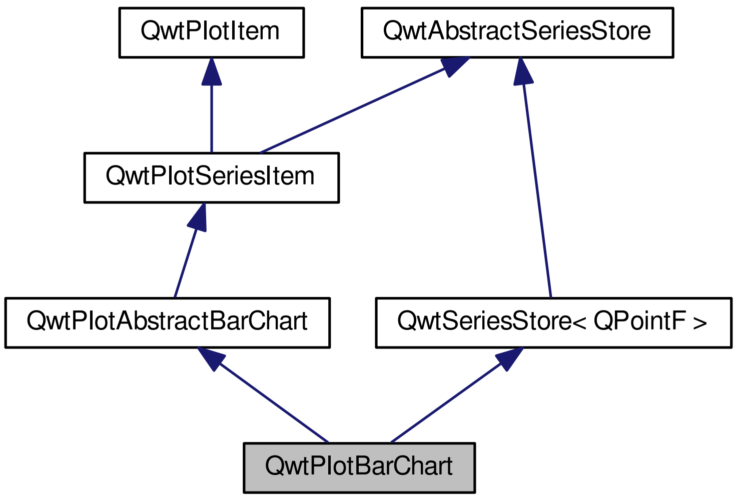
setSpacing(), margin()

## 12.67 QwtPlotBarChart Class Reference

QwtPlotBarChart displays a series of a values as bars.

`#include <qwt_plot_barchart.h>`

Inheritance diagram for QwtPlotBarChart:



#### Public Types

- enum LegendMode { LegendChartTitle, LegendBarTitles }

  *Legend modes.*

#### Public Member Functions

- QwtPlotBarChart (const QString &title=QString::null)
- QwtPlotBarChart (const QwtText &title)
- virtual ∼QwtPlotBarChart ()

  *Destructor.*
- virtual int rtti () const
- void setSamples (const QVector< QPointF > &)
- void setSamples (const QVector< double > &)
- void setSamples (QwtSeriesData< QPointF > ∗series)
- void setSymbol (QwtColumnSymbol ∗)

  *Assign a symbol.*
- const QwtColumnSymbol ∗ symbol () const
- void setLegendMode (LegendMode)
- LegendMode legendMode () const

- virtual void drawSeries (QPainter ∗painter, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- virtual QRectF boundingRect () const
- virtual QwtColumnSymbol ∗ specialSymbol (int sampleIndex, const QPointF &) const
- virtual QwtText barTitle (int sampleIndex) const

  *Return the title of a bar.*

**Protected Member Functions**

- virtual void drawSample (QPainter ∗painter, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, const QwtInterval &boundingInterval, int index, const QPointF &sample) const
- virtual void drawBar (QPainter ∗, int sampleIndex, const QPointF &point, const QwtColumnRect &) const
- QList< QwtLegendData > legendData () const

  *Return all information, that is needed to represent the item on the legend.*
- QwtGraphic legendIcon (int index, const QSizeF &) const

### 12.67.1 Detailed Description

QwtPlotBarChart displays a series of a values as bars.

Each bar might be customized individually by implementing a specialSymbol(). Otherwise it is rendered using a default symbol.

Depending on its orientation() the bars are displayed horizontally or vertically. The bars cover the interval between the baseline() and the value.

By activating the LegendBarTitles mode each sample will have its own entry on the legend.

The most common use case of a bar chart is to display a list of y coordinates, where the x coordinate is simply the index in the list. But for other situations ( f.e. when values are related to dates ) it is also possible to set x coordinates explicitly.

**See Also**

QwtPlotMultiBarChart, QwtPlotHistogram, QwtPlotCurve::Sticks, QwtPlotSeriesItem::orientation(), QwtPlotAbstractBarChart::baseline()

### 12.67.2 Member Enumeration Documentation

#### 12.67.2.1 enum QwtPlotBarChart::LegendMode

Legend modes.

The default setting is QwtPlotBarChart::LegendChartTitle.

**See Also**

setLegendMode(), legendMode()

**Enumerator**

***LegendChartTitle*** One entry on the legend showing the default symbol and the title() of the chart

**See Also**

QwtPlotItem::title()

***LegendBarTitles*** One entry for each value showing the individual symbol of the corresponding bar and the bar title.

**See Also**

specialSymbol(), barTitle()

### 12.67.3 Constructor & Destructor Documentation

#### 12.67.3.1 QwtPlotBarChart::QwtPlotBarChart ( const QString & *title* = `QString::null` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

#### 12.67.3.2 QwtPlotBarChart::QwtPlotBarChart ( const QwtText & *title* ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

### 12.67.4 Member Function Documentation

#### 12.67.4.1 QwtText QwtPlotBarChart::barTitle ( int *sampleIndex* ) const `[virtual]`

Return the title of a bar.

In LegendBarTitles mode the title is displayed on the legend entry corresponding to a bar.

The default implementation is a dummy, that is intended to be overloaded.

**Parameters**

| | |
|---|---|
| *sampleIndex* | Index of the bar |

**Returns**

An empty text

**See Also**

LegendBarTitles

#### 12.67.4.2 QRectF QwtPlotBarChart::boundingRect ( ) const `[virtual]`

**Returns**

Bounding rectangle of all samples. For an empty series the rectangle is invalid.

Reimplemented from QwtPlotSeriesItem.

#### 12.67.4.3 void QwtPlotBarChart::drawBar ( QPainter ∗ *painter*, int *sampleIndex*, const QPointF & *sample*, const QwtColumnRect & *rect* ) const `[protected]`, `[virtual]`

Draw a bar

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *sampleIndex* | Index of the sample represented by the bar |

| | |
|---:|---|
| *sample* | Value of the sample |
| *rect* | Bounding rectangle of the bar |

#### 12.67.4.4 void QwtPlotBarChart::drawSample ( QPainter ∗ *painter*, const **QwtScaleMap** & *xMap*, const **QwtScaleMap** & *yMap*, const QRectF & *canvasRect*, const **QwtInterval** & *boundingInterval*, int *index*, const QPointF & *sample* ) const `[protected]`, `[virtual]`

Draw a sample

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rect of the canvas |
| *boundingInterval* | Bounding interval of sample values |
| *index* | Index of the sample |
| *sample* | Value of the sample |

**See Also**

drawSeries()

#### 12.67.4.5 void QwtPlotBarChart::drawSeries ( QPainter ∗ *painter*, const **QwtScaleMap** & *xMap*, const **QwtScaleMap** & *yMap*, const QRectF & *canvasRect*, int *from*, int *to* ) const `[virtual]`

Draw an interval of the bar chart

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rect of the canvas |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted. If to $<$ 0 the curve will be painted to its last point. |

**See Also**

drawSymbols()

Implements QwtPlotSeriesItem.

#### 12.67.4.6 QList$<$ **QwtLegendData** $>$ QwtPlotBarChart::legendData ( ) const `[protected]`, `[virtual]`

Return all information, that is needed to represent the item on the legend.

In case of LegendBarTitles an entry for each bar is returned, otherwise the chart is represented like any other plot item from its title() and the legendIcon().

**Returns**

Information, that is needed to represent the item on the legend

**See Also**

title(), setLegendMode(), barTitle(), QwtLegend, QwtPlotLegendItem

Reimplemented from QwtPlotItem.

#### 12.67.4.7 QwtGraphic QwtPlotBarChart::legendIcon ( int *index*, const QSizeF & *size* ) const [protected], [virtual]

**Returns**

Icon representing a bar or the chart on the legend

When the legendMode() is LegendBarTitles the icon shows the bar corresponding to index - otherwise the bar displays the default symbol.

**Parameters**

| | |
|---|---|
| *index* | Index of the legend entry |
| *size* | Icon size |

**See Also**

setLegendMode(), drawBar(), QwtPlotItem::setLegendIconSize(), QwtPlotItem::legendData()

Reimplemented from QwtPlotItem.

#### 12.67.4.8 QwtPlotBarChart::LegendMode QwtPlotBarChart::legendMode ( ) const

**Returns**

Legend mode

**See Also**

setLegendMode()

#### 12.67.4.9 int QwtPlotBarChart::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotBarChart

Reimplemented from QwtPlotItem.

#### 12.67.4.10 void QwtPlotBarChart::setLegendMode ( LegendMode *mode* )

Set the mode that decides what to display on the legend

In case of LegendBarTitles barTitle() needs to be overloaded to return individual titles for each bar.

**Parameters**

| | |
|---|---|
| *mode* | New mode |

**See Also**

legendMode(), legendData(), barTitle(), QwtPlotItem::ItemAttribute

#### 12.67.4.11 void QwtPlotBarChart::setSamples ( const QVector< QPointF > & *samples* )

Initialize data with an array of points

**Parameters**

| | |
|---|---|
| *samples* | Vector of points |

**Note**

QVector is implicitly shared
QPolygonF is derived from QVector<QPointF>

#### 12.67.4.12 void QwtPlotBarChart::setSamples ( const QVector< double > & *samples* )

Initialize data with an array of doubles

The indices in the array are taken as x coordinate, while the doubles are interpreted as y values.

**Parameters**

| | |
|---|---|
| *samples* | Vector of y coordinates |

**Note**

QVector is implicitly shared

#### 12.67.4.13 void QwtPlotBarChart::setSamples ( QwtSeriesData< QPointF > ∗ *data* )

Assign a series of samples

setSamples() is just a wrapper for setData() without any additional value - beside that it is easier to find for the developer.

**Parameters**

| | |
|---|---|
| *data* | Data |

**Warning**

The item takes ownership of the data object, deleting it when its not used anymore.

#### 12.67.4.14 void QwtPlotBarChart::setSymbol ( QwtColumnSymbol ∗ *symbol* )

Assign a symbol.

The bar chart will take the ownership of the symbol, hence the previously set symbol will be delete by setting a new one. If `symbol` is `NULL` no symbol will be drawn.

**Parameters**

| | |
|---|---|
| *symbol* | Symbol |

**See Also**

symbol()

#### 12.67.4.15 QwtColumnSymbol ∗ QwtPlotBarChart::specialSymbol ( int *sampleIndex*, const QPointF & *sample* ) const `[virtual]`

Needs to be overloaded to return a non default symbol for a specific sample

**Parameters**

| | |
|---|---|
| *sampleIndex* | Index of the sample represented by the bar |
| *sample* | Value of the sample |

**Returns**

NULL, indicating to use the default symbol

#### 12.67.4.16 const QwtColumnSymbol $*$ QwtPlotBarChart::symbol ( ) const

**Returns**

Current symbol or NULL, when no symbol has been assigned

**See Also**

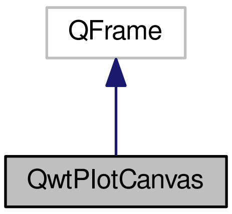
setSymbol()

## 12.68 QwtPlotCanvas Class Reference

Canvas of a QwtPlot.

```
#include <qwt_plot_canvas.h>
```

Inheritance diagram for QwtPlotCanvas:



**Public Types**

- enum PaintAttribute { BackingStore = 1, Opaque = 2, HackStyledBackground = 4, ImmediatePaint = 8 }

  *Paint attributes.*
- enum FocusIndicator { NoFocusIndicator, CanvasFocusIndicator, ItemFocusIndicator }

  *Focus indicator The default setting is NoFocusIndicator.*
- typedef QFlags< PaintAttribute > PaintAttributes

  *Paint attributes.*

**Public Slots**

- void replot ()

#### Public Member Functions

- QwtPlotCanvas (QwtPlot ∗=NULL)

  *Constructor.*
- virtual ∼QwtPlotCanvas ()

  *Destructor.*
- QwtPlot ∗ plot ()

  *Return parent plot widget.*
- const QwtPlot ∗ plot () const

  *Return parent plot widget.*
- void setFocusIndicator (FocusIndicator)
- FocusIndicator focusIndicator () const
- void setBorderRadius (double)
- double borderRadius () const
- void setPaintAttribute (PaintAttribute, bool on=true)

  *Changing the paint attributes.*
- bool testPaintAttribute (PaintAttribute) const
- const QPixmap ∗ backingStore () const
- void invalidateBackingStore ()

  *Invalidate the internal backing store.*
- virtual bool event (QEvent ∗)
- Q_INVOKABLE QPainterPath borderPath (const QRect &) const

#### Protected Member Functions

- virtual void paintEvent (QPaintEvent ∗)
- virtual void resizeEvent (QResizeEvent ∗)
- virtual void drawFocusIndicator (QPainter ∗)
- virtual void drawBorder (QPainter ∗)
- void updateStyleSheetInfo ()

  *Update the cached information about the current style sheet.*

### 12.68.1 Detailed Description

Canvas of a QwtPlot.

Canvas is the widget where all plot items are displayed

#### See Also

QwtPlot::setCanvas(), QwtPlotGLCanvas

### 12.68.2 Member Enumeration Documentation

#### 12.68.2.1 enum QwtPlotCanvas::FocusIndicator

Focus indicator The default setting is NoFocusIndicator.

**See Also**

setFocusIndicator(), focusIndicator(), paintFocus()

**Enumerator**

***NoFocusIndicator*** Don't paint a focus indicator.

***CanvasFocusIndicator*** The focus is related to the complete canvas. Paint the focus indicator using paint-Focus()

***ItemFocusIndicator*** The focus is related to an item (curve, point, ...) on the canvas. It is up to the application to display a focus indication using f.e. highlighting.

#### 12.68.2.2 enum QwtPlotCanvas::PaintAttribute

Paint attributes.

The default setting enables BackingStore and Opaque.

**See Also**

setPaintAttribute(), testPaintAttribute()

**Enumerator**

***BackingStore*** Paint double buffered reusing the content of the pixmap buffer when possible. Using a backing store might improve the performance significantly, when working with widget overlays ( like rubber bands ). Disabling the cache might improve the performance for incremental paints (using QwtPlotDirectPainter ).

**See Also**

backingStore(), invalidateBackingStore()

***Opaque*** Try to fill the complete contents rectangle of the plot canvas. When using styled backgrounds Qt assumes, that the canvas doesn't fill its area completely ( f.e because of rounded borders ) and fills the area below the canvas. When this is done with gradients it might result in a serious performance bottleneck - depending on the size.

When the Opaque attribute is enabled the canvas tries to identify the gaps with some heuristics and to fill those only.

**Warning**

Will not work for semitransparent backgrounds

***HackStyledBackground*** Try to improve painting of styled backgrounds. QwtPlotCanvas supports the box model attributes for customizing the layout with style sheets. Unfortunately the design of Qt style sheets has no concept how to handle backgrounds with rounded corners - beside of padding.

When HackStyledBackground is enabled the plot canvas tries to separate the background from the background border by reverse engineering to paint the background before and the border after the plot items. In this order the border gets perfectly antialiased and you can avoid some pixel artifacts in the corners.

***ImmediatePaint*** When ImmediatePaint is set replot() calls repaint() instead of update().

**See Also**

replot(), QWidget::repaint(), QWidget::update()

### 12.68.3 Constructor & Destructor Documentation

#### 12.68.3.1 QwtPlotCanvas::QwtPlotCanvas ( QwtPlot ∗ *plot* = `NULL` ) `[explicit]`

Constructor.

**Parameters**

| | |
|---:|---|
| *plot* | Parent plot widget |

**See Also**

QwtPlot::setCanvas()

### 12.68.4 Member Function Documentation

#### 12.68.4.1 const QPixmap ∗ QwtPlotCanvas::backingStore ( ) const

**Returns**

Backing store, might be null

#### 12.68.4.2 QPainterPath QwtPlotCanvas::borderPath ( const QRect & *rect* ) const

Calculate the painter path for a styled or rounded border

When the canvas has no styled background or rounded borders the painter path is empty.

**Parameters**

| | |
|---:|---|
| *rect* | Bounding rectangle of the canvas |

**Returns**

Painter path, that can be used for clipping

#### 12.68.4.3 double QwtPlotCanvas::borderRadius ( ) const

**Returns**

Radius for the corners of the border frame

**See Also**

setBorderRadius()

#### 12.68.4.4 void QwtPlotCanvas::drawBorder ( QPainter ∗ *painter* ) `[protected]`, `[virtual]`

Draw the border of the plot canvas

**Parameters**

| | |
|---:|---|
| *painter* | Painter |

**See Also**

setBorderRadius()

#### 12.68.4.5 void QwtPlotCanvas::drawFocusIndicator ( QPainter ∗ *painter* ) `[protected]`, `[virtual]`

Draw the focus indication

**Parameters**

|  |  |
|---|---|
| *painter* | Painter |

#### 12.68.4.6 bool QwtPlotCanvas::event ( QEvent ∗ *event* ) [virtual]

Qt event handler for QEvent::PolishRequest and QEvent::StyleChange

**Parameters**

|  |  |
|---|---|
| *event* | Qt Event |

**Returns**

See QFrame::event()

#### 12.68.4.7 QwtPlotCanvas::FocusIndicator QwtPlotCanvas::focusIndicator ( ) const

**Returns**

Focus indicator

**See Also**

FocusIndicator, setFocusIndicator()

#### 12.68.4.8 void QwtPlotCanvas::paintEvent ( QPaintEvent ∗ *event* ) [protected], [virtual]

Paint event

**Parameters**

|  |  |
|---|---|
| *event* | Paint event |

#### 12.68.4.9 void QwtPlotCanvas::replot ( ) [slot]

Invalidate the paint cache and repaint the canvas

**See Also**

invalidatePaintCache()

#### 12.68.4.10 void QwtPlotCanvas::resizeEvent ( QResizeEvent ∗ *event* ) [protected], [virtual]

Resize event

**Parameters**

|  |  |
|---|---|
| *event* | Resize event |

#### 12.68.4.11 void QwtPlotCanvas::setBorderRadius ( double *radius* )

Set the radius for the corners of the border frame

**Parameters**

| | |
|---|---|
| *radius* | Radius of a rounded corner |

**See Also**

borderRadius()

#### 12.68.4.12 void QwtPlotCanvas::setFocusIndicator ( FocusIndicator *focusIndicator* )

Set the focus indicator

**See Also**

FocusIndicator, focusIndicator()

#### 12.68.4.13 void QwtPlotCanvas::setPaintAttribute ( PaintAttribute *attribute*, bool *on* = `true` )

Changing the paint attributes.

**Parameters**

| | |
|---|---|
| *attribute* | Paint attribute |
| *on* | On/Off |

**See Also**

testPaintAttribute(), backingStore()

#### 12.68.4.14 bool QwtPlotCanvas::testPaintAttribute ( PaintAttribute *attribute* ) const

Test whether a paint attribute is enabled

**Parameters**

| | |
|---|---|
| *attribute* | Paint attribute |

**Returns**

true, when attribute is enabled

**See Also**

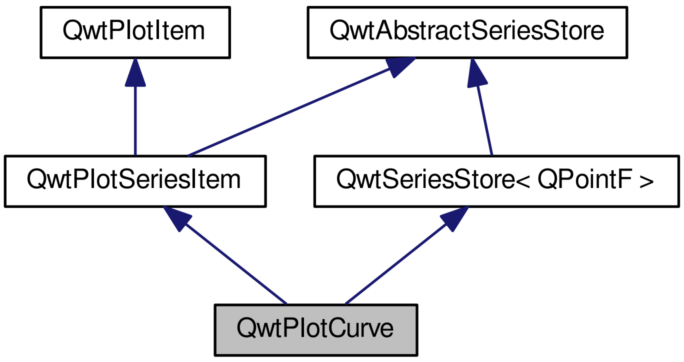
setPaintAttribute()

### 12.69 QwtPlotCurve Class Reference

A plot item, that represents a series of points.

`#include <qwt_plot_curve.h>`

Inheritance diagram for QwtPlotCurve:



**Public Types**

- enum CurveStyle {
  NoCurve = -1, Lines, Sticks, Steps,
  Dots, UserCurve = 100 }
- enum CurveAttribute { Inverted = 0x01, Fitted = 0x02 }
- enum LegendAttribute { LegendNoAttribute = 0x00, LegendShowLine = 0x01, LegendShowSymbol = 0x02, LegendShowBrush = 0x04 }
- enum PaintAttribute { ClipPolygons = 0x01, FilterPoints = 0x02, MinimizeMemory = 0x04, ImageBuffer = 0x08 }
- typedef QFlags< CurveAttribute > CurveAttributes

  *Curve attributes.*
- typedef QFlags< LegendAttribute > LegendAttributes

  *Legend attributes.*
- typedef QFlags< PaintAttribute > PaintAttributes

  *Paint attributes.*

**Public Member Functions**

- QwtPlotCurve (const QString &title=QString::null)
- QwtPlotCurve (const QwtText &title)
- virtual ∼QwtPlotCurve ()

  *Destructor.*
- virtual int rtti () const
- void setPaintAttribute (PaintAttribute, bool on=true)

- bool testPaintAttribute (PaintAttribute) const
- void setLegendAttribute (LegendAttribute, bool on=true)
- bool testLegendAttribute (LegendAttribute) const
- void setRawSamples (const double ∗xData, const double ∗yData, int size)

  *Initialize the data by pointing to memory blocks which are not managed by QwtPlotCurve.*
- void setSamples (const double ∗xData, const double ∗yData, int size)
- void setSamples (const QVector< double > &xData, const QVector< double > &yData)

  *Initialize data with x- and y-arrays (explicitly shared)*
- void setSamples (const QVector< QPointF > &)
- void setSamples (QwtSeriesData< QPointF > ∗)
- int closestPoint (const QPoint &pos, double ∗dist=NULL) const
- double minXValue () const

  *boundingRect().left()*
- double maxXValue () const

  *boundingRect().right()*
- double minYValue () const

  *boundingRect().top()*
- double maxYValue () const

  *boundingRect().bottom()*
- void setCurveAttribute (CurveAttribute, bool on=true)
- bool testCurveAttribute (CurveAttribute) const
- void setPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setPen (const QPen &)
- const QPen & pen () const
- void setBrush (const QBrush &)

  *Assign a brush.*
- const QBrush & brush () const
- void setBaseline (double)

  *Set the value of the baseline.*
- double baseline () const
- void setStyle (CurveStyle style)
- CurveStyle style () const
- void setSymbol (QwtSymbol ∗)

  *Assign a symbol.*
- const QwtSymbol ∗ symbol () const
- void setCurveFitter (QwtCurveFitter ∗)
- QwtCurveFitter ∗ curveFitter () const
- virtual void drawSeries (QPainter ∗, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- virtual QwtGraphic legendIcon (int index, const QSizeF &) const

### Protected Member Functions

- void init ()

  *Initialize internal members.*
- virtual void drawCurve (QPainter ∗p, int style, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const

  *Draw the line part (without symbols) of a curve interval.*
- virtual void drawSymbols (QPainter ∗p, const QwtSymbol &, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- virtual void drawLines (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const

  *Draw lines.*

- virtual void drawSticks (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- virtual void drawDots (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- virtual void drawSteps (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- virtual void fillCurve (QPainter ∗, const QwtScaleMap &, const QwtScaleMap &, const QRectF &canvasRect, QPolygonF &) const
- void closePolyline (QPainter ∗, const QwtScaleMap &, const QwtScaleMap &, QPolygonF &) const

    *Complete a polygon to be a closed polygon including the area between the original polygon and the baseline.*

### 12.69.1 Detailed Description

A plot item, that represents a series of points.

A curve is the representation of a series of points in the x-y plane. It supports different display styles, interpolation ( f.e. spline ) and symbols.

**Usage**

**a) Assign curve properties** When a curve is created, it is configured to draw black solid lines with in QwtPlotCurve::Lines style and no symbols. You can change this by calling setPen(), setStyle() and setSymbol().

**b) Connect/Assign data.** QwtPlotCurve gets its points using a QwtSeriesData object offering a bridge to the real storage of the points ( like QAbstractItemModel ). There are several convenience classes derived from QwtSeriesData, that also store the points inside ( like QStandardItemModel ). QwtPlotCurve also offers a couple of variations of setSamples(), that build QwtSeriesData objects from arrays internally.

**c) Attach the curve to a plot** See QwtPlotItem::attach()

**Example:**

see examples/bode

**See Also**

QwtPointSeriesData, QwtSymbol, QwtScaleMap

### 12.69.2 Member Enumeration Documentation

#### 12.69.2.1 enum QwtPlotCurve::CurveAttribute

Attribute for drawing the curve

**See Also**

setCurveAttribute(), testCurveAttribute(), curveFitter()

**Enumerator**

***Inverted*** For QwtPlotCurve::Steps only. Draws a step function from the right to the left.

***Fitted*** Only in combination with QwtPlotCurve::Lines A QwtCurveFitter tries to interpolate/smooth the curve, before it is painted.

**Note**

Curve fitting requires temporary memory for calculating coefficients and additional points. If painting in QwtPlotCurve::Fitted mode is slow it might be better to fit the points, before they are passed to QwtPlotCurve.

#### 12.69.2.2 enum QwtPlotCurve::CurveStyle

Curve styles.

**See Also**

setStyle(), style()

**Enumerator**

***NoCurve*** Don't draw a curve. Note: This doesn't affect the symbols.

***Lines*** Connect the points with straight lines. The lines might be interpolated depending on the 'Fitted' attribute. Curve fitting can be configured using setCurveFitter().

***Sticks*** Draw vertical or horizontal sticks ( depending on the orientation() ) from a baseline which is defined by setBaseline().

***Steps*** Connect the points with a step function. The step function is drawn from the left to the right or vice versa, depending on the QwtPlotCurve::Inverted attribute.

***Dots*** Draw dots at the locations of the data points. Note: This is different from a dotted line (see setPen()), and faster as a curve in QwtPlotCurve::NoStyle style and a symbol painting a point.

***UserCurve*** Styles >= QwtPlotCurve::UserCurve are reserved for derived classes of QwtPlotCurve that overload drawCurve() with additional application specific curve types.

#### 12.69.2.3 enum QwtPlotCurve::LegendAttribute

Attributes how to represent the curve on the legend

**See Also**

setLegendAttribute(), testLegendAttribute(), QwtPlotItem::legendData(), legendIcon()

**Enumerator**

***LegendNoAttribute*** QwtPlotCurve tries to find a color representing the curve and paints a rectangle with it.

***LegendShowLine*** If the style() is not QwtPlotCurve::NoCurve a line is painted with the curve pen().

***LegendShowSymbol*** If the curve has a valid symbol it is painted.

***LegendShowBrush*** If the curve has a brush a rectangle filled with the curve brush() is painted.

#### 12.69.2.4 enum QwtPlotCurve::PaintAttribute

Attributes to modify the drawing algorithm. The default setting enables ClipPolygons | FilterPoints

**See Also**

setPaintAttribute(), testPaintAttribute()

**Enumerator**

***ClipPolygons*** Clip polygons before painting them. In situations, where points are far outside the visible area (f.e when zooming deep) this might be a substantial improvement for the painting performance

***FilterPoints*** Tries to reduce the data that has to be painted, by sorting out duplicates, or paintings outside the visible area. Might have a notable impact on curves with many close points. Only a couple of very basic filtering algorithms are implemented.

***MinimizeMemory*** Minimize memory usage that is temporarily needed for the translated points, before they get painted. This might slow down the performance of painting

***ImageBuffer*** Render the points to a temporary image and paint the image. This is a very special optimization for Dots style, when having a huge amount of points. With a reasonable number of points QPainter::drawPoints() will be faster.

#### 12.69.3 Constructor & Destructor Documentation

##### 12.69.3.1 QwtPlotCurve::QwtPlotCurve ( const QString & *title* = `QString::null` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

#### 12.69.3.2 QwtPlotCurve::QwtPlotCurve ( const QwtText & *title* ) [explicit]

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

### 12.69.4 Member Function Documentation

#### 12.69.4.1 double QwtPlotCurve::baseline ( ) const

**Returns**

Value of the baseline

**See Also**

setBaseline()

#### 12.69.4.2 const QBrush & QwtPlotCurve::brush ( ) const

**Returns**

Brush used to fill the area between lines and the baseline

**See Also**

setBrush(), setBaseline(), baseline()

#### 12.69.4.3 void QwtPlotCurve::closePolyline ( QPainter ∗ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* QPolygonF & *polygon* ) const [protected]

Complete a polygon to be a closed polygon including the area between the original polygon and the baseline.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | X map |
| *yMap* | Y map |
| *polygon* | Polygon to be completed |

#### 12.69.4.4 int QwtPlotCurve::closestPoint ( const QPoint & *pos,* double ∗ *dist* = NULL ) const

Find the closest curve point for a specific position

**Parameters**

| | |
|---|---|
| *pos* | Position, where to look for the closest curve point |
| *dist* | If dist != NULL, closestPoint() returns the distance between the position and the closest curve point |

**Returns**

Index of the closest curve point, or -1 if none can be found ( f.e when the curve has no points )

**Note**

closestPoint() implements a dumb algorithm, that iterates over all points

#### 12.69.4.5 QwtCurveFitter ∗ QwtPlotCurve::curveFitter ( ) const

Get the curve fitter. If curve fitting is disabled NULL is returned.

**Returns**

Curve fitter

**See Also**

setCurveFitter(), Fitted

#### 12.69.4.6 void QwtPlotCurve::drawCurve ( QPainter ∗ *painter*, int *style*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect*, int *from*, int *to* ) const [protected], [virtual]

Draw the line part (without symbols) of a curve interval.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *style* | curve style, see QwtPlotCurve::CurveStyle |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | index of the first point to be painted |
| *to* | index of the last point to be painted |

**See Also**

draw(), drawDots(), drawLines(), drawSteps(), drawSticks()

#### 12.69.4.7 void QwtPlotCurve::drawDots ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect*, int *from*, int *to* ) const [protected], [virtual]

Draw dots

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | index of the first point to be painted |
| *to* | index of the last point to be painted |

**See Also**

draw(), drawCurve(), drawSticks(), drawLines(), drawSteps()

#### 12.69.4.8 void QwtPlotCurve::drawLines ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect*, int *from*, int *to* ) const [protected], [virtual]

Draw lines.

If the CurveAttribute Fitted is enabled a QwtCurveFitter tries to interpolate/smooth the curve, before it is painted.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | index of the first point to be painted |
| *to* | index of the last point to be painted |

**See Also**

setCurveAttribute(), setCurveFitter(), draw(), drawLines(), drawDots(), drawSteps(), drawSticks()

#### 12.69.4.9 void QwtPlotCurve::drawSeries ( QPainter ∗ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect,* int *from,* int *to* ) const `[virtual]`

Draw an interval of the curve

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted. If to $<$ 0 the curve will be painted to its last point. |

**See Also**

drawCurve(), drawSymbols(),

Implements QwtPlotSeriesItem.

#### 12.69.4.10 void QwtPlotCurve::drawSteps ( QPainter ∗ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect,* int *from,* int *to* ) const `[protected]`, `[virtual]`

Draw step function

The direction of the steps depends on Inverted attribute.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | index of the first point to be painted |
| *to* | index of the last point to be painted |

**See Also**

CurveAttribute, setCurveAttribute(), draw(), drawCurve(), drawDots(), drawLines(), drawSticks()

#### 12.69.4.11 void QwtPlotCurve::drawSticks ( QPainter ∗ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect,* int *from,* int *to* ) const `[protected]`, `[virtual]`

Draw sticks

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | index of the first point to be painted |
| *to* | index of the last point to be painted |

**See Also**

draw(), drawCurve(), drawDots(), drawLines(), drawSteps()

#### 12.69.4.12 void QwtPlotCurve::drawSymbols ( QPainter ∗ *painter,* const QwtSymbol & *symbol,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect,* int *from,* int *to* ) const `[protected]`, `[virtual]`

Draw symbols

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *symbol* | Curve symbol |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted |

**See Also**

setSymbol(), drawSeries(), drawCurve()

#### 12.69.4.13 void QwtPlotCurve::fillCurve ( QPainter ∗ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect,* QPolygonF & *polygon* ) const `[protected]`, `[virtual]`

Fill the area between the curve and the baseline with the curve brush

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *polygon* | Polygon - will be modified ! |

**See Also**

setBrush(), setBaseline(), setStyle()

#### 12.69.4.14 QwtGraphic QwtPlotCurve::legendIcon ( int *index,* const QSizeF & *size* ) const `[virtual]`

**Returns**

Icon representing the curve on the legend

**Parameters**

| | |
|---|---|
| *index* | Index of the legend entry ( ignored as there is only one ) |
| *size* | Icon size |

**See Also**

QwtPlotItem::setLegendIconSize(), QwtPlotItem::legendData()

Reimplemented from QwtPlotItem.

#### 12.69.4.15 const QPen & QwtPlotCurve::pen ( ) const

**Returns**

Pen used to draw the lines

**See Also**

setPen(), brush()

#### 12.69.4.16 int QwtPlotCurve::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotCurve

Reimplemented from QwtPlotItem.

#### 12.69.4.17 void QwtPlotCurve::setBaseline ( double *value* )

Set the value of the baseline.

The baseline is needed for filling the curve with a brush or the Sticks drawing style.

The interpretation of the baseline depends on the orientation(). With Qt::Horizontal, the baseline is interpreted as a horizontal line at y = baseline(), with Qt::Vertical, it is interpreted as a vertical line at x = baseline().

The default value is 0.0.

**Parameters**

| | |
|---|---|
| *value* | Value of the baseline |

**See Also**

baseline(), setBrush(), setStyle(), QwtPlotAbstractSeriesItem::orientation()

#### 12.69.4.18 void QwtPlotCurve::setBrush ( const QBrush & *brush* )

Assign a brush.

In case of brush.style() != QBrush::NoBrush and style() != QwtPlotCurve::Sticks the area between the curve and the baseline will be filled.

In case !brush.color().isValid() the area will be filled by pen.color(). The fill algorithm simply connects the first and the last curve point to the baseline. So the curve data has to be sorted (ascending or descending).

**Parameters**

| | |
|---|---|
| *brush* | New brush |

**See Also**

brush(), setBaseline(), baseline()

#### 12.69.4.19 void QwtPlotCurve::setCurveAttribute ( **CurveAttribute** *attribute*, bool *on* = `true` )

Specify an attribute for drawing the curve

**Parameters**

| | |
|---|---|
| *attribute* | Curve attribute |
| *on* | On/Off |

/sa testCurveAttribute(), setCurveFitter()

#### 12.69.4.20 void QwtPlotCurve::setCurveFitter ( **QwtCurveFitter** $*$ *curveFitter* )

Assign a curve fitter

The curve fitter "smooths" the curve points, when the Fitted CurveAttribute is set. setCurveFitter(NULL) also disables curve fitting.

The curve fitter operates on the translated points ( = widget coordinates) to be functional for logarithmic scales. Obviously this is less performant for fitting algorithms, that reduce the number of points.

For situations, where curve fitting is used to improve the performance of painting huge series of points it might be better to execute the fitter on the curve points once and to cache the result in the QwtSeriesData object.

**Parameters**

| | |
|---|---|
| *curveFitter()* | Curve fitter |

**See Also**

Fitted

#### 12.69.4.21 void QwtPlotCurve::setLegendAttribute ( **LegendAttribute** *attribute*, bool *on* = `true` )

Specify an attribute how to draw the legend icon

**Parameters**

| | |
|---|---|
| *attribute* | Attribute |
| *on* | On/Off /sa testLegendAttribute(). legendIcon() |

#### 12.69.4.22 void QwtPlotCurve::setPaintAttribute ( **PaintAttribute** *attribute*, bool *on* = `true` )

Specify an attribute how to draw the curve

**Parameters**

| | |
|---|---|
| *attribute* | Paint attribute |
| *on* | On/Off |

**See Also**

testPaintAttribute()

#### 12.69.4.23 void QwtPlotCurve::setPen ( const QColor & *color*, qreal *width* = `0.0`, Qt::PenStyle *style* = `Qt::SolidLine` )

Build and assign a pen

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.69.4.24 void QwtPlotCurve::setPen ( const QPen & *pen* )

Assign a pen

**Parameters**

| | |
|---|---|
| *pen* | New pen |

**See Also**

pen(), brush()

#### 12.69.4.25 void QwtPlotCurve::setRawSamples ( const double ∗ *xData*, const double ∗ *yData*, int *size* )

Initialize the data by pointing to memory blocks which are not managed by QwtPlotCurve.

setRawSamples is provided for efficiency. It is important to keep the pointers during the lifetime of the underlying QwtCPointerData class.

**Parameters**

| | |
|---|---|
| *xData* | pointer to x data |
| *yData* | pointer to y data |
| *size* | size of x and y |

**See Also**

QwtCPointerData

#### 12.69.4.26 void QwtPlotCurve::setSamples ( const double ∗ *xData*, const double ∗ *yData*, int *size* )

Set data by copying x- and y-values from specified memory blocks. Contrary to setRawSamples(), this function makes a 'deep copy' of the data.

**Parameters**

| | |
|---|---|
| *xData* | pointer to x values |
| *yData* | pointer to y values |
| *size* | size of xData and yData |

**See Also**

QwtPointArrayData

#### 12.69.4.27 void QwtPlotCurve::setSamples ( const QVector< double > & *xData*, const QVector< double > & *yData* )

Initialize data with x- and y-arrays (explicitly shared)

**Parameters**

| | |
|---|---|
| *xData* | x data |
| *yData* | y data |

**See Also**

QwtPointArrayData

#### 12.69.4.28 void QwtPlotCurve::setSamples ( const QVector< QPointF > & *samples* )

Initialize data with an array of points.

**Parameters**

| | |
|---|---|
| *samples* | Vector of points |

**Note**

QVector is implicitly shared
QPolygonF is derived from QVector<QPointF>

#### 12.69.4.29 void QwtPlotCurve::setSamples ( QwtSeriesData< QPointF > ∗ *data* )

Assign a series of points

setSamples() is just a wrapper for setData() without any additional value - beside that it is easier to find for the developer.

**Parameters**

| | |
|---|---|
| *data* | Data |

**Warning**

The item takes ownership of the data object, deleting it when its not used anymore.

#### 12.69.4.30 void QwtPlotCurve::setStyle ( CurveStyle *style* )

Set the curve's drawing style

**Parameters**

| | |
|---|---|
| *style* | Curve style |

**See Also**

style()

#### 12.69.4.31 void QwtPlotCurve::setSymbol ( QwtSymbol ∗ *symbol* )

Assign a symbol.

The curve will take the ownership of the symbol, hence the previously set symbol will be delete by setting a new one. If `symbol` is `NULL` no symbol will be drawn.

**Parameters**

| | |
|---|---|
| *symbol* | Symbol |

**See Also**

symbol()

#### 12.69.4.32 QwtPlotCurve::CurveStyle QwtPlotCurve::style ( ) const

**Returns**

Style of the curve

**See Also**

setStyle()

#### 12.69.4.33 const QwtSymbol ∗ QwtPlotCurve::symbol ( ) const

**Returns**

Current symbol or NULL, when no symbol has been assigned

**See Also**

setSymbol()

#### 12.69.4.34 bool QwtPlotCurve::testCurveAttribute ( CurveAttribute *attribute* ) const

**Returns**

true, if attribute is enabled

**See Also**

setCurveAttribute()

#### 12.69.4.35 bool QwtPlotCurve::testLegendAttribute ( LegendAttribute *attribute* ) const

**Returns**

True, when attribute is enabled

**See Also**

setLegendAttribute()

#### 12.69.4.36 bool QwtPlotCurve::testPaintAttribute ( PaintAttribute *attribute* ) const

**Returns**

True, when attribute is enabled

**See Also**

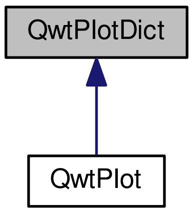
setPaintAttribute()

## 12.70 QwtPlotDict Class Reference

A dictionary for plot items.

`#include <qwt_plot_dict.h>`

Inheritance diagram for QwtPlotDict:



### Public Member Functions

- QwtPlotDict ()
- virtual ∼QwtPlotDict ()
- void setAutoDelete (bool)
- bool autoDelete () const
- const QwtPlotItemList & itemList () const

    *A QwtPlotItemList of all attached plot items.*
- QwtPlotItemList itemList (int rtti) const
- void detachItems (int rtti=QwtPlotItem::Rtti_PlotItem, bool autoDelete=true)

### Protected Member Functions

- void insertItem (QwtPlotItem $*$)
- void removeItem (QwtPlotItem $*$)

### 12.70.1 Detailed Description

A dictionary for plot items.

QwtPlotDict organizes plot items in increasing z-order. If autoDelete() is enabled, all attached items will be deleted in the destructor of the dictionary. QwtPlotDict can be used to get access to all QwtPlotItem items - or all items of a specific type - that are currently on the plot.

**See Also**

QwtPlotItem::attach(), QwtPlotItem::detach(), QwtPlotItem::z()

### 12.70.2 Constructor & Destructor Documentation

#### 12.70.2.1 QwtPlotDict::QwtPlotDict ( ) `[explicit]`

Constructor

Auto deletion is enabled.

**See Also**

setAutoDelete(), QwtPlotItem::attach()

#### 12.70.2.2 QwtPlotDict::∼QwtPlotDict ( ) `[virtual]`

Destructor

If autoDelete() is on, all attached items will be deleted

**See Also**

setAutoDelete(), autoDelete(), QwtPlotItem::attach()

### 12.70.3 Member Function Documentation

#### 12.70.3.1 bool QwtPlotDict::autoDelete ( ) const

**Returns**

true if auto deletion is enabled

**See Also**

setAutoDelete(), insertItem()

#### 12.70.3.2 void QwtPlotDict::detachItems ( int *rtti* = QwtPlotItem::Rtti_PlotItem, bool *autoDelete* = `true` )

Detach items from the dictionary

**Parameters**

| | |
|---|---|
| *rtti* | In case of QwtPlotItem::Rtti_PlotItem detach all items otherwise only those items of the type rtti. |
| *autoDelete* | If true, delete all detached items |

#### 12.70.3.3 void QwtPlotDict::insertItem ( QwtPlotItem ∗ *item* ) `[protected]`

Insert a plot item

**Parameters**

| | |
|---|---|
| *item* | PlotItem |

**See Also**

removeItem()

#### 12.70.3.4 const QwtPlotItemList & QwtPlotDict::itemList ( ) const

A QwtPlotItemList of all attached plot items.

Use caution when iterating these lists, as removing/detaching an item will invalidate the iterator. Instead you can place pointers to objects to be removed in a removal list, and traverse that list later.

**Returns**

List of all attached plot items.

#### 12.70.3.5 QwtPlotItemList QwtPlotDict::itemList ( int *rtti* ) const

**Returns**

List of all attached plot items of a specific type.

**Parameters**

| | |
|---|---|
| *rtti* | See QwtPlotItem::RttiValues |

**See Also**

QwtPlotItem::rtti()

#### 12.70.3.6 void QwtPlotDict::removeItem ( QwtPlotItem ∗ *item* ) [protected]

Remove a plot item

**Parameters**

| | |
|---|---|
| *item* | PlotItem |

**See Also**

insertItem()

#### 12.70.3.7 void QwtPlotDict::setAutoDelete ( bool *autoDelete* )

En/Disable Auto deletion

If Auto deletion is on all attached plot items will be deleted in the destructor of QwtPlotDict. The default value is on.

**See Also**

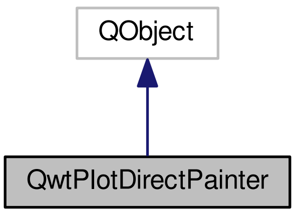
autoDelete(), insertItem()

## 12.71 QwtPlotDirectPainter Class Reference

Painter object trying to paint incrementally.

`#include <qwt_plot_directpainter.h>`

Inheritance diagram for QwtPlotDirectPainter:



### Public Types

- enum Attribute { AtomicPainter = 0x01, FullRepaint = 0x02, CopyBackingStore = 0x04 }

  *Paint attributes.*
- typedef QFlags< Attribute > Attributes

  *Paint attributes.*

### Public Member Functions

- QwtPlotDirectPainter (QObject ∗parent=NULL)

  *Constructor.*
- virtual ∼QwtPlotDirectPainter ()

  *Destructor.*
- void setAttribute (Attribute, bool on)
- bool testAttribute (Attribute) const
- void setClipping (bool)
- bool hasClipping () const
- void setClipRegion (const QRegion &)

  *Assign a clip region and enable clipping.*
- QRegion clipRegion () const
- void drawSeries (QwtPlotSeriesItem ∗, int from, int to)

  *Draw a set of points of a seriesItem.*
- void reset ()

  *Close the internal QPainter.*
- virtual bool eventFilter (QObject ∗, QEvent ∗)

  *Event filter.*

### 12.71.1 Detailed Description

Painter object trying to paint incrementally.

Often applications want to display samples while they are collected. When there are too many samples complete replots will be expensive to be processed in a collection cycle.

QwtPlotDirectPainter offers an API to paint subsets ( f.e all additions points ) without erasing/repainting the plot canvas.

On certain environments it might be important to calculate a proper clip region before painting. F.e. for Qt Embedded only the clipped part of the backing store will be copied to a ( maybe unaccelerated ) frame buffer.

**Warning**

Incremental painting will only help when no replot is triggered by another operation ( like changing scales ) and nothing needs to be erased.

### 12.71.2 Member Enumeration Documentation

#### 12.71.2.1 enum QwtPlotDirectPainter::Attribute

Paint attributes.

**See Also**

setAttribute(), testAttribute(), drawSeries()

**Enumerator**

***AtomicPainter*** Initializing a QPainter is an expensive operation. When AtomicPainter is set each call of drawSeries() opens/closes a temporary QPainter. Otherwise QwtPlotDirectPainter tries to use the same QPainter as long as possible.

***FullRepaint*** When FullRepaint is set the plot canvas is explicitly repainted after the samples have been rendered.

***CopyBackingStore*** When QwtPlotCanvas::BackingStore is enabled the painter has to paint to the backing store and the widget. In certain situations/environments it might be faster to paint to the backing store only and then copy the backing store to the canvas. This flag can also be useful for settings, where Qt fills the the clip region with the widget background.

### 12.71.3 Member Function Documentation

#### 12.71.3.1 QRegion QwtPlotDirectPainter::clipRegion ( ) const

**Returns**

Currently set clip region.

**See Also**

setClipRegion(), setClipping(), hasClipping()

#### 12.71.3.2 void QwtPlotDirectPainter::drawSeries ( QwtPlotSeriesItem ∗ *seriesItem,* int *from,* int *to* )

Draw a set of points of a seriesItem.

When observing an measurement while it is running, new points have to be added to an existing seriesItem. drawSeries() can be used to display them avoiding a complete redraw of the canvas.

Setting plot()->canvas()->setAttribute(Qt::WA_PaintOutsidePaintEvent, true); will result in faster painting, if the paint engine of the canvas widget supports this feature.

**Parameters**

| | |
|---:|---|
| *seriesItem* | Item to be painted |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted. If to < 0 the series will be painted to its last point. |

#### 12.71.3.3 bool QwtPlotDirectPainter::hasClipping ( ) const

**Returns**

true, when clipping is enabled

**See Also**

setClipping(), clipRegion(), setClipRegion()

#### 12.71.3.4 void QwtPlotDirectPainter::setAttribute ( Attribute *attribute,* bool *on* )

Change an attribute

**Parameters**

| | |
|---|---|
| *attribute* | Attribute to change |
| *on* | On/Off |

**See Also**

Attribute, testAttribute()

#### 12.71.3.5 void QwtPlotDirectPainter::setClipping ( bool *enable* )

En/Disables clipping

**Parameters**

| | |
|---|---|
| *enable* | Enables clipping is true, disable it otherwise |

**See Also**

hasClipping(), clipRegion(), setClipRegion()

#### 12.71.3.6 void QwtPlotDirectPainter::setClipRegion ( const QRegion & *region* )

Assign a clip region and enable clipping.

Depending on the environment setting a proper clip region might improve the performance heavily. F.e. on Qt embedded only the clipped part of the backing store will be copied to a ( maybe unaccelerated ) frame buffer device.

**Parameters**

| | |
|---|---|
| *region* | Clip region |

**See Also**

clipRegion(), hasClipping(), setClipping()

#### 12.71.3.7 bool QwtPlotDirectPainter::testAttribute ( Attribute *attribute* ) const

**Returns**

True, when attribute is enabled

**Parameters**

| | |
|---|---|
| *attribute* | Attribute to be tested |

**See Also**

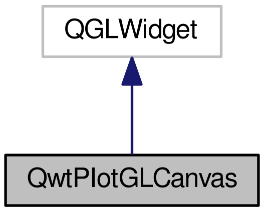
Attribute, setAttribute()

## 12.72 QwtPlotGLCanvas Class Reference

An alternative canvas for a QwtPlot derived from QGLWidget.

```
#include <qwt_plot_glcanvas.h>
```

Inheritance diagram for QwtPlotGLCanvas:



### Public Types

- enum Shadow { Plain = QFrame::Plain, Raised = QFrame::Raised, Sunken = QFrame::Sunken }

  *Frame shadow.*
- enum Shape { **NoFrame** = QFrame::NoFrame, **Box** = QFrame::Box, **Panel** = QFrame::Panel }

  *Frame shape.*

### Public Slots

- void replot ()

  *Calls repaint()*

### Public Member Functions

- QwtPlotGLCanvas (QwtPlot ∗=NULL)

  *Constructor.*
- virtual ∼QwtPlotGLCanvas ()

  *Destructor.*
- void setFrameStyle (int style)
- int frameStyle () const
- void setFrameShadow (Shadow)
- Shadow frameShadow () const
- void setFrameShape (Shape)
- Shape frameShape () const
- void setLineWidth (int)
- int lineWidth () const
- void setMidLineWidth (int)
- int midLineWidth () const
- int frameWidth () const
- QRect frameRect () const
- Q_INVOKABLE QPainterPath borderPath (const QRect &) const
- virtual bool event (QEvent ∗)

### Protected Member Functions

- virtual void paintEvent (QPaintEvent ∗)
- virtual void drawBackground (QPainter ∗)
- virtual void drawBorder (QPainter ∗)
- virtual void drawItems (QPainter ∗)

### 12.72.1 Detailed Description

An alternative canvas for a QwtPlot derived from QGLWidget.

QwtPlotGLCanvas implements the very basics to act as canvas inside of a QwtPlot widget. It might be extended to a full featured alternative to QwtPlotCanvas in a future version of Qwt.

Even if QwtPlotGLCanvas is not derived from QFrame it imitates its API. When using style sheets it supports the box model - beside backgrounds with rounded borders.

**See Also**

QwtPlot::setCanvas(), QwtPlotCanvas

**Note**

You might want to use the QPaintEngine::OpenGL paint engine ( see QGL::setPreferredPaintEngine() ). On a Linux test system QPaintEngine::OpenGL2 shows very basic problems ( wrong geometries of rectangles ) but also more advanced stuff like antialiasing doesn't work.
Another way to introduce OpenGL rendering to Qwt is to use QGLPixelBuffer or QGLFramebufferObject. Both type of buffers can be converted into a QImage and used in combination with a regular QwtPlotCanvas.

### 12.72.2 Member Enumeration Documentation

#### 12.72.2.1 enum QwtPlotGLCanvas::Shadow

Frame shadow.

Unfortunately it is not possible to use QFrame::Shadow as a property of a widget that is not derived from QFrame. The following enum is made for the designer only. It is safe to use QFrame::Shadow instead.

**Enumerator**

***Plain*** QFrame::Plain.

***Raised*** QFrame::Raised.

***Sunken*** QFrame::Sunken.

#### 12.72.2.2 enum QwtPlotGLCanvas::Shape

Frame shape.

Unfortunately it is not possible to use QFrame::Shape as a property of a widget that is not derived from QFrame. The following enum is made for the designer only. It is safe to use QFrame::Shadow instead.

**Note**

QFrame::StyledPanel and QFrame::WinPanel are unsuported and will be displayed as QFrame::Panel.

### 12.72.3 Constructor & Destructor Documentation

#### 12.72.3.1 QwtPlotGLCanvas::QwtPlotGLCanvas ( QwtPlot ∗ *plot* = `NULL` ) `[explicit]`

Constructor.

**Parameters**

| | |
|---|---|
| *plot* | Parent plot widget |

**See Also**

QwtPlot::setCanvas()

### 12.72.4 Member Function Documentation

#### 12.72.4.1 QPainterPath QwtPlotGLCanvas::borderPath ( const QRect & *rect* ) const

**Returns**

Empty path

#### 12.72.4.2 void QwtPlotGLCanvas::drawBackground ( QPainter ∗ *painter* ) [protected], [virtual]

Draw the background of the canvas

**Parameters**

| | |
|---|---|
| *painter* | Painter |

#### 12.72.4.3 void QwtPlotGLCanvas::drawBorder ( QPainter ∗ *painter* ) [protected], [virtual]

Draw the border of the canvas

**Parameters**

| | |
|---|---|
| *painter* | Painter |

#### 12.72.4.4 void QwtPlotGLCanvas::drawItems ( QPainter ∗ *painter* ) [protected], [virtual]

Draw the plot items

**Parameters**

| | |
|---|---|
| *painter* | Painter |

**See Also**

QwtPlot::drawCanvas()

#### 12.72.4.5 bool QwtPlotGLCanvas::event ( QEvent ∗ *event* ) [virtual]

Qt event handler for QEvent::PolishRequest and QEvent::StyleChange

**Parameters**

| | |
|---|---|
| *event* | Qt Event |

**Returns**

See QGLWidget::event()

#### 12.72.4.6 QRect QwtPlotGLCanvas::frameRect ( ) const

**Returns**

The rectangle where the frame is drawn in.

#### 12.72.4.7 QwtPlotGLCanvas::Shadow QwtPlotGLCanvas::frameShadow ( ) const

**Returns**

Frame shadow

**See Also**

setFrameShadow(), QFrame::setFrameShadow()

#### 12.72.4.8 QwtPlotGLCanvas::Shape QwtPlotGLCanvas::frameShape ( ) const

**Returns**

Frame shape

**See Also**

setFrameShape(), QFrame::frameShape()

#### 12.72.4.9 int QwtPlotGLCanvas::frameStyle ( ) const

**Returns**

The bitwise OR between a frameShape() and a frameShadow()

**See Also**

setFrameStyle(), QFrame::frameStyle()

#### 12.72.4.10 int QwtPlotGLCanvas::frameWidth ( ) const

**Returns**

Frame width depending on the style, line width and midline width.

#### 12.72.4.11 int QwtPlotGLCanvas::lineWidth ( ) const

**Returns**

Line width of the frame

**See Also**

setLineWidth(), midLineWidth()

#### 12.72.4.12 int QwtPlotGLCanvas::midLineWidth ( ) const

**Returns**

Midline width of the frame

**See Also**

setMidLineWidth(), lineWidth()

#### 12.72.4.13 void QwtPlotGLCanvas::paintEvent ( QPaintEvent ∗ *event* ) [protected], [virtual]

Paint event

**Parameters**

| | |
|---|---|
| *event* | Paint event |

**See Also**

QwtPlot::drawCanvas()

#### 12.72.4.14 void QwtPlotGLCanvas::setFrameShadow ( Shadow *shadow* )

Set the frame shadow

**Parameters**

| | |
|---|---|
| *shadow* | Frame shadow |

**See Also**

frameShadow(), setFrameShape(), QFrame::setFrameShadow()

#### 12.72.4.15 void QwtPlotGLCanvas::setFrameShape ( Shape *shape* )

Set the frame shape

**Parameters**

| | |
|---|---|
| *shape* | Frame shape |

**See Also**

frameShape(), setFrameShadow(), QFrame::frameShape()

#### 12.72.4.16 void QwtPlotGLCanvas::setFrameStyle ( int *style* )

Set the frame style

**Parameters**

| | |
|---|---|
| *style* | The bitwise OR between a shape and a shadow. |

**See Also**

frameStyle(), QFrame::setFrameStyle(), setFrameShadow(), setFrameShape()

#### 12.72.4.17 void QwtPlotGLCanvas::setLineWidth ( int *width* )

Set the frame line width

The default line width is 2 pixels.

**Parameters**

| | |
|---|---|
| *width* | Line width of the frame |

**See Also**

lineWidth(), setMidLineWidth()

#### 12.72.4.18 void QwtPlotGLCanvas::setMidLineWidth ( int *width* )

Set the frame mid line width

The default midline width is 0 pixels.

**Parameters**

| | |
|---|---|
| *width* | Midline width of the frame |

**See Also**

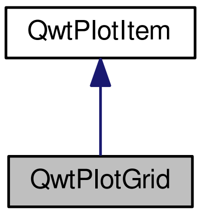
midLineWidth(), setLineWidth()

## 12.73 QwtPlotGrid Class Reference

A class which draws a coordinate grid.

```
#include <qwt_plot_grid.h>
```

Inheritance diagram for QwtPlotGrid:



**Public Member Functions**

- QwtPlotGrid ()

  *Enables major grid, disables minor grid.*
- virtual ∼QwtPlotGrid ()

  *Destructor.*
- virtual int rtti () const
- void enableX (bool tf)

  *Enable or disable vertical grid lines.*
- bool xEnabled () const
- void enableY (bool tf)

  *Enable or disable horizontal grid lines.*
- bool yEnabled () const
- void enableXMin (bool tf)

  *Enable or disable minor vertical grid lines.*
- bool xMinEnabled () const
- void enableYMin (bool tf)

  *Enable or disable minor horizontal grid lines.*
- bool yMinEnabled () const
- void setXDiv (const QwtScaleDiv &sx)
- const QwtScaleDiv & xScaleDiv () const
- void setYDiv (const QwtScaleDiv &sy)
- const QwtScaleDiv & yScaleDiv () const
- void setPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setPen (const QPen &)

- void setMajorPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setMajorPen (const QPen &)
- const QPen & majorPen () const
- void setMinorPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setMinorPen (const QPen &p)
- const QPen & minorPen () const
- virtual void draw (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &rect) const

  *Draw the grid.*
- virtual void updateScaleDiv (const QwtScaleDiv &xMap, const QwtScaleDiv &yMap)

### Additional Inherited Members

### 12.73.1 Detailed Description

A class which draws a coordinate grid.

The QwtPlotGrid class can be used to draw a coordinate grid. A coordinate grid consists of major and minor vertical and horizontal grid lines. The locations of the grid lines are determined by the X and Y scale divisions which can be assigned with setXDiv() and setYDiv(). The draw() member draws the grid within a bounding rectangle.

### 12.73.2 Member Function Documentation

#### 12.73.2.1 void QwtPlotGrid::draw ( QPainter ∗ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect* ) const [virtual]

Draw the grid.

The grid is drawn into the bounding rectangle such that grid lines begin and end at the rectangle's borders. The X and Y maps are used to map the scale divisions into the drawing region screen.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | X axis map |
| *yMap* | Y axis |
| *canvasRect* | Contents rectangle of the plot canvas |

Implements QwtPlotItem.

#### 12.73.2.2 void QwtPlotGrid::enableX ( bool *on* )

Enable or disable vertical grid lines.

**Parameters**

| | |
|---|---|
| *on* | Enable (true) or disable |

**See Also**

Minor grid lines can be enabled or disabled with enableXMin()

#### 12.73.2.3 void QwtPlotGrid::enableXMin ( bool *on* )

Enable or disable minor vertical grid lines.

**Parameters**

| | |
|---|---|
| *on* | Enable (true) or disable |

**See Also**

enableX()

#### 12.73.2.4 void QwtPlotGrid::enableY ( bool *on* )

Enable or disable horizontal grid lines.

**Parameters**

| | |
|---|---|
| *on* | Enable (true) or disable |

**See Also**

Minor grid lines can be enabled or disabled with enableYMin()

#### 12.73.2.5 void QwtPlotGrid::enableYMin ( bool *on* )

Enable or disable minor horizontal grid lines.

**Parameters**

| | |
|---|---|
| *on* | Enable (true) or disable |

**See Also**

enableY()

#### 12.73.2.6 const QPen & QwtPlotGrid::majorPen ( ) const

**Returns**

the pen for the major grid lines

**See Also**

setMajorPen(), setMinorPen(), setPen()

#### 12.73.2.7 const QPen & QwtPlotGrid::minorPen ( ) const

**Returns**

the pen for the minor grid lines

**See Also**

setMinorPen(), setMajorPen(), setPen()

#### 12.73.2.8 int QwtPlotGrid::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotGrid

Reimplemented from QwtPlotItem.

#### 12.73.2.9 void QwtPlotGrid::setMajorPen ( const QColor & *color*, qreal *width* = `0.0`, Qt::PenStyle *style* = `Qt::SolidLine` )

Build and assign a pen for both major grid lines

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.73.2.10 void QwtPlotGrid::setMajorPen ( const QPen & *pen* )

Assign a pen for the major grid lines

**Parameters**

| | |
|---|---|
| *pen* | Pen |

**See Also**

majorPen(), setMinorPen(), setPen()

#### 12.73.2.11 void QwtPlotGrid::setMinorPen ( const QColor & *color*, qreal *width* = `0.0`, Qt::PenStyle *style* = `Qt::SolidLine` )

Build and assign a pen for the minor grid lines

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.73.2.12 void QwtPlotGrid::setMinorPen ( const QPen & *pen* )

Assign a pen for the minor grid lines

**Parameters**

| | |
|---|---|
| *pen* | Pen |

**See Also**

minorPen(), setMajorPen(), setPen()

#### 12.73.2.13 void QwtPlotGrid::setPen ( const QColor & *color*, qreal *width* = `0.0`, Qt::PenStyle *style* = `Qt::SolidLine` )

Build and assign a pen for both major and minor grid lines

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.73.2.14 void QwtPlotGrid::setPen ( const QPen & *pen* )

Assign a pen for both major and minor grid lines

**Parameters**

| | |
|---|---|
| *pen* | Pen |

**See Also**

setMajorPen(), setMinorPen()

#### 12.73.2.15 void QwtPlotGrid::setXDiv ( const QwtScaleDiv & *scaleDiv* )

Assign an x axis scale division

**Parameters**

| | |
|---|---|
| *scaleDiv* | Scale division |

#### 12.73.2.16 void QwtPlotGrid::setYDiv ( const QwtScaleDiv & *scaleDiv* )

Assign a y axis division

**Parameters**

| | |
|---|---|
| *scaleDiv* | Scale division |

#### 12.73.2.17 void QwtPlotGrid::updateScaleDiv ( const QwtScaleDiv & *xScaleDiv*, const QwtScaleDiv & *yScaleDiv* ) `[virtual]`

Update the grid to changes of the axes scale division

**Parameters**

| | |
|---|---|
| *xScaleDiv* | Scale division of the x-axis |
| *yScaleDiv* | Scale division of the y-axis |

**See Also**

QwtPlot::updateAxes()

Reimplemented from QwtPlotItem.

#### 12.73.2.18 bool QwtPlotGrid::xEnabled ( ) const

**Returns**

true if vertical grid lines are enabled

**See Also**

enableX()

#### 12.73.2.19 bool QwtPlotGrid::xMinEnabled ( ) const

**Returns**

true if minor vertical grid lines are enabled

**See Also**

enableXMin()

#### 12.73.2.20 const QwtScaleDiv & QwtPlotGrid::xScaleDiv ( ) const

**Returns**

the scale division of the x axis

#### 12.73.2.21 bool QwtPlotGrid::yEnabled ( ) const

**Returns**

true if horizontal grid lines are enabled

**See Also**

enableY()

#### 12.73.2.22 bool QwtPlotGrid::yMinEnabled ( ) const

**Returns**

true if minor horizontal grid lines are enabled

**See Also**

enableYMin()

#### 12.73.2.23 const QwtScaleDiv & QwtPlotGrid::yScaleDiv ( ) const

**Returns**

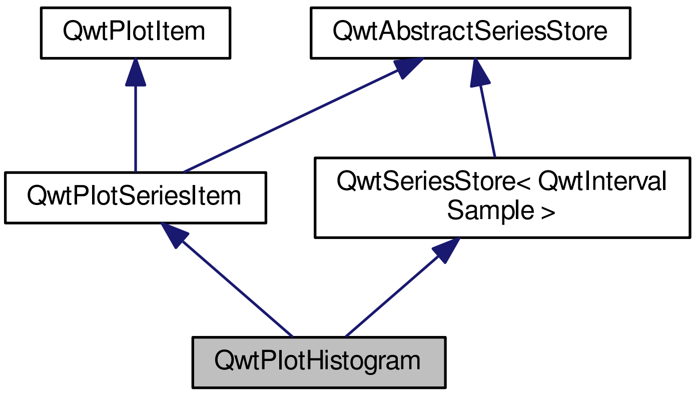
the scale division of the y axis

## 12.74 QwtPlotHistogram Class Reference

QwtPlotHistogram represents a series of samples, where an interval is associated with a value ( $y = f([x1,x2])$ ).

`#include <qwt_plot_histogram.h>`

Inheritance diagram for QwtPlotHistogram:



#### Public Types

- enum HistogramStyle { Outline, Columns, Lines, UserStyle = 100 }

#### Public Member Functions

- QwtPlotHistogram (const QString &title=QString::null)
- QwtPlotHistogram (const QwtText &title)
- virtual ∼QwtPlotHistogram ()

  *Destructor.*
- virtual int rtti () const
- void setPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setPen (const QPen &)
- const QPen & pen () const
- void setBrush (const QBrush &)
- const QBrush & brush () const
- void setSamples (const QVector< QwtIntervalSample > &)
- void setSamples (QwtSeriesData< QwtIntervalSample > ∗)
- void setBaseline (double reference)

  *Set the value of the baseline.*
- double baseline () const
- void setStyle (HistogramStyle style)
- HistogramStyle style () const
- void setSymbol (const QwtColumnSymbol ∗)

  *Assign a symbol.*
- const QwtColumnSymbol ∗ symbol () const
- virtual void drawSeries (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- virtual QRectF boundingRect () const
- virtual QwtGraphic legendIcon (int index, const QSizeF &) const

#### Protected Member Functions

- virtual QwtColumnRect columnRect (const QwtIntervalSample &, const QwtScaleMap &, const QwtScaleMap &) const
- virtual void drawColumn (QPainter $*$, const QwtColumnRect &, const QwtIntervalSample &) const
- void drawColumns (QPainter $*$, const QwtScaleMap &xMap, const QwtScaleMap &yMap, int from, int to) const
- void drawOutline (QPainter $*$, const QwtScaleMap &xMap, const QwtScaleMap &yMap, int from, int to) const
- void drawLines (QPainter $*$, const QwtScaleMap &xMap, const QwtScaleMap &yMap, int from, int to) const

### 12.74.1 Detailed Description

QwtPlotHistogram represents a series of samples, where an interval is associated with a value ( $y = f([x1,x2])$ ).

The representation depends on the style() and an optional symbol() that is displayed for each interval.

**Note**

The term "histogram" is used in a different way in the areas of digital image processing and statistics. Wikipedia introduces the terms "image histogram" and "color histogram" to avoid confusions. While "image histograms" can be displayed by a QwtPlotCurve there is no applicable plot item for a "color histogram" yet.

**See Also**

QwtPlotBarChart, QwtPlotMultiBarChart

### 12.74.2 Member Enumeration Documentation

#### 12.74.2.1 enum QwtPlotHistogram::HistogramStyle

Histogram styles. The default style is QwtPlotHistogram::Columns.

**See Also**

setStyle(), style(), setSymbol(), symbol(), setBaseline()

**Enumerator**

***Outline*** Draw an outline around the area, that is build by all intervals using the pen() and fill it with the brush(). The outline style requires, that the intervals are in increasing order and not overlapping.

***Columns*** Draw a column for each interval. When a symbol() has been set the symbol is used otherwise the column is displayed as plain rectangle using pen() and brush().

***Lines*** Draw a simple line using the pen() for each interval.

***UserStyle*** Styles $>=$ UserStyle are reserved for derived classes that overload drawSeries() with additional application specific ways to display a histogram.

### 12.74.3 Constructor & Destructor Documentation

#### 12.74.3.1 QwtPlotHistogram::QwtPlotHistogram ( const QString & *title* = `QString::null` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the histogram. |

#### 12.74.3.2 QwtPlotHistogram::QwtPlotHistogram ( const **QwtText** & *title* ) [explicit]

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the histogram. |

### 12.74.4 Member Function Documentation

#### 12.74.4.1 double QwtPlotHistogram::baseline ( ) const

**Returns**

Value of the baseline

**See Also**

setBaseline()

#### 12.74.4.2 QRectF QwtPlotHistogram::boundingRect ( ) const [virtual]

**Returns**

Bounding rectangle of all samples. For an empty series the rectangle is invalid.

Reimplemented from QwtPlotSeriesItem.

#### 12.74.4.3 const QBrush & QwtPlotHistogram::brush ( ) const

**Returns**

Brush used in a style() depending way.

**See Also**

setPen(), brush()

#### 12.74.4.4 **QwtColumnRect** QwtPlotHistogram::columnRect ( const **QwtIntervalSample** & *sample,* const **QwtScaleMap** & *xMap,* const **QwtScaleMap** & *yMap* ) const [protected], [virtual]

Calculate the area that is covered by a sample

**Parameters**

| | |
|---|---|
| *sample* | Sample |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |

**Returns**

Rectangle, that is covered by a sample

#### 12.74.4.5 void QwtPlotHistogram::drawColumn ( QPainter ∗ *painter,* const **QwtColumnRect** & *rect,* const **QwtIntervalSample** & *sample* ) const [protected], [virtual]

Draw a column for a sample in Columns style().

When a symbol() has been set the symbol is used otherwise the column is displayed as plain rectangle using pen() and brush().

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *rect* | Rectangle where to paint the column in paint device coordinates |
| *sample* | Sample to be displayed |

**Note**

In applications, where different intervals need to be displayed in a different way ( f.e different colors or even using different symbols) it is recommended to overload drawColumn().

#### 12.74.4.6 void QwtPlotHistogram::drawColumns ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, int *from*, int *to* ) const [protected]

Draw a histogram in Columns style()

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *from* | Index of the first sample to be painted |
| *to* | Index of the last sample to be painted. If to $<$ 0 the histogram will be painted to its last point. |

**See Also**

setStyle(), style(), setSymbol(), drawColumn()

#### 12.74.4.7 void QwtPlotHistogram::drawLines ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, int *from*, int *to* ) const [protected]

Draw a histogram in Lines style()

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *from* | Index of the first sample to be painted |
| *to* | Index of the last sample to be painted. If to $<$ 0 the histogram will be painted to its last point. |

**See Also**

setStyle(), style(), setPen()

#### 12.74.4.8 void QwtPlotHistogram::drawOutline ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, int *from*, int *to* ) const [protected]

Draw a histogram in Outline style()

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |

| | |
|---|---|
| *from* | Index of the first sample to be painted |
| *to* | Index of the last sample to be painted. If to $<$ 0 the histogram will be painted to its last point. |

**See Also**

setStyle(), style()

**Warning**

The outline style requires, that the intervals are in increasing order and not overlapping.

### 12.74.4.9 void QwtPlotHistogram::drawSeries ( QPainter $*$ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect,* int *from,* int *to* ) const [virtual]

Draw a subset of the histogram samples

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first sample to be painted |
| *to* | Index of the last sample to be painted. If to $<$ 0 the series will be painted to its last sample. |

**See Also**

drawOutline(), drawLines(), drawColumns

Implements QwtPlotSeriesItem.

### 12.74.4.10 QwtGraphic QwtPlotHistogram::legendIcon ( int *index,* const QSizeF & *size* ) const [virtual]

A plain rectangle without pen using the brush()

**Parameters**

| | |
|---|---|
| *index* | Index of the legend entry ( ignored as there is only one ) |
| *size* | Icon size |

**Returns**

A graphic displaying the icon

**See Also**

QwtPlotItem::setLegendIconSize(), QwtPlotItem::legendData()

Reimplemented from QwtPlotItem.

### 12.74.4.11 const QPen & QwtPlotHistogram::pen ( ) const

**Returns**

Pen used in a style() depending way.

**See Also**

setPen(), brush()

#### 12.74.4.12 int QwtPlotHistogram::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotHistogram

Reimplemented from QwtPlotItem.

#### 12.74.4.13 void QwtPlotHistogram::setBaseline ( double *value* )

Set the value of the baseline.

Each column representing an QwtIntervalSample is defined by its interval and the interval between baseline and the value of the sample.

The default value of the baseline is 0.0.

**Parameters**

| | |
|---|---|
| *value* | Value of the baseline |

**See Also**

baseline()

#### 12.74.4.14 void QwtPlotHistogram::setBrush ( const QBrush & *brush* )

Assign a brush, that is used in a style() depending way.

**Parameters**

| | |
|---|---|
| *brush* | New brush |

**See Also**

pen(), brush()

#### 12.74.4.15 void QwtPlotHistogram::setPen ( const QColor & *color*, qreal *width* = 0.0, Qt::PenStyle *style* = Qt::SolidLine )

Build and assign a pen

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.74.4.16 void QwtPlotHistogram::setPen ( const QPen & *pen* )

Assign a pen, that is used in a style() depending way.

**Parameters**

| | |
|---|---|
| *pen* | New pen |

**See Also**

pen(), brush()

#### 12.74.4.17 void QwtPlotHistogram::setSamples ( const QVector< **QwtIntervalSample** > & *samples* )

Initialize data with an array of samples.

**Parameters**

| | |
|---|---|
| *samples* | Vector of points |

#### 12.74.4.18 void QwtPlotHistogram::setSamples ( **QwtSeriesData**< **QwtIntervalSample** > * *data* )

Assign a series of samples

setSamples() is just a wrapper for setData() without any additional value - beside that it is easier to find for the developer.

**Parameters**

| | |
|---|---|
| *data* | Data |

**Warning**

The item takes ownership of the data object, deleting it when its not used anymore.

#### 12.74.4.19 void QwtPlotHistogram::setStyle ( **HistogramStyle** *style* )

Set the histogram's drawing style

**Parameters**

| | |
|---|---|
| *style* | Histogram style |

**See Also**

HistogramStyle, style()

#### 12.74.4.20 void QwtPlotHistogram::setSymbol ( const **QwtColumnSymbol** * *symbol* )

Assign a symbol.

In Column style an optional symbol can be assigned, that is responsible for displaying the rectangle that is defined by the interval and the distance between baseline() and value. When no symbol has been defined the area is displayed as plain rectangle using pen() and brush().

**See Also**

style(), symbol(), drawColumn(), pen(), brush()

**Note**

In applications, where different intervals need to be displayed in a different way ( f.e different colors or even using different symbols) it is recommended to overload drawColumn().

#### 12.74.4.21 QwtPlotHistogram::HistogramStyle QwtPlotHistogram::style ( ) const

**Returns**

Style of the histogram

**See Also**

HistogramStyle, setStyle()

#### 12.74.4.22 const QwtColumnSymbol $*$ QwtPlotHistogram::symbol ( ) const

**Returns**

Current symbol or NULL, when no symbol has been assigned

**See Also**

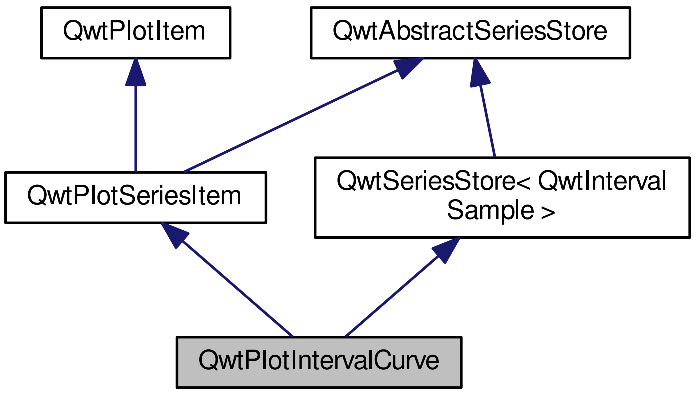
setSymbol()

## 12.75 QwtPlotIntervalCurve Class Reference

QwtPlotIntervalCurve represents a series of samples, where each value is associated with an interval ( $[y1,y2] = f(x)$ ).

`#include <qwt_plot_intervalcurve.h>`

Inheritance diagram for QwtPlotIntervalCurve:



**Public Types**

- enum CurveStyle { NoCurve, Tube, UserCurve = 100 }

  *Curve styles. The default setting is QwtPlotIntervalCurve::Tube.*
- enum PaintAttribute { ClipPolygons = 0x01, ClipSymbol = 0x02 }
- typedef QFlags$<$ PaintAttribute $>$ PaintAttributes

  *Paint attributes.*

#### Public Member Functions

- QwtPlotIntervalCurve (const QString &title=QString::null)
- QwtPlotIntervalCurve (const QwtText &title)
- virtual ∼QwtPlotIntervalCurve ()

  *Destructor.*
- virtual int rtti () const
- void setPaintAttribute (PaintAttribute, bool on=true)
- bool testPaintAttribute (PaintAttribute) const
- void setSamples (const QVector< QwtIntervalSample > &)
- void setSamples (QwtSeriesData< QwtIntervalSample > ∗)
- void setPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setPen (const QPen &)

  *Assign a pen.*
- const QPen & pen () const
- void setBrush (const QBrush &)
- const QBrush & brush () const
- void setStyle (CurveStyle style)
- CurveStyle style () const
- void setSymbol (const QwtIntervalSymbol ∗)
- const QwtIntervalSymbol ∗ symbol () const
- virtual void drawSeries (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- virtual QRectF boundingRect () const
- virtual QwtGraphic legendIcon (int index, const QSizeF &) const

#### Protected Member Functions

- void init ()

  *Initialize internal members.*
- virtual void drawTube (QPainter ∗, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- virtual void drawSymbols (QPainter ∗, const QwtIntervalSymbol &, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const

### 12.75.1 Detailed Description

QwtPlotIntervalCurve represents a series of samples, where each value is associated with an interval ( $[y1, y2] = f(x)$ ).

The representation depends on the style() and an optional symbol() that is displayed for each interval. QwtPlotIntervalCurve might be used to display error bars or the area between 2 curves.

### 12.75.2 Member Enumeration Documentation

#### 12.75.2.1 enum QwtPlotIntervalCurve::CurveStyle

Curve styles. The default setting is QwtPlotIntervalCurve::Tube.

**See Also**

setStyle(), style()

**Enumerator**

***NoCurve*** Don't draw a curve. Note: This doesn't affect the symbols.

***Tube*** Build 2 curves from the upper and lower limits of the intervals and draw them with the pen(). The area between the curves is filled with the brush().

***UserCurve*** Styles >= QwtPlotIntervalCurve::UserCurve are reserved for derived classes that overload drawSeries() with additional application specific curve types.

#### 12.75.2.2 enum QwtPlotIntervalCurve::PaintAttribute

Attributes to modify the drawing algorithm.

**See Also**

setPaintAttribute(), testPaintAttribute()

**Enumerator**

***ClipPolygons*** Clip polygons before painting them. In situations, where points are far outside the visible area (f.e when zooming deep) this might be a substantial improvement for the painting performance.

***ClipSymbol*** Check if a symbol is on the plot canvas before painting it.

### 12.75.3 Constructor & Destructor Documentation

#### 12.75.3.1 QwtPlotIntervalCurve::QwtPlotIntervalCurve ( const QString & *title* = `QString::null` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

#### 12.75.3.2 QwtPlotIntervalCurve::QwtPlotIntervalCurve ( const QwtText & *title* ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

### 12.75.4 Member Function Documentation

#### 12.75.4.1 QRectF QwtPlotIntervalCurve::boundingRect ( ) const `[virtual]`

**Returns**

Bounding rectangle of all samples. For an empty series the rectangle is invalid.

Reimplemented from QwtPlotSeriesItem.

#### 12.75.4.2 const QBrush & QwtPlotIntervalCurve::brush ( ) const

**Returns**

Brush used to fill the area in Tube style()

**See Also**

setBrush(), setStyle(), CurveStyle

#### 12.75.4.3 void QwtPlotIntervalCurve::drawSeries ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect*, int *from*, int *to* ) const [virtual]

Draw a subset of the samples

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first sample to be painted |
| *to* | Index of the last sample to be painted. If to $<$ 0 the series will be painted to its last sample. |

**See Also**

drawTube(), drawSymbols()

Implements QwtPlotSeriesItem.

#### 12.75.4.4 void QwtPlotIntervalCurve::drawSymbols ( QPainter ∗ *painter*, const QwtIntervalSymbol & *symbol*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect*, int *from*, int *to* ) const [protected], [virtual]

Draw symbols for a subset of the samples

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *symbol* | Interval symbol |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first sample to be painted |
| *to* | Index of the last sample to be painted |

**See Also**

setSymbol(), drawSeries(), drawTube()

#### 12.75.4.5 void QwtPlotIntervalCurve::drawTube ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect*, int *from*, int *to* ) const [protected], [virtual]

Draw a tube

Builds 2 curves from the upper and lower limits of the intervals and draws them with the pen(). The area between the curves is filled with the brush().

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |

| | |
|---:|---|
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first sample to be painted |
| *to* | Index of the last sample to be painted. If to $<$ 0 the series will be painted to its last sample. |

**See Also**

drawSeries(), drawSymbols()

#### 12.75.4.6 QwtGraphic QwtPlotIntervalCurve::legendIcon ( int *index,* const QSizeF & *size* ) const [virtual]

**Returns**

Icon for the legend

In case of Tube style() the icon is a plain rectangle filled with the brush(). If a symbol is assigned it is scaled to size.

**Parameters**

| | |
|---:|---|
| *index* | Index of the legend entry ( ignored as there is only one ) |
| *size* | Icon size |

**See Also**

QwtPlotItem::setLegendIconSize(), QwtPlotItem::legendData()

Reimplemented from QwtPlotItem.

#### 12.75.4.7 const QPen & QwtPlotIntervalCurve::pen ( ) const

**Returns**

Pen used to draw the lines

**See Also**

setPen(), brush()

#### 12.75.4.8 int QwtPlotIntervalCurve::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotIntervalCurve

Reimplemented from QwtPlotItem.

#### 12.75.4.9 void QwtPlotIntervalCurve::setBrush ( const QBrush & *brush* )

Assign a brush.

The brush is used to fill the area in Tube style().

**Parameters**

| | |
|---:|---|
| *brush* | Brush |

**See Also**

brush(), pen(), setStyle(), CurveStyle

#### 12.75.4.10 void QwtPlotIntervalCurve::setPaintAttribute ( PaintAttribute *attribute,* bool *on* = true )

Specify an attribute how to draw the curve

**Parameters**

| | |
|---|---|
| *attribute* | Paint attribute |
| *on* | On/Off |

**See Also**

testPaintAttribute()

#### 12.75.4.11 void QwtPlotIntervalCurve::setPen ( const QColor & *color,* qreal *width* = `0.0`, Qt::PenStyle *style* = `Qt::SolidLine` )

Build and assign a pen

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.75.4.12 void QwtPlotIntervalCurve::setPen ( const QPen & *pen* )

Assign a pen.

**Parameters**

| | |
|---|---|
| *pen* | New pen |

**See Also**

pen(), brush()

#### 12.75.4.13 void QwtPlotIntervalCurve::setSamples ( const QVector< QwtIntervalSample > & *samples* )

Initialize data with an array of samples.

**Parameters**

| | |
|---|---|
| *samples* | Vector of samples |

#### 12.75.4.14 void QwtPlotIntervalCurve::setSamples ( QwtSeriesData< QwtIntervalSample > * *data* )

Assign a series of samples

setSamples() is just a wrapper for setData() without any additional value - beside that it is easier to find for the developer.

**Parameters**

| | |
|---|---|
| *data* | Data |

**Warning**

The item takes ownership of the data object, deleting it when its not used anymore.

#### 12.75.4.15 void QwtPlotIntervalCurve::setStyle ( CurveStyle *style* )

Set the curve's drawing style

**Parameters**

| | |
|---|---|
| *style* | Curve style |

**See Also**

CurveStyle, style()

#### 12.75.4.16 void QwtPlotIntervalCurve::setSymbol ( const QwtIntervalSymbol ∗ *symbol* )

Assign a symbol.

**Parameters**

| | |
|---|---|
| *symbol* | Symbol |

**See Also**

symbol()

#### 12.75.4.17 QwtPlotIntervalCurve::CurveStyle QwtPlotIntervalCurve::style ( ) const

**Returns**

Style of the curve

**See Also**

setStyle()

#### 12.75.4.18 const QwtIntervalSymbol ∗ QwtPlotIntervalCurve::symbol ( ) const

**Returns**

Current symbol or NULL, when no symbol has been assigned

**See Also**

setSymbol()

#### 12.75.4.19 bool QwtPlotIntervalCurve::testPaintAttribute ( PaintAttribute *attribute* ) const

**Returns**

True, when attribute is enabled

**See Also**

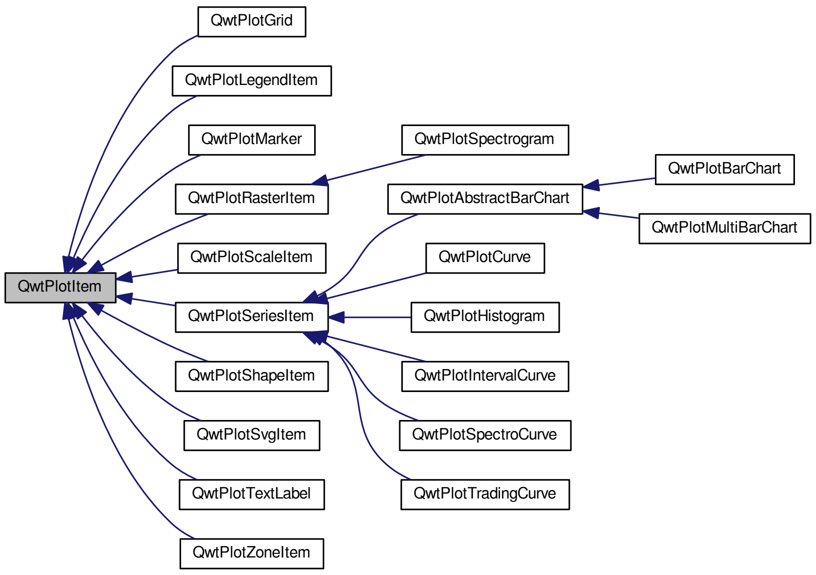
PaintAttribute, setPaintAttribute()

## 12.76 QwtPlotItem Class Reference

Base class for items on the plot canvas.

```
#include <qwt_plot_item.h>
```

Inheritance diagram for QwtPlotItem:



### Public Types

- enum RttiValues {
  Rtti_PlotItem = 0, Rtti_PlotGrid, Rtti_PlotScale, Rtti_PlotLegend,
  Rtti_PlotMarker, Rtti_PlotCurve, Rtti_PlotSpectroCurve, Rtti_PlotIntervalCurve,
  Rtti_PlotHistogram, Rtti_PlotSpectrogram, Rtti_PlotSVG, Rtti_PlotTradingCurve,
  Rtti_PlotBarChart, Rtti_PlotMultiBarChart, Rtti_PlotShape, Rtti_PlotTextLabel,
  Rtti_PlotZone, Rtti_PlotUserItem = 1000 }

  *Runtime type information.*
- enum ItemAttribute { Legend = 0x01, AutoScale = 0x02, Margins = 0x04 }

  *Plot Item Attributes.*
- enum ItemInterest { ScaleInterest = 0x01, LegendInterest = 0x02 }

  *Plot Item Interests.*
- enum RenderHint { RenderAntialiased = 0x1 }

  *Render hints.*
- typedef QFlags< ItemAttribute > ItemAttributes

  *Plot Item Attributes.*
- typedef QFlags< ItemInterest > ItemInterests

  *Plot Item Interests.*
- typedef QFlags< RenderHint > RenderHints

  *Render hints.*

### Public Member Functions

- QwtPlotItem (const QwtText &title=QwtText())
- virtual ∼QwtPlotItem ()

  *Destroy the QwtPlotItem.*
- void attach (QwtPlot ∗plot)

  *Attach the item to a plot.*

- void detach ()

  *This method detaches a QwtPlotItem from any QwtPlot it has been associated with.*
- QwtPlot ∗ plot () const

  *Return attached plot.*
- void setTitle (const QString &title)
- void setTitle (const QwtText &title)
- const QwtText & title () const
- virtual int rtti () const
- void setItemAttribute (ItemAttribute, bool on=true)
- bool testItemAttribute (ItemAttribute) const
- void setItemInterest (ItemInterest, bool on=true)
- bool testItemInterest (ItemInterest) const
- void setRenderHint (RenderHint, bool on=true)
- bool testRenderHint (RenderHint) const
- void setRenderThreadCount (uint numThreads)
- uint renderThreadCount () const
- void setLegendIconSize (const QSize &)
- QSize legendIconSize () const
- double z () const
- void setZ (double z)

  *Set the z value.*
- void show ()

  *Show the item.*
- void hide ()

  *Hide the item.*
- virtual void setVisible (bool)
- bool isVisible () const
- void setAxes (int xAxis, int yAxis)
- void setXAxis (int axis)
- int xAxis () const

  *Return xAxis.*
- void setYAxis (int axis)
- int yAxis () const

  *Return yAxis.*
- virtual void itemChanged ()
- virtual void legendChanged ()
- virtual void draw (QPainter ∗painter, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect) const =0

  *Draw the item.*
- virtual QRectF boundingRect () const
- virtual void getCanvasMarginHint (const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasSize, double &left, double &top, double &right, double &bottom) const

  *Calculate a hint for the canvas margin.*
- virtual void updateScaleDiv (const QwtScaleDiv &, const QwtScaleDiv &)

  *Update the item to changes of the axes scale division.*
- virtual void updateLegend (const QwtPlotItem ∗, const QList< QwtLegendData > &)

  *Update the item to changes of the legend info.*
- QRectF scaleRect (const QwtScaleMap &, const QwtScaleMap &) const

  *Calculate the bounding scale rectangle of 2 maps.*
- QRectF paintRect (const QwtScaleMap &, const QwtScaleMap &) const

  *Calculate the bounding paint rectangle of 2 maps.*
- virtual QList< QwtLegendData > legendData () const

  *Return all information, that is needed to represent the item on the legend.*
- virtual QwtGraphic legendIcon (int index, const QSizeF &) const

#### Protected Member Functions

- QwtGraphic defaultIcon (const QBrush &, const QSizeF &) const

    *Return a default icon from a brush.*

### 12.76.1 Detailed Description

Base class for items on the plot canvas.

A plot item is "something", that can be painted on the plot canvas, or only affects the scales of the plot widget. They can be categorized as:

- Representator

  A "Representator" is an item that represents some sort of data on the plot canvas. The different representator classes are organized according to the characteristics of the data:

  - QwtPlotMarker Represents a point or a horizontal/vertical coordinate
  - QwtPlotCurve Represents a series of points
  - QwtPlotSpectrogram ( QwtPlotRasterItem ) Represents raster data
  - ...

- Decorators

  A "Decorator" is an item, that displays additional information, that is not related to any data:

  - QwtPlotGrid
  - QwtPlotScaleItem
  - QwtPlotSvgItem
  - ...

Depending on the QwtPlotItem::ItemAttribute flags, an item is included into autoscaling or has an entry on the legend.

Before misusing the existing item classes it might be better to implement a new type of plot item ( don't implement a watermark as spectrogram ). Deriving a new type of QwtPlotItem primarily means to implement the YourPlotItem::draw() method.

#### See Also

The cpuplot example shows the implementation of additional plot items.

### 12.76.2 Member Enumeration Documentation

#### 12.76.2.1 enum QwtPlotItem::ItemAttribute

Plot Item Attributes.

Various aspects of a plot widget depend on the attributes of the attached plot items. If and how a single plot item participates in these updates depends on its attributes.

#### See Also

setItemAttribute(), testItemAttribute(), ItemInterest

#### Enumerator

***Legend*** The item is represented on the legend.

***AutoScale*** The boundingRect() of the item is included in the autoscaling calculation as long as its width or height is >= 0.0.

***Margins*** The item needs extra space to display something outside its bounding rectangle.

**See Also**

getCanvasMarginHint()

#### 12.76.2.2 enum QwtPlotItem::ItemInterest

Plot Item Interests.

Plot items might depend on the situation of the corresponding plot widget. By enabling an interest the plot item will be notified, when the corresponding attribute of the plot widgets has changed.

**See Also**

setItemAttribute(), testItemAttribute(), ItemInterest

**Enumerator**

***ScaleInterest*** The item is interested in updates of the scales

**See Also**

updateScaleDiv()

***LegendInterest*** The item is interested in updates of the legend ( of other items ) This flag is intended for items, that want to implement a legend for displaying entries of other plot item.

**Note**

If the plot item wants to be represented on a legend enable QwtPlotItem::Legend instead.

**See Also**

updateLegend()

#### 12.76.2.3 enum QwtPlotItem::RenderHint

Render hints.

**Enumerator**

***RenderAntialiased*** Enable antialiasing.

#### 12.76.2.4 enum QwtPlotItem::RttiValues

Runtime type information.

RttiValues is used to cast plot items, without having to enable runtime type information of the compiler.

**Enumerator**

***Rtti_PlotItem*** Unspecific value, that can be used, when it doesn't matter.

***Rtti_PlotGrid*** For QwtPlotGrid.

***Rtti_PlotScale*** For QwtPlotScaleItem.

***Rtti_PlotLegend*** For QwtPlotLegendItem.

***Rtti_PlotMarker*** For QwtPlotMarker.

***Rtti_PlotCurve*** For QwtPlotCurve.

***Rtti_PlotSpectroCurve*** For QwtPlotSpectroCurve.

***Rtti_PlotIntervalCurve*** For QwtPlotIntervalCurve.

***Rtti_PlotHistogram*** For QwtPlotHistogram.

***Rtti_PlotSpectrogram*** For QwtPlotSpectrogram.

***Rtti_PlotSVG*** For QwtPlotSvgItem.

***Rtti_PlotTradingCurve*** For QwtPlotTradingCurve.

***Rtti_PlotBarChart*** For QwtPlotBarChart.

***Rtti_PlotMultiBarChart*** For QwtPlotMultiBarChart.

***Rtti_PlotShape*** For QwtPlotShapeItem.

***Rtti_PlotTextLabel*** For QwtPlotTextLabel.

***Rtti_PlotZone*** For QwtPlotZoneItem.

***Rtti_PlotUserItem*** Values >= Rtti_PlotUserItem are reserved for plot items not implemented in the Qwt library.

### 12.76.3 Constructor & Destructor Documentation

#### 12.76.3.1 QwtPlotItem::QwtPlotItem ( const QwtText & *title* = QwtText() ) [explicit]

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the item |

### 12.76.4 Member Function Documentation

#### 12.76.4.1 void QwtPlotItem::attach ( QwtPlot ∗ *plot* )

Attach the item to a plot.

This method will attach a QwtPlotItem to the QwtPlot argument. It will first detach the QwtPlotItem from any plot from a previous call to attach (if necessary). If a NULL argument is passed, it will detach from any QwtPlot it was attached to.

**Parameters**

| | |
|---|---|
| *plot* | Plot widget |

**See Also**

detach()

#### 12.76.4.2 QRectF QwtPlotItem::boundingRect ( ) const [virtual]

**Returns**

An invalid bounding rect: QRectF(1.0, 1.0, -2.0, -2.0)

**Note**

A width or height < 0.0 is ignored by the autoscaler

Reimplemented in QwtPlotTradingCurve, QwtPlotMarker, QwtPlotIntervalCurve, QwtPlotHistogram, QwtPlotRasterItem, QwtPlotShapeItem, QwtPlotBarChart, QwtPlotMultiBarChart, QwtPlotZoneItem, QwtPlotSeriesItem, and QwtPlotSvgItem.

#### 12.76.4.3 QwtGraphic QwtPlotItem::defaultIcon ( const QBrush & *brush*, const QSizeF & *size* ) const [protected]

Return a default icon from a brush.

The default icon is a filled rectangle used in several derived classes as legendIcon().

**Parameters**

| | |
|---:|---|
| *brush* | Fill brush |
| *size* | Icon size |

**Returns**

A filled rectangle

#### 12.76.4.4 void QwtPlotItem::detach ( )

This method detaches a QwtPlotItem from any QwtPlot it has been associated with.

detach() is equivalent to calling attach( NULL )

**See Also**

attach()

#### 12.76.4.5 virtual void QwtPlotItem::draw ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect* ) const [pure virtual]

Draw the item.

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rect of the canvas in painter coordinates |

Implemented in QwtPlotMarker, QwtPlotLegendItem, QwtPlotRasterItem, QwtPlotShapeItem, QwtPlot-Spectrogram, QwtPlotScaleItem, QwtPlotGrid, QwtPlotTextLabel, QwtPlotZoneItem, QwtPlotSvgItem, and Qwt-PlotSeriesItem.

#### 12.76.4.6 void QwtPlotItem::getCanvasMarginHint ( const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect*, double & *left*, double & *top*, double & *right*, double & *bottom* ) const [virtual]

Calculate a hint for the canvas margin.

When the QwtPlotItem::Margins flag is enabled the plot item indicates, that it needs some margins at the borders of the canvas. This is f.e. used by bar charts to reserve space for displaying the bars.

The margins are in target device coordinates ( pixels on screen )

**Parameters**

| | |
|---:|---|
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas in painter coordinates |
| *left* | Returns the left margin |
| *top* | Returns the top margin |
| *right* | Returns the right margin |
| *bottom* | Returns the bottom margin |

**Returns**

The default implementation returns 0 for all margins

**See Also**

QwtPlot::getCanvasMarginsHint(), QwtPlot::updateCanvasMargins()

Reimplemented in QwtPlotAbstractBarChart.

#### 12.76.4.7 bool QwtPlotItem::isVisible ( ) const

**Returns**

true if visible

**See Also**

setVisible(), show(), hide()

#### 12.76.4.8 void QwtPlotItem::itemChanged ( ) [virtual]

Update the legend and call QwtPlot::autoRefresh() for the parent plot.

**See Also**

QwtPlot::legendChanged(), QwtPlot::autoRefresh()

#### 12.76.4.9 void QwtPlotItem::legendChanged ( ) [virtual]

Update the legend of the parent plot.

**See Also**

QwtPlot::updateLegend(), itemChanged()

#### 12.76.4.10 QList< QwtLegendData > QwtPlotItem::legendData ( ) const [virtual]

Return all information, that is needed to represent the item on the legend.

Most items are represented by one entry on the legend showing an icon and a text, but f.e. QwtPlotMultiBarChart displays one entry for each bar.

QwtLegendData is basically a list of QVariants that makes it possible to overload and reimplement legendData() to return almost any type of information, that is understood by the receiver that acts as the legend.

The default implementation returns one entry with the title() of the item and the legendIcon().

**Returns**

Data, that is needed to represent the item on the legend

**See Also**

title(), legendIcon(), QwtLegend, QwtPlotLegendItem

Reimplemented in QwtPlotBarChart, and QwtPlotMultiBarChart.

#### 12.76.4.11 QwtGraphic QwtPlotItem::legendIcon ( int *index,* const QSizeF & *size* ) const [virtual]

**Returns**

Icon representing the item on the legend

The default implementation returns an invalid icon

**Parameters**

| | |
|---|---|
| *index* | Index of the legend entry ( usually there is only one ) |
| *size* | Icon size |

**See Also**

setLegendIconSize(), legendData()

Reimplemented in QwtPlotCurve, QwtPlotTradingCurve, QwtPlotMarker, QwtPlotIntervalCurve, QwtPlotHistogram, QwtPlotBarChart, QwtPlotShapeItem, and QwtPlotMultiBarChart.

#### 12.76.4.12 QSize QwtPlotItem::legendIconSize ( ) const

**Returns**

Legend icon size

**See Also**

setLegendIconSize(), legendIcon()

#### 12.76.4.13 QRectF QwtPlotItem::paintRect ( const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap* ) const

Calculate the bounding paint rectangle of 2 maps.

**Parameters**

| | |
|---|---|
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |

**Returns**

Bounding paint rectangle of the scale maps, not normalized

#### 12.76.4.14 uint QwtPlotItem::renderThreadCount ( ) const

**Returns**

Number of threads to be used for rendering. If numThreads() is set to 0, the system specific ideal thread count is used.

#### 12.76.4.15 int QwtPlotItem::rtti ( ) const [virtual]

Return rtti for the specific class represented. QwtPlotItem is simply a virtual interface class, and base classes will implement this method with specific rtti values so a user can differentiate them.

The rtti value is useful for environments, where the runtime type information is disabled and it is not possible to do a dynamic_cast<...>.

**Returns**

rtti value

**See Also**

RttiValues

Reimplemented in QwtPlotCurve, QwtPlotTradingCurve, QwtPlotShapeItem, QwtPlotSpectrogram, QwtPlotInterval-Curve, QwtPlotHistogram, QwtPlotMarker, QwtPlotBarChart, QwtPlotMultiBarChart, QwtPlotLegendItem, QwtPlot-ScaleItem, QwtPlotTextLabel, QwtPlotSpectroCurve, QwtPlotSvgItem, QwtPlotGrid, and QwtPlotZoneItem.

#### 12.76.4.16 QRectF QwtPlotItem::scaleRect ( const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap* ) const

Calculate the bounding scale rectangle of 2 maps.

**Parameters**

| | |
|---|---|
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |

**Returns**

Bounding scale rect of the scale maps, not normalized

#### 12.76.4.17 void QwtPlotItem::setAxes ( int *xAxis*, int *yAxis* )

Set X and Y axis

The item will painted according to the coordinates of its Axes.

**Parameters**

| | |
|---|---|
| *xAxis* | X Axis ( QwtPlot::xBottom or QwtPlot::xTop ) |
| *yAxis* | Y Axis ( QwtPlot::yLeft or QwtPlot::yRight ) |

**See Also**

setXAxis(), setYAxis(), xAxis(), yAxis(), QwtPlot::Axis

#### 12.76.4.18 void QwtPlotItem::setItemAttribute ( ItemAttribute *attribute*, bool *on* = `true` )

Toggle an item attribute

**Parameters**

| | |
|---|---|
| *attribute* | Attribute type |
| *on* | true/false |

**See Also**

testItemAttribute(), ItemInterest

#### 12.76.4.19 void QwtPlotItem::setItemInterest ( ItemInterest *interest*, bool *on* = `true` )

Toggle an item interest

**Parameters**

| | |
|---|---|
| *interest* | Interest type |
| *on* | true/false |

**See Also**

testItemInterest(), ItemAttribute

#### 12.76.4.20 void QwtPlotItem::setLegendIconSize ( const QSize & *size* )

Set the size of the legend icon

The default setting is 8x8 pixels

**Parameters**

| | |
|---|---|
| *size* | Size |

**See Also**

legendIconSize(), legendIcon()

#### 12.76.4.21 void QwtPlotItem::setRenderHint ( RenderHint *hint*, bool *on* = `true` )

Toggle an render hint

**Parameters**

| | |
|---|---|
| *hint* | Render hint |
| *on* | true/false |

**See Also**

testRenderHint(), RenderHint

#### 12.76.4.22 void QwtPlotItem::setRenderThreadCount ( uint *numThreads* )

On multi core systems rendering of certain plot item ( f.e QwtPlotRasterItem ) can be done in parallel in several threads.

The default setting is set to 1.

**Parameters**

| | |
|---|---|
| *numThreads* | Number of threads to be used for rendering. If numThreads is set to 0, the system specific ideal thread count is used. |

The default thread count is 1 ( = no additional threads )

#### 12.76.4.23 void QwtPlotItem::setTitle ( const QString & *title* )

Set a new title

**Parameters**

| | |
|---|---|
| *title* | Title |

**See Also**

title()

#### 12.76.4.24 void QwtPlotItem::setTitle ( const QwtText & *title* )

Set a new title

**Parameters**

| | |
|---|---|
| *title* | Title |

**See Also**

title()

#### 12.76.4.25 void QwtPlotItem::setVisible ( bool *on* ) `[virtual]`

Show/Hide the item

**Parameters**

| | |
|---|---|
| *on* | Show if true, otherwise hide |

**See Also**

isVisible(), show(), hide()

#### 12.76.4.26 void QwtPlotItem::setXAxis ( int *axis* )

Set the X axis

The item will painted according to the coordinates its Axes.

**Parameters**

| | |
|---|---|
| *axis* | X Axis ( QwtPlot::xBottom or QwtPlot::xTop ) |

**See Also**

setAxes(), setYAxis(), xAxis(), QwtPlot::Axis

#### 12.76.4.27 void QwtPlotItem::setYAxis ( int *axis* )

Set the Y axis

The item will painted according to the coordinates its Axes.

**Parameters**

| | |
|---|---|
| *axis* | Y Axis ( QwtPlot::yLeft or QwtPlot::yRight ) |

**See Also**

setAxes(), setXAxis(), yAxis(), QwtPlot::Axis

#### 12.76.4.28 void QwtPlotItem::setZ ( double *z* )

Set the z value.

Plot items are painted in increasing z-order.

**Parameters**

| | |
|---|---|
| *z* | Z-value |

**See Also**

z(), QwtPlotDict::itemList()

#### 12.76.4.29 bool QwtPlotItem::testItemAttribute ( ItemAttribute *attribute* ) const

Test an item attribute

**Parameters**

| | |
|---|---|
| *attribute* | Attribute type |

**Returns**

true/false

**See Also**

setItemAttribute(), ItemInterest

#### 12.76.4.30 bool QwtPlotItem::testItemInterest ( ItemInterest *interest* ) const

Test an item interest

**Parameters**

| | |
|---|---|
| *interest* | Interest type |

**Returns**

true/false

**See Also**

setItemInterest(), ItemAttribute

#### 12.76.4.31 bool QwtPlotItem::testRenderHint ( **RenderHint** *hint* ) const

Test a render hint

**Parameters**

| | |
|---|---|
| *hint* | Render hint |

**Returns**

true/false

**See Also**

setRenderHint(), RenderHint

#### 12.76.4.32 const **QwtText** & QwtPlotItem::title ( ) const

**Returns**

Title of the item

**See Also**

setTitle()

#### 12.76.4.33 void QwtPlotItem::updateLegend ( const **QwtPlotItem** ∗ *item,* const QList< **QwtLegendData** > & *data* ) [virtual]

Update the item to changes of the legend info.

Plot items that want to display a legend ( not those, that want to be displayed on a legend ! ) will have to implement updateLegend().

updateLegend() is only called when the LegendInterest interest is enabled. The default implementation does nothing.

**Parameters**

| | |
|---|---|
| *item* | Plot item to be displayed on a legend |
| *data* | Attributes how to display item on the legend |

**See Also**

QwtPlotLegendItem

**Note**

Plot items, that want to be displayed on a legend need to enable the QwtPlotItem::Legend flag and to implement legendData() and legendIcon()

Reimplemented in QwtPlotLegendItem.

#### 12.76.4.34 void QwtPlotItem::updateScaleDiv ( const **QwtScaleDiv** & *xScaleDiv*, const **QwtScaleDiv** & *yScaleDiv* ) [virtual]

Update the item to changes of the axes scale division.

Update the item, when the axes of plot have changed. The default implementation does nothing, but items that depend on the scale division (like QwtPlotGrid()) have to reimplement updateScaleDiv()

updateScaleDiv() is only called when the ScaleInterest interest is enabled. The default implementation does nothing.

**Parameters**

| | |
|---|---|
| *xScaleDiv* | Scale division of the x-axis |
| *yScaleDiv* | Scale division of the y-axis |

**See Also**

QwtPlot::updateAxes(), ScaleInterest

Reimplemented in QwtPlotScaleItem, QwtPlotGrid, and QwtPlotSeriesItem.

#### 12.76.4.35 double QwtPlotItem::z ( ) const

Plot items are painted in increasing z-order.

**Returns**

setZ(), QwtPlotDict::itemList()

## 12.77 QwtPlotLayout Class Reference

Layout engine for QwtPlot.

```
#include <qwt_plot_layout.h>
```

**Public Types**

- enum Option {
  AlignScales = 0x01, IgnoreScrollbars = 0x02, IgnoreFrames = 0x04, IgnoreLegend = 0x08,
  IgnoreTitle = 0x10, IgnoreFooter = 0x20 }
- typedef QFlags< Option > Options

  *Layout options.*

**Public Member Functions**

- QwtPlotLayout ()

  *Constructor.*
- virtual ∼QwtPlotLayout ()

  *Destructor.*
- void setCanvasMargin (int margin, int axis=-1)
- int canvasMargin (int axis) const
- void setAlignCanvasToScales (bool)

  *Set the align-canvas-to-axis-scales flag for all axes.*
- void setAlignCanvasToScale (int axisId, bool)
- bool alignCanvasToScale (int axisId) const
- void setSpacing (int)
- int spacing () const

- void setLegendPosition (QwtPlot::LegendPosition pos, double ratio)

    *Specify the position of the legend.*
- void setLegendPosition (QwtPlot::LegendPosition pos)

    *Specify the position of the legend.*
- QwtPlot::LegendPosition legendPosition () const
- void setLegendRatio (double ratio)
- double legendRatio () const
- virtual QSize minimumSizeHint (const QwtPlot ∗) const
- virtual void activate (const QwtPlot ∗, const QRectF &rect, Options options=0x00)

    *Recalculate the geometry of all components.*
- virtual void invalidate ()
- QRectF titleRect () const
- QRectF footerRect () const
- QRectF legendRect () const
- QRectF scaleRect (int axis) const
- QRectF canvasRect () const

#### Protected Member Functions

- void setTitleRect (const QRectF &)

    *Set the geometry for the title.*
- void setFooterRect (const QRectF &)

    *Set the geometry for the footer.*
- void setLegendRect (const QRectF &)

    *Set the geometry for the legend.*
- void setScaleRect (int axis, const QRectF &)

    *Set the geometry for an axis.*
- void setCanvasRect (const QRectF &)

    *Set the geometry for the canvas.*
- QRectF layoutLegend (Options options, const QRectF &) const
- QRectF alignLegend (const QRectF &canvasRect, const QRectF &legendRect) const
- void expandLineBreaks (Options options, const QRectF &rect, int &dimTitle, int &dimFooter, int dimAxes[QwtPlot::axisCnt]) const
- void alignScales (Options options, QRectF &canvasRect, QRectF scaleRect[QwtPlot::axisCnt]) const

### 12.77.1 Detailed Description

Layout engine for QwtPlot.

It is used by the QwtPlot widget to organize its internal widgets or by QwtPlot::print() to render its content to a QPaintDevice like a QPrinter, QPixmap/QImage or QSvgRenderer.

#### See Also

QwtPlot::setPlotLayout()

### 12.77.2 Member Enumeration Documentation

#### 12.77.2.1 enum QwtPlotLayout::Option

Options to configure the plot layout engine

**See Also**

activate(), QwtPlotRenderer

**Enumerator**

***AlignScales*** Unused.

***IgnoreScrollbars*** Ignore the dimension of the scrollbars. There are no scrollbars, when the plot is not rendered to widgets.

***IgnoreFrames*** Ignore all frames.

***IgnoreLegend*** Ignore the legend.

***IgnoreTitle*** Ignore the title.

***IgnoreFooter*** Ignore the footer.

### 12.77.3 Member Function Documentation

#### 12.77.3.1 void QwtPlotLayout::activate ( const QwtPlot * *plot*, const QRectF & *plotRect*, Options *options* = `0x00` ) `[virtual]`

Recalculate the geometry of all components.

**Parameters**

| | |
|---|---|
| *plot* | Plot to be layout |
| *plotRect* | Rectangle where to place the components |
| *options* | Layout options |

**See Also**

invalidate(), titleRect(), footerRect() legendRect(), scaleRect(), canvasRect()

#### 12.77.3.2 bool QwtPlotLayout::alignCanvasToScale ( int *axisId* ) const

Return the align-canvas-to-axis-scales setting. The canvas may:

- extend beyond the axis scale ends to maximize its size
- align with the axis scale ends to control its size.

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |

**Returns**

align-canvas-to-axis-scales setting

**See Also**

setAlignCanvasToScale(), setAlignCanvasToScale(), setCanvasMargin()

#### 12.77.3.3 QRectF QwtPlotLayout::alignLegend ( const QRectF & *canvasRect*, const QRectF & *legendRect* ) const `[protected]`

Align the legend to the canvas

**Parameters**

| | |
|---:|---|
| *canvasRect* | Geometry of the canvas |
| *legendRect* | Maximum geometry for the legend |

**Returns**

Geometry for the aligned legend

#### 12.77.3.4 void QwtPlotLayout::alignScales ( Options *options,* QRectF & *canvasRect,* QRectF *scaleRect[QwtPlot::axisCnt]* ) const [protected]

Align the ticks of the axis to the canvas borders using the empty corners.

**Parameters**

| | |
|---:|---|
| *options* | Layout options |
| *canvasRect* | Geometry of the canvas ( IN/OUT ) |
| *scaleRect* | Geometries of the scales ( IN/OUT ) |

**See Also**

Options

#### 12.77.3.5 int QwtPlotLayout::canvasMargin ( int *axisId* ) const

**Parameters**

| | |
|---:|---|
| *axisId* | Axis index |

**Returns**

Margin around the scale tick borders

**See Also**

setCanvasMargin()

#### 12.77.3.6 QRectF QwtPlotLayout::canvasRect ( ) const

**Returns**

Geometry for the canvas

**See Also**

activate(), invalidate()

#### 12.77.3.7 void QwtPlotLayout::expandLineBreaks ( Options *options,* const QRectF & *rect,* int & *dimTitle,* int & *dimFooter,* int *dimAxis[QwtPlot::axisCnt]* ) const [protected]

Expand all line breaks in text labels, and calculate the height of their widgets in orientation of the text.

**Parameters**

| | |
|---:|---|
| *options* | Options how to layout the legend |
| *rect* | Bounding rectangle for title, footer, axes and canvas. |
| *dimTitle* | Expanded height of the title widget |
| *dimFooter* | Expanded height of the footer widget |
| *dimAxis* | Expanded heights of the axis in axis orientation. |

**See Also**

Options

#### 12.77.3.8 QRectF QwtPlotLayout::footerRect ( ) const

**Returns**

Geometry for the footer

**See Also**

activate(), invalidate()

#### 12.77.3.9 void QwtPlotLayout::invalidate ( ) [virtual]

Invalidate the geometry of all components.

**See Also**

activate()

#### 12.77.3.10 QRectF QwtPlotLayout::layoutLegend ( Options *options*, const QRectF & *rect* ) const [protected]

Find the geometry for the legend

**Parameters**

| | |
|---:|---|
| *options* | Options how to layout the legend |
| *rect* | Rectangle where to place the legend |

**Returns**

Geometry for the legend

**See Also**

Options

#### 12.77.3.11 QwtPlot::LegendPosition QwtPlotLayout::legendPosition ( ) const

**Returns**

Position of the legend

**See Also**

setLegendPosition(), QwtPlot::setLegendPosition(), QwtPlot::legendPosition()

#### 12.77.3.12 double QwtPlotLayout::legendRatio ( ) const

**Returns**

The relative size of the legend in the plot.

**See Also**

setLegendPosition()

#### 12.77.3.13 QRectF QwtPlotLayout::legendRect ( ) const

**Returns**

Geometry for the legend

**See Also**

activate(), invalidate()

#### 12.77.3.14 QSize QwtPlotLayout::minimumSizeHint ( const QwtPlot * *plot* ) const [virtual]

**Returns**

Minimum size hint

**Parameters**

| | |
|---|---|
| *plot* | Plot widget |

**See Also**

QwtPlot::minimumSizeHint()

#### 12.77.3.15 QRectF QwtPlotLayout::scaleRect ( int *axis* ) const

**Parameters**

| | |
|---|---|
| *axis* | Axis index |

**Returns**

Geometry for the scale

**See Also**

activate(), invalidate()

#### 12.77.3.16 void QwtPlotLayout::setAlignCanvasToScale ( int *axisId,* bool *on* )

Change the align-canvas-to-axis-scales setting. The canvas may:

- extend beyond the axis scale ends to maximize its size,
- align with the axis scale ends to control its size.

The axisId parameter is somehow confusing as it identifies a border of the plot and not the axes, that are aligned. F.e when QwtPlot::yLeft is set, the left end of the the x-axes ( QwtPlot::xTop, QwtPlot::xBottom ) is aligned.

**Parameters**

| | |
|---|---|
| *axisId* | Axis index |
| *on* | New align-canvas-to-axis-scales setting |

**See Also**

setCanvasMargin(), alignCanvasToScale(), setAlignCanvasToScales()

**Warning**

In case of on == true canvasMargin() will have no effect

#### 12.77.3.17 void QwtPlotLayout::setAlignCanvasToScales ( bool *on* )

Set the align-canvas-to-axis-scales flag for all axes.

**Parameters**

| | |
|---|---|
| *on* | True/False |

**See Also**

setAlignCanvasToScale(), alignCanvasToScale()

#### 12.77.3.18 void QwtPlotLayout::setCanvasMargin ( int *margin*, int *axis* = `-1` )

Change a margin of the canvas. The margin is the space above/below the scale ticks. A negative margin will be set to -1, excluding the borders of the scales.

**Parameters**

| | |
|---|---|
| *margin* | New margin |
| *axis* | One of QwtPlot::Axis. Specifies where the position of the margin. -1 means margin at all borders. |

**See Also**

canvasMargin()

**Warning**

The margin will have no effect when alignCanvasToScale() is true

#### 12.77.3.19 void QwtPlotLayout::setCanvasRect ( const QRectF & *rect* ) `[protected]`

Set the geometry for the canvas.

This method is intended to be used from derived layouts overloading activate()

**See Also**

canvasRect(), activate()

#### 12.77.3.20 void QwtPlotLayout::setFooterRect ( const QRectF & *rect* ) `[protected]`

Set the geometry for the footer.

This method is intended to be used from derived layouts overloading activate()

**See Also**

footerRect(), activate()

#### 12.77.3.21 void QwtPlotLayout::setLegendPosition ( QwtPlot::LegendPosition *pos*, double *ratio* )

Specify the position of the legend.

**Parameters**

| | |
|---|---|
| *pos* | The legend's position. |
| *ratio* | Ratio between legend and the bounding rectangle of title, footer, canvas and axes. The legend will be shrunk if it would need more space than the given ratio. The ratio is limited to ]0.0 .. 1.0]. In case of <= 0.0 it will be reset to the default ratio. The default vertical/horizontal ratio is 0.33/0.5. |

**See Also**

QwtPlot::setLegendPosition()

#### 12.77.3.22 void QwtPlotLayout::setLegendPosition ( QwtPlot::LegendPosition *pos* )

Specify the position of the legend.

**Parameters**

| | |
|---|---|
| *pos* | The legend's position. Valid values are `QwtPlot::LeftLegend`, `QwtPlot::Right-Legend`, `QwtPlot::TopLegend`, `QwtPlot::BottomLegend`. |

**See Also**

QwtPlot::setLegendPosition()

#### 12.77.3.23 void QwtPlotLayout::setLegendRatio ( double *ratio* )

Specify the relative size of the legend in the plot

**Parameters**

| | |
|---|---|
| *ratio* | Ratio between legend and the bounding rectangle of title, footer, canvas and axes. The legend will be shrunk if it would need more space than the given ratio. The ratio is limited to ]0.0 .. 1.0]. In case of <= 0.0 it will be reset to the default ratio. The default vertical/horizontal ratio is 0.33/0.5. |

#### 12.77.3.24 void QwtPlotLayout::setLegendRect ( const QRectF & *rect* ) `[protected]`

Set the geometry for the legend.

This method is intended to be used from derived layouts overloading activate()

**Parameters**

| | |
|---|---|
| *rect* | Rectangle for the legend |

**See Also**

legendRect(), activate()

#### 12.77.3.25 void QwtPlotLayout::setScaleRect ( int *axis*, const QRectF & *rect* ) `[protected]`

Set the geometry for an axis.

This method is intended to be used from derived layouts overloading activate()

**Parameters**

| | |
|---|---|
| *axis* | Axis index |
| *rect* | Rectangle for the scale |

**See Also**

scaleRect(), activate()

#### 12.77.3.26 void QwtPlotLayout::setSpacing ( int *spacing* )

Change the spacing of the plot. The spacing is the distance between the plot components.

**Parameters**

| | |
|---|---|
| *spacing* | New spacing |

**See Also**

setCanvasMargin(), spacing()

#### 12.77.3.27 void QwtPlotLayout::setTitleRect ( const QRectF & *rect* ) `[protected]`

Set the geometry for the title.

This method is intended to be used from derived layouts overloading activate()

**See Also**

titleRect(), activate()

#### 12.77.3.28 int QwtPlotLayout::spacing ( ) const

**Returns**

Spacing

**See Also**

margin(), setSpacing()

#### 12.77.3.29 QRectF QwtPlotLayout::titleRect ( ) const

**Returns**

Geometry for the title

**See Also**

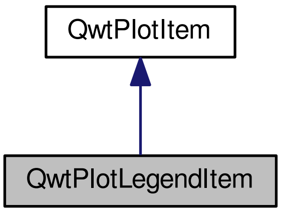
activate(), invalidate()

## 12.78 QwtPlotLegendItem Class Reference

A class which draws a legend inside the plot canvas.

`#include <qwt_plot_legenditem.h>`

Inheritance diagram for QwtPlotLegendItem:



**Public Types**

- enum BackgroundMode { LegendBackground, ItemBackground }

    *Background mode.*

**Public Member Functions**

- QwtPlotLegendItem ()

    *Constructor.*
- virtual ∼QwtPlotLegendItem ()

    *Destructor.*
- virtual int rtti () const
- void setAlignment (Qt::Alignment)

    *Set the alignmnet.*
- Qt::Alignment alignment () const
- void setMaxColumns (uint)

    *Limit the number of columns.*
- uint maxColumns () const
- void setMargin (int)

    *Set the margin around legend items.*
- int margin () const
- void setSpacing (int)

    *Set the spacing between the legend items.*
- int spacing () const
- void setItemMargin (int)
- int itemMargin () const
- void setItemSpacing (int)
- int itemSpacing () const
- void setFont (const QFont &)
- QFont font () const
- void setBorderDistance (int numPixels)

    *Set the margin between the legend and the canvas border.*
- int borderDistance () const
- void setBorderRadius (double)
- double borderRadius () const
- void setBorderPen (const QPen &)

- QPen borderPen () const
- void setBackgroundBrush (const QBrush &)

  *Set the background brush.*
- QBrush backgroundBrush () const
- void setBackgroundMode (BackgroundMode)

  *Set the background mode.*
- BackgroundMode backgroundMode () const
- void setTextPen (const QPen &)

  *Set the pen for drawing text labels.*
- QPen textPen () const
- virtual void draw (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &rect) const
- void clearLegend ()

  *Remove all items from the legend.*
- virtual void updateLegend (const QwtPlotItem ∗, const QList< QwtLegendData > &)
- virtual QRect geometry (const QRectF &canvasRect) const
- virtual QSize minimumSize (const QwtLegendData &) const
- virtual int heightForWidth (const QwtLegendData &, int w) const
- QList< const QwtPlotItem ∗ > plotItems () const
- QList< QRect > legendGeometries (const QwtPlotItem ∗) const

### Protected Member Functions

- virtual void drawLegendData (QPainter ∗painter, const QwtPlotItem ∗, const QwtLegendData &, const QRect-F &) const
- virtual void drawBackground (QPainter ∗, const QRectF &rect) const

### 12.78.1 Detailed Description

A class which draws a legend inside the plot canvas.

QwtPlotLegendItem can be used to draw a inside the plot canvas. It can be used together with a QwtLegend or instead of it to have more space for the plot canvas.

In opposite to QwtLegend the legend item is not interactive. To identify mouse clicks on a legend item an event filter needs to be installed catching mouse events ob the plot canvas. The geometries of the legend items are available using legendGeometries().

The legend item is aligned to plot canvas according to its alignment() flags. It might have a background for the complete legend ( usually semi transparent ) or for each legend item.

#### Note

An external QwtLegend with a transparent background on top the plot canvas might be another option with a similar effect.

### 12.78.2 Member Enumeration Documentation

#### 12.78.2.1 enum QwtPlotLegendItem::BackgroundMode

Background mode.

Depending on the mode the complete legend or each item might have an background.

The default setting is LegendBackground.

**See Also**

setBackgroundMode(), setBackgroundBrush(), drawBackground()

**Enumerator**

***LegendBackground*** The legend has a background.

***ItemBackground*** Each item has a background.

#### 12.78.3 Member Function Documentation

##### 12.78.3.1 Qt::Alignment QwtPlotLegendItem::alignment ( ) const

**Returns**

Alignment flags

**See Also**

setAlignment()

##### 12.78.3.2 QBrush QwtPlotLegendItem::backgroundBrush ( ) const

**Returns**

Brush is used to fill the background

**See Also**

setBackgroundBrush(), backgroundMode(), drawBackground()

##### 12.78.3.3 QwtPlotLegendItem::BackgroundMode QwtPlotLegendItem::backgroundMode ( ) const

**Returns**

backgroundMode

**See Also**

setBackgroundMode(), backgroundBrush(), drawBackground()

##### 12.78.3.4 int QwtPlotLegendItem::borderDistance ( ) const

**Returns**

Margin between the legend and the canvas border

**See Also**

margin()

##### 12.78.3.5 QPen QwtPlotLegendItem::borderPen ( ) const

**Returns**

Pen for drawing the border

**See Also**

setBorderPen(), backgroundBrush()

#### 12.78.3.6 double QwtPlotLegendItem::borderRadius ( ) const

**Returns**

Radius of the border

**See Also**

setBorderRadius(), setBorderPen()

#### 12.78.3.7 void QwtPlotLegendItem::draw ( QPainter ∗ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect* ) const [virtual]

Draw the legend

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | x Scale Map |
| *yMap* | y Scale Map |
| *canvasRect* | Contents rectangle of the canvas in painter coordinates |

Implements QwtPlotItem.

#### 12.78.3.8 void QwtPlotLegendItem::drawBackground ( QPainter ∗ *painter,* const QRectF & *rect* ) const [protected], [virtual]

Draw a rounded rect

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Bounding rectangle |

**See Also**

setBorderRadius(), setBorderPen(), setBackgroundBrush(), setBackgroundMode()

#### 12.78.3.9 void QwtPlotLegendItem::drawLegendData ( QPainter ∗ *painter,* const QwtPlotItem ∗ *plotItem,* const QwtLegendData & *data,* const QRectF & *rect* ) const [protected], [virtual]

Draw an entry on the legend

**Parameters**

| | |
|---|---|
| *painter* | Qt Painter |
| *plotItem* | Plot item, represented by the entry |
| *data* | Attributes of the legend entry |
| *rect* | Bounding rectangle for the entry |

#### 12.78.3.10 QFont QwtPlotLegendItem::font ( ) const

**Returns**

Font used for drawing the text label

**See Also**

setFont()

#### 12.78.3.11 QRect QwtPlotLegendItem::geometry ( const QRectF & *canvasRect* ) const [virtual]

Calculate the geometry of the legend on the canvas

**Parameters**

| | |
|---|---|
| *canvasRect* | Geometry of the canvas |

**Returns**

Geometry of the legend

#### 12.78.3.12 int QwtPlotLegendItem::heightForWidth ( const QwtLegendData & *data*, int *width* ) const [virtual]

**Returns**

The preferred height, for a width.

**Parameters**

| | |
|---|---|
| *data* | Attributes of the legend entry |
| *width* | Width |

#### 12.78.3.13 int QwtPlotLegendItem::itemMargin ( ) const

**Returns**

Margin around each item

**See Also**

setItemMargin(), itemSpacing(), margin(), spacing()

#### 12.78.3.14 int QwtPlotLegendItem::itemSpacing ( ) const

**Returns**

Spacing inside of each item

**See Also**

setItemSpacing(), itemMargin(), margin(), spacing()

#### 12.78.3.15 QList< QRect > QwtPlotLegendItem::legendGeometries ( const QwtPlotItem * *plotItem* ) const

**Returns**

Geometries of the items of a plot item

**Note**

Usually a plot item has only one entry on the legend

#### 12.78.3.16 int QwtPlotLegendItem::margin ( ) const

**Returns**

Margin around the legend items

**See Also**

setMargin(), spacing(), itemMargin(), itemSpacing()

#### 12.78.3.17 uint QwtPlotLegendItem::maxColumns ( ) const

**Returns**

Maximum number of columns

**See Also**

maxColumns(), QwtDynGridLayout::maxColumns()

#### 12.78.3.18 QSize QwtPlotLegendItem::minimumSize ( const QwtLegendData & *data* ) const [virtual]

Minimum size hint needed to display an entry

**Parameters**

| | |
|---|---|
| *data* | Attributes of the legend entry |

**Returns**

Minimum size

#### 12.78.3.19 QList< const QwtPlotItem * > QwtPlotLegendItem::plotItems ( ) const

**Returns**

All plot items with an entry on the legend

**Note**

A plot item might have more than one entry on the legend

#### 12.78.3.20 int QwtPlotLegendItem::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotLegend

Reimplemented from QwtPlotItem.

#### 12.78.3.21 void QwtPlotLegendItem::setAlignment ( Qt::Alignment *alignment* )

Set the alignmnet.

Alignment means the position of the legend relative to the geometry of the plot canvas.

**Parameters**

| | |
|---|---|
| *alignment* | Alignment flags |

**See Also**

alignment(), setMaxColumns()

**Note**

To align a legend with many items horizontally the number of columns need to be limited

#### 12.78.3.22 void QwtPlotLegendItem::setBackgroundBrush ( const QBrush & *brush* )

Set the background brush.

The brush is used to fill the background

**Parameters**

| | |
|---|---|
| *brush* | Brush |

**See Also**

backgroundBrush(), setBackgroundMode(), drawBackground()

#### 12.78.3.23 void QwtPlotLegendItem::setBackgroundMode ( BackgroundMode *mode* )

Set the background mode.

Depending on the mode the complete legend or each item might have an background.

The default setting is LegendBackground.

**See Also**

backgroundMode(), setBackgroundBrush(), drawBackground()

#### 12.78.3.24 void QwtPlotLegendItem::setBorderDistance ( int *distance* )

Set the margin between the legend and the canvas border.

The default setting for the margin is 10 pixels.

**Parameters**

| | |
|---|---|
| *distance* | Margin in pixels |

**See Also**

setMargin()

#### 12.78.3.25 void QwtPlotLegendItem::setBorderPen ( const QPen & *pen* )

Set the pen for drawing the border

**Parameters**

| | |
|---|---|
| *pen* | Border pen |

**See Also**

borderPen(), setBackgroundBrush()

#### 12.78.3.26 void QwtPlotLegendItem::setBorderRadius ( double *radius* )

Set the radius for the border

**Parameters**

| | |
|---|---|
| *radius* | A value <= 0 defines a rectangular border |

**See Also**

borderRadius(), setBorderPen()

#### 12.78.3.27 void QwtPlotLegendItem::setFont ( const QFont & *font* )

Change the font used for drawing the text label

**Parameters**

| | |
|---|---|
| *font* | Legend font |

**See Also**

font()

#### 12.78.3.28 void QwtPlotLegendItem::setItemMargin ( int *margin* )

Set the margin around each item

**Parameters**

| | |
|---|---|
| *margin* | Margin |

**See Also**

itemMargin(), setItemSpacing(), setMargin(), setSpacing()

#### 12.78.3.29 void QwtPlotLegendItem::setItemSpacing ( int *spacing* )

Set the spacing inside of each item

**Parameters**

| | |
|---|---|
| *spacing* | Spacing |

**See Also**

itemSpacing(), setItemMargin(), setMargin(), setSpacing()

#### 12.78.3.30 void QwtPlotLegendItem::setMargin ( int *margin* )

Set the margin around legend items.

The default setting for the margin is 0.

**Parameters**

| | |
|---|---|
| *margin* | Margin in pixels |

**See Also**

margin(), setSpacing(), setItemMargin(), setItemSpacing

#### 12.78.3.31 void QwtPlotLegendItem::setMaxColumns ( uint *maxColumns* )

Limit the number of columns.

When aligning the legend horizontally ( Qt::AlignLeft, Qt::AlignRight ) the number of columns needs to be limited to avoid, that the width of the legend grows with an increasing number of entries.

**Parameters**

| | |
|---|---|
| *maxColumns* | Maximum number of columns. 0 means unlimited. |

**See Also**

maxColumns(), QwtDynGridLayout::setMaxColumns()

#### 12.78.3.32 void QwtPlotLegendItem::setSpacing ( int *spacing* )

Set the spacing between the legend items.

**Parameters**

| | |
|---|---|
| *spacing* | Spacing in pixels |

**See Also**

spacing(), setMargin()

#### 12.78.3.33 void QwtPlotLegendItem::setTextPen ( const QPen & *pen* )

Set the pen for drawing text labels.

**Parameters**

| | |
|---|---|
| *pen* | Text pen |

**See Also**

textPen(), setFont()

#### 12.78.3.34 int QwtPlotLegendItem::spacing ( ) const

**Returns**

Spacing between the legend items

**See Also**

setSpacing(), margin(), itemSpacing(), itemMargin()

#### 12.78.3.35 QPen QwtPlotLegendItem::textPen ( ) const

**Returns**

Pen for drawing text labels

**See Also**

setTextPen(), font()

#### 12.78.3.36 void QwtPlotLegendItem::updateLegend ( const **QwtPlotItem** ∗ *plotItem,* const QList< **QwtLegendData** > & *data* ) [virtual]

Update the legend items according to modifications of a plot item

**Parameters**

| | |
|---|---|
| *plotItem* | Plot item |
| *data* | Attributes of the legend entries |

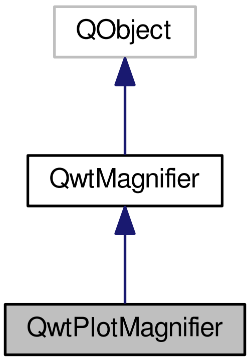
Reimplemented from QwtPlotItem.

## 12.79 QwtPlotMagnifier Class Reference

QwtPlotMagnifier provides zooming, by magnifying in steps.

```
#include <qwt_plot_magnifier.h>
```

Inheritance diagram for QwtPlotMagnifier:



#### Public Member Functions

- QwtPlotMagnifier (QWidget ∗)
- virtual ∼QwtPlotMagnifier ()

  *Destructor.*
- void setAxisEnabled (int axis, bool on)

  *En/Disable an axis.*
- bool isAxisEnabled (int axis) const
- QWidget ∗ canvas ()

  *Return observed plot canvas.*
- const QWidget ∗ canvas () const

  *Return Observed plot canvas.*
- QwtPlot ∗ plot ()

  *Return plot widget, containing the observed plot canvas.*
- const QwtPlot ∗ plot () const

  *Return plot widget, containing the observed plot canvas.*

#### Protected Member Functions

- virtual void rescale (double factor)

### 12.79.1 Detailed Description

QwtPlotMagnifier provides zooming, by magnifying in steps.

Using QwtPlotMagnifier a plot can be zoomed in/out in steps using keys, the mouse wheel or moving a mouse button in vertical direction.

Together with QwtPlotZoomer and QwtPlotPanner it is possible to implement individual and powerful navigation of the plot canvas.

**See Also**

QwtPlotZoomer, QwtPlotPanner, QwtPlot

### 12.79.2 Constructor & Destructor Documentation

#### 12.79.2.1 QwtPlotMagnifier::QwtPlotMagnifier ( QWidget $*$ *canvas* ) [explicit]

Constructor

**Parameters**

| | |
|---|---|
| *canvas* | Plot canvas to be magnified |

### 12.79.3 Member Function Documentation

#### 12.79.3.1 bool QwtPlotMagnifier::isAxisEnabled ( int *axis* ) const

Test if an axis is enabled

**Parameters**

| | |
|---|---|
| *axis* | Axis, see QwtPlot::Axis |

**Returns**

True, if the axis is enabled

**See Also**

setAxisEnabled()

#### 12.79.3.2 void QwtPlotMagnifier::rescale ( double *factor* ) [protected], [virtual]

Zoom in/out the axes scales

**Parameters**

| | |
|---|---|
| *factor* | A value $<$ 1.0 zooms in, a value $>$ 1.0 zooms out. |

Implements QwtMagnifier.

#### 12.79.3.3 void QwtPlotMagnifier::setAxisEnabled ( int *axis*, bool *on* )

En/Disable an axis.

Only Axes that are enabled will be zoomed. All other axes will remain unchanged.

**Parameters**

| | |
|---|---|
| *axis* | Axis, see QwtPlot::Axis |
| *on* | On/Off |

**See Also**

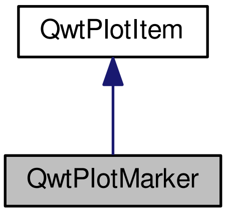
isAxisEnabled()

## 12.80 QwtPlotMarker Class Reference

A class for drawing markers.

```
#include <qwt_plot_marker.h>
```

Inheritance diagram for QwtPlotMarker:



**Public Types**

- enum LineStyle { NoLine, HLine, VLine, Cross }

**Public Member Functions**

- QwtPlotMarker (const QString &title=QString::null)

  *Sets alignment to Qt::AlignCenter, and style to QwtPlotMarker::NoLine.*
- QwtPlotMarker (const QwtText &title)

  *Sets alignment to Qt::AlignCenter, and style to QwtPlotMarker::NoLine.*
- virtual ∼QwtPlotMarker ()

  *Destructor.*
- virtual int rtti () const
- double xValue () const

  *Return x Value.*
- double yValue () const

  *Return y Value.*
- QPointF value () const

  *Return Value.*
- void setXValue (double)

  *Set X Value.*
- void setYValue (double)

  *Set Y Value.*
- void setValue (double, double)

  *Set Value.*
- void setValue (const QPointF &)

  *Set Value.*
- void setLineStyle (LineStyle st)

  *Set the line style.*
- LineStyle lineStyle () const
- void setLinePen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setLinePen (const QPen &p)
- const QPen & linePen () const
- void setSymbol (const QwtSymbol ∗)

  *Assign a symbol.*
- const QwtSymbol ∗ symbol () const

- void setLabel (const QwtText &)

    *Set the label.*
- QwtText label () const
- void setLabelAlignment (Qt::Alignment)

    *Set the alignment of the label.*
- Qt::Alignment labelAlignment () const
- void setLabelOrientation (Qt::Orientation)

    *Set the orientation of the label.*
- Qt::Orientation labelOrientation () const
- void setSpacing (int)

    *Set the spacing.*
- int spacing () const
- virtual void draw (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &) const
- virtual QRectF boundingRect () const
- virtual QwtGraphic legendIcon (int index, const QSizeF &) const

**Protected Member Functions**

- virtual void drawLines (QPainter ∗, const QRectF &, const QPointF &) const
- virtual void drawLabel (QPainter ∗, const QRectF &, const QPointF &) const

### 12.80.1 Detailed Description

A class for drawing markers.

A marker can be a horizontal line, a vertical line, a symbol, a label or any combination of them, which can be drawn around a center point inside a bounding rectangle.

The setSymbol() member assigns a symbol to the marker. The symbol is drawn at the specified point.

With setLabel(), a label can be assigned to the marker. The setLabelAlignment() member specifies where the label is drawn. All the Align∗-constants in Qt::AlignmentFlags (see Qt documentation) are valid. The interpretation of the alignment depends on the marker's line style. The alignment refers to the center point of the marker, which means, for example, that the label would be printed left above the center point if the alignment was set to Qt::AlignLeft | Qt::AlignTop.

**Note**

QwtPlotTextLabel is intended to align a text label according to the geometry of canvas ( unrelated to plot coordinates )

### 12.80.2 Member Enumeration Documentation

#### 12.80.2.1 enum QwtPlotMarker::LineStyle

Line styles.

**See Also**

setLineStyle(), lineStyle()

**Enumerator**

***NoLine*** No line.

***HLine*** A horizontal line.

***VLine*** A vertical line.

***Cross*** A crosshair.

### 12.80.3 Member Function Documentation

#### 12.80.3.1 QRectF QwtPlotMarker::boundingRect ( ) const [virtual]

**Returns**

An invalid bounding rect: QRectF(1.0, 1.0, -2.0, -2.0)

**Note**

A width or height $<$ 0.0 is ignored by the autoscaler

Reimplemented from QwtPlotItem.

#### 12.80.3.2 void QwtPlotMarker::draw ( QPainter $*$ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect* ) const [virtual]

Draw the marker

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | x Scale Map |
| *yMap* | y Scale Map |
| *canvasRect* | Contents rectangle of the canvas in painter coordinates |

Implements QwtPlotItem.

#### 12.80.3.3 void QwtPlotMarker::drawLabel ( QPainter $*$ *painter,* const QRectF & *canvasRect,* const QPointF & *pos* ) const [protected], [virtual]

Align and draw the text label of the marker

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *canvasRect* | Contents rectangle of the canvas in painter coordinates |
| *pos* | Position of the marker, translated into widget coordinates |

**See Also**

drawLabel(), QwtSymbol::drawSymbol()

#### 12.80.3.4 void QwtPlotMarker::drawLines ( QPainter $*$ *painter,* const QRectF & *canvasRect,* const QPointF & *pos* ) const [protected], [virtual]

Draw the lines marker

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *canvasRect* | Contents rectangle of the canvas in painter coordinates |
| *pos* | Position of the marker, translated into widget coordinates |

**See Also**

drawLabel(), QwtSymbol::drawSymbol()

#### 12.80.3.5 QwtText QwtPlotMarker::label ( ) const

**Returns**

the label

**See Also**

setLabel()

#### 12.80.3.6 Qt::Alignment QwtPlotMarker::labelAlignment ( ) const

**Returns**

the label alignment

**See Also**

setLabelAlignment(), setLabelOrientation()

#### 12.80.3.7 Qt::Orientation QwtPlotMarker::labelOrientation ( ) const

**Returns**

the label orientation

**See Also**

setLabelOrientation(), labelAlignment()

#### 12.80.3.8 QwtGraphic QwtPlotMarker::legendIcon ( int *index*, const QSizeF & *size* ) const [virtual]

**Returns**

Icon representing the marker on the legend

**Parameters**

| | |
|---|---|
| *index* | Index of the legend entry ( usually there is only one ) |
| *size* | Icon size |

**See Also**

setLegendIconSize(), legendData()

Reimplemented from QwtPlotItem.

#### 12.80.3.9 const QPen & QwtPlotMarker::linePen ( ) const

**Returns**

the line pen

**See Also**

setLinePen()

#### 12.80.3.10 QwtPlotMarker::LineStyle QwtPlotMarker::lineStyle ( ) const

**Returns**

the line style

**See Also**

setLineStyle()

#### 12.80.3.11 int QwtPlotMarker::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotMarker

Reimplemented from QwtPlotItem.

#### 12.80.3.12 void QwtPlotMarker::setLabel ( const QwtText & *label* )

Set the label.

**Parameters**

| | |
|---|---|
| *label* | Label text |

**See Also**

label()

#### 12.80.3.13 void QwtPlotMarker::setLabelAlignment ( Qt::Alignment *align* )

Set the alignment of the label.

In case of QwtPlotMarker::HLine the alignment is relative to the y position of the marker, but the horizontal flags correspond to the canvas rectangle. In case of QwtPlotMarker::VLine the alignment is relative to the x position of the marker, but the vertical flags correspond to the canvas rectangle.

In all other styles the alignment is relative to the marker's position.

**Parameters**

| | |
|---|---|
| *align* | Alignment. |

**See Also**

labelAlignment(), labelOrientation()

#### 12.80.3.14 void QwtPlotMarker::setLabelOrientation ( Qt::Orientation *orientation* )

Set the orientation of the label.

When orientation is Qt::Vertical the label is rotated by 90.0 degrees ( from bottom to top ).

**Parameters**

| | |
|---|---|
| *orientation* | Orientation of the label |

**See Also**

labelOrientation(), setLabelAlignment()

#### 12.80.3.15 void QwtPlotMarker::setLinePen ( const QColor & *color*, qreal *width* = 0.0, Qt::PenStyle *style* = Qt::SolidLine )

Build and assign a line pen

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.80.3.16 void QwtPlotMarker::setLinePen ( const QPen & *pen* )

Specify a pen for the line.

**Parameters**

| | |
|---|---|
| *pen* | New pen |

**See Also**

linePen()

#### 12.80.3.17 void QwtPlotMarker::setLineStyle ( LineStyle *style* )

Set the line style.

**Parameters**

| | |
|---|---|
| *style* | Line style. |

**See Also**

lineStyle()

#### 12.80.3.18 void QwtPlotMarker::setSpacing ( int *spacing* )

Set the spacing.

When the label is not centered on the marker position, the spacing is the distance between the position and the label.

**Parameters**

| | |
|---|---|
| *spacing* | Spacing |

**See Also**

spacing(), setLabelAlignment()

#### 12.80.3.19 void QwtPlotMarker::setSymbol ( const QwtSymbol ∗ *symbol* )

Assign a symbol.

**Parameters**

| | |
|---|---|
| *symbol* | New symbol |

**See Also**

symbol()

#### 12.80.3.20 int QwtPlotMarker::spacing ( ) const

**Returns**

the spacing

**See Also**

setSpacing()

#### 12.80.3.21 const QwtSymbol * QwtPlotMarker::symbol ( ) const

**Returns**

the symbol

**See Also**

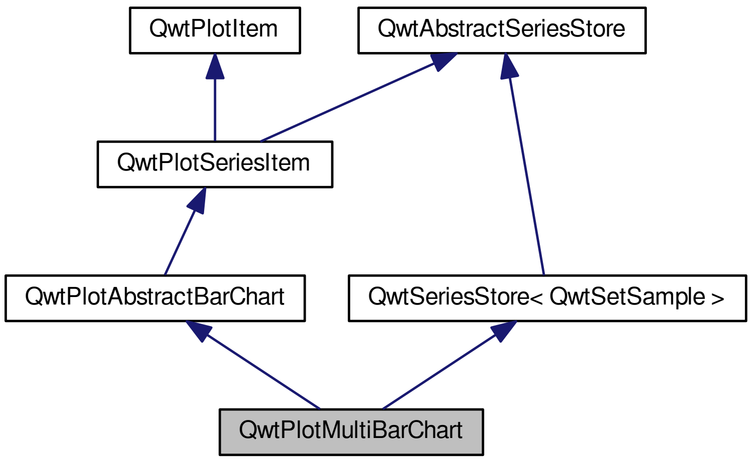
setSymbol(), QwtSymbol

## 12.81 QwtPlotMultiBarChart Class Reference

QwtPlotMultiBarChart displays a series of a samples that consist each of a set of values.

```
#include <qwt_plot_multi_barchart.h>
```

Inheritance diagram for QwtPlotMultiBarChart:



**Public Types**

- enum ChartStyle { Grouped, Stacked }

  *Chart styles.*

**Public Member Functions**

- QwtPlotMultiBarChart (const QString &title=QString::null)

- QwtPlotMultiBarChart (const QwtText &title)
- virtual ∼QwtPlotMultiBarChart ()

  *Destructor.*
- virtual int rtti () const
- void setBarTitles (const QList< QwtText > &)

  *Set the titles for the bars.*
- QList< QwtText > barTitles () const
- void setSamples (const QVector< QwtSetSample > &)
- void setSamples (const QVector< QVector< double > > &)
- void setSamples (QwtSeriesData< QwtSetSample > ∗)
- void setStyle (ChartStyle style)
- ChartStyle style () const
- void setSymbol (int barIndex, QwtColumnSymbol ∗symbol)

  *Add a symbol to the symbol map.*
- const QwtColumnSymbol ∗ symbol (int barIndex) const
- void resetSymbolMap ()
- virtual void drawSeries (QPainter ∗painter, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- virtual QRectF boundingRect () const
- virtual QList< QwtLegendData > legendData () const
- virtual QwtGraphic legendIcon (int index, const QSizeF &) const

**Protected Member Functions**

- QwtColumnSymbol ∗ symbol (int barIndex)
- virtual QwtColumnSymbol ∗ specialSymbol (int sampleIndex, int valueIndex) const

  *Create a symbol for special values.*
- virtual void drawSample (QPainter ∗painter, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, const QwtInterval &boundingInterval, int index, const QwtSetSample &sample) const
- virtual void drawBar (QPainter ∗, int sampleIndex, int barIndex, const QwtColumnRect &) const
- void drawStackedBars (QPainter ∗painter, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int index, double sampleWidth, const QwtSetSample &sample) const
- void drawGroupedBars (QPainter ∗painter, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int index, double sampleWidth, const QwtSetSample &sample) const

### 12.81.1 Detailed Description

QwtPlotMultiBarChart displays a series of a samples that consist each of a set of values.

Each value is displayed as a bar, the bars of each set can be organized side by side or accumulated.

Each bar of a set is rendered by a QwtColumnSymbol, that is set by setSymbol(). The bars of different sets use the same symbols. Exceptions are possible by overloading specialSymbol() or overloading drawBar().

Depending on its orientation() the bars are displayed horizontally or vertically. The bars cover the interval between the baseline() and the value.

In opposite to most other plot items, QwtPlotMultiBarChart returns more than one entry for the legend - one for each symbol.

**See Also**

QwtPlotBarChart, QwtPlotHistogram QwtPlotSeriesItem::orientation(), QwtPlotAbstractBarChart::baseline()

### 12.81.2 Member Enumeration Documentation

#### 12.81.2.1 enum QwtPlotMultiBarChart::ChartStyle

Chart styles.

The default setting is QwtPlotMultiBarChart::Grouped.

**See Also**

setStyle(), style()

**Enumerator**

***Grouped*** The bars of a set are displayed side by side.

***Stacked*** The bars are displayed on top of each other accumulating to a single bar. All values of a set need to have the same sign.

### 12.81.3 Constructor & Destructor Documentation

#### 12.81.3.1 QwtPlotMultiBarChart::QwtPlotMultiBarChart ( const QString & *title* = `QString::null` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the chart |

#### 12.81.3.2 QwtPlotMultiBarChart::QwtPlotMultiBarChart ( const QwtText & *title* ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the chart |

### 12.81.4 Member Function Documentation

#### 12.81.4.1 QList< QwtText > QwtPlotMultiBarChart::barTitles ( ) const

**Returns**

Bar titles

**See Also**

setBarTitles(), legendData()

#### 12.81.4.2 QRectF QwtPlotMultiBarChart::boundingRect ( ) const `[virtual]`

**Returns**

Bounding rectangle of all samples. For an empty series the rectangle is invalid.

Reimplemented from QwtPlotSeriesItem.

#### 12.81.4.3 void QwtPlotMultiBarChart::drawBar ( QPainter * *painter*, int *sampleIndex*, int *valueIndex*, const QwtColumnRect & *rect* ) const `[protected]`, `[virtual]`

Draw a bar

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *sampleIndex* | Index of the sample - might be -1 when the bar is painted for the legend |
| *valueIndex* | Index of a value in a set |
| *rect* | Directed target rectangle for the bar |

**See Also**

drawSeries()

#### 12.81.4.4 void QwtPlotMultiBarChart::drawGroupedBars ( QPainter ∗ *painter*, const **QwtScaleMap** & *xMap*, const **QwtScaleMap** & *yMap*, const QRectF & *canvasRect*, int *index*, double *sampleWidth*, const **QwtSetSample** & *sample* ) const `[protected]`

Draw a grouped sample

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *index* | Index of the sample to be painted |
| *sampleWidth* | Boundng width for all bars of the smaple |
| *sample* | Sample |

**See Also**

drawSeries(), sampleWidth()

#### 12.81.4.5 void QwtPlotMultiBarChart::drawSample ( QPainter ∗ *painter*, const **QwtScaleMap** & *xMap*, const **QwtScaleMap** & *yMap*, const QRectF & *canvasRect*, const **QwtInterval** & *boundingInterval*, int *index*, const **QwtSetSample** & *sample* ) const `[protected]`, `[virtual]`

Draw a sample

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *boundingInterval* | Bounding interval of sample values |
| *index* | Index of the sample to be painted |
| *sample* | Sample value |

**See Also**

drawSeries()

#### 12.81.4.6 void QwtPlotMultiBarChart::drawSeries ( QPainter ∗ *painter*, const **QwtScaleMap** & *xMap*, const **QwtScaleMap** & *yMap*, const QRectF & *canvasRect*, int *from*, int *to* ) const `[virtual]`

Draw an interval of the bar chart

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted. If to $<$ 0 the curve will be painted to its last point. |

**See Also**

drawSymbols()

Implements QwtPlotSeriesItem.

#### 12.81.4.7 void QwtPlotMultiBarChart::drawStackedBars ( QPainter $*$ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect,* int *index,* double *sampleWidth,* const QwtSetSample & *sample* ) const `[protected]`

Draw a stacked sample

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *index* | Index of the sample to be painted |
| *sampleWidth* | Width of the bars |
| *sample* | Sample |

**See Also**

drawSeries(), sampleWidth()

#### 12.81.4.8 QList< QwtLegendData > QwtPlotMultiBarChart::legendData ( ) const `[virtual]`

**Returns**

Information to be displayed on the legend

The chart is represented by a list of entries - one for each bar title. Each element contains a bar title and an icon showing its corresponding bar.

**See Also**

barTitles(), legendIcon(), legendIconSize()

Reimplemented from QwtPlotItem.

#### 12.81.4.9 QwtGraphic QwtPlotMultiBarChart::legendIcon ( int *index,* const QSizeF & *size* ) const `[virtual]`

**Returns**

Icon for representing a bar on the legend

**Parameters**

| | |
|---|---|
| *index* | Index of the bar |
| *size* | Icon size |

**Returns**

An icon showing a bar

**See Also**

drawBar(), legendData()

Reimplemented from QwtPlotItem.

#### 12.81.4.10 void QwtPlotMultiBarChart::resetSymbolMap ( )

Remove all symbols from the symbol map

#### 12.81.4.11 int QwtPlotMultiBarChart::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotBarChart

Reimplemented from QwtPlotItem.

#### 12.81.4.12 void QwtPlotMultiBarChart::setBarTitles ( const QList< QwtText > & *titles* )

Set the titles for the bars.

The titles are used for the legend.

**Parameters**

| | |
|---|---|
| *titles* | Bar titles |

**See Also**

barTitles(), legendData()

#### 12.81.4.13 void QwtPlotMultiBarChart::setSamples ( const QVector< QwtSetSample > & *samples* )

Initialize data with an array of samples.

**Parameters**

| | |
|---|---|
| *samples* | Vector of points |

#### 12.81.4.14 void QwtPlotMultiBarChart::setSamples ( const QVector< QVector< double > > & *samples* )

Initialize data with an array of samples.

**Parameters**

| | |
|---|---|
| *samples* | Vector of points |

#### 12.81.4.15 void QwtPlotMultiBarChart::setSamples ( QwtSeriesData< QwtSetSample > * *data* )

Assign a series of samples

setSamples() is just a wrapper for setData() without any additional value - beside that it is easier to find for the developer.

**Parameters**

| | |
|---|---|
| *data* | Data |

**Warning**

The item takes ownership of the data object, deleting it when its not used anymore.

#### 12.81.4.16 void QwtPlotMultiBarChart::setStyle ( ChartStyle *style* )

Set the style of the chart

**Parameters**

| | |
|---|---|
| *style* | Chart style |

**See Also**

style()

#### 12.81.4.17 void QwtPlotMultiBarChart::setSymbol ( int *valueIndex,* QwtColumnSymbol ∗ *symbol* )

Add a symbol to the symbol map.

Assign a default symbol for drawing the bar representing all values with the same index in a set.

**Parameters**

| | |
|---|---|
| *valueIndex* | Index of a value in a set |
| *symbol* | Symbol used for drawing a bar |

**See Also**

symbol(), resetSymbolMap(), specialSymbol()

#### 12.81.4.18 QwtColumnSymbol ∗ QwtPlotMultiBarChart::specialSymbol ( int *sampleIndex,* int *valueIndex* ) const [protected], [virtual]

Create a symbol for special values.

Usually the symbols for displaying a bar are set by setSymbols() and common for all sets. By overloading special-Symbol() it is possible to create a temporary symbol() for displaying a special value.

The symbol has to be created by new each time specialSymbol() is called. As soon as the symbol is painted this symbol gets deleted.

When no symbol ( NULL ) is returned, the value will be displayed with the standard symbol that is used for all symbols with the same valueIndex.

**Parameters**

| | |
|---|---|
| *sampleIndex* | Index of the sample |
| *valueIndex* | Index of the value in the set |

**Returns**

NULL, meaning that the value is not special

#### 12.81.4.19 QwtPlotMultiBarChart::ChartStyle QwtPlotMultiBarChart::style ( ) const

**Returns**

Style of the chart

**See Also**

setStyle()

#### 12.81.4.20 const QwtColumnSymbol * QwtPlotMultiBarChart::symbol ( int *valueIndex* ) const

Find a symbol in the symbol map

**Parameters**

| | |
|---|---|
| *valueIndex* | Index of a value in a set |

**Returns**

The symbol, that had been set by setSymbol() or NULL.

**See Also**

setSymbol(), specialSymbol(), drawBar()

#### 12.81.4.21 QwtColumnSymbol * QwtPlotMultiBarChart::symbol ( int *valueIndex* ) [protected]

Find a symbol in the symbol map

**Parameters**

| | |
|---|---|
| *valueIndex* | Index of a value in a set |

**Returns**

The symbol, that had been set by setSymbol() or NULL.

**See Also**

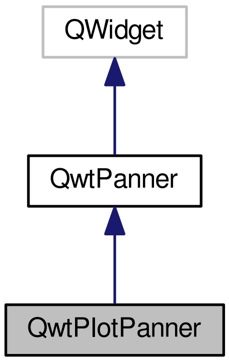
setSymbol(), specialSymbol(), drawBar()

## 12.82 QwtPlotPanner Class Reference

QwtPlotPanner provides panning of a plot canvas.

`#include <qwt_plot_panner.h>`

Inheritance diagram for QwtPlotPanner:



**Public Member Functions**

- QwtPlotPanner (QWidget ∗)

  *A panner for the canvas of a QwtPlot.*
- virtual ∼QwtPlotPanner ()

  *Destructor.*
- QWidget ∗ canvas ()

  *Return observed plot canvas.*
- const QWidget ∗ canvas () const

  *Return Observed plot canvas.*
- QwtPlot ∗ plot ()

  *Return plot widget, containing the observed plot canvas.*
- const QwtPlot ∗ plot () const

  *Return plot widget, containing the observed plot canvas.*
- void setAxisEnabled (int axis, bool on)

  *En/Disable an axis.*
- bool isAxisEnabled (int axis) const

**Protected Slots**

- virtual void moveCanvas (int dx, int dy)

#### Protected Member Functions

- virtual QBitmap contentsMask () const
- virtual QPixmap grab () const

#### Additional Inherited Members

### 12.82.1 Detailed Description

QwtPlotPanner provides panning of a plot canvas.

QwtPlotPanner is a panner for a plot canvas, that adjusts the scales of the axes after dropping the canvas on its new position.

Together with QwtPlotZoomer and QwtPlotMagnifier powerful ways of navigating on a QwtPlot widget can be implemented easily.

**Note**

The axes are not updated, while dragging the canvas

**See Also**

QwtPlotZoomer, QwtPlotMagnifier

### 12.82.2 Constructor & Destructor Documentation

#### 12.82.2.1 QwtPlotPanner::QwtPlotPanner ( QWidget ∗ *canvas* ) `[explicit]`

A panner for the canvas of a QwtPlot.

The panner is enabled for all axes

**Parameters**

| | |
|---|---|
| *canvas* | Plot canvas to pan, also the parent object |

**See Also**

setAxisEnabled()

### 12.82.3 Member Function Documentation

#### 12.82.3.1 QBitmap QwtPlotPanner::contentsMask ( ) const `[protected]`, `[virtual]`

Calculate a mask from the border path of the canvas

**Returns**

Mask as bitmap

**See Also**

QwtPlotCanvas::borderPath()

Reimplemented from QwtPanner.

#### 12.82.3.2 QPixmap QwtPlotPanner::grab ( ) const [protected], [virtual]

**Returns**

Pixmap with the content of the canvas

Reimplemented from QwtPanner.

#### 12.82.3.3 bool QwtPlotPanner::isAxisEnabled ( int *axis* ) const

Test if an axis is enabled

**Parameters**

| | |
|---|---|
| *axis* | Axis, see QwtPlot::Axis |

**Returns**

True, if the axis is enabled

**See Also**

setAxisEnabled(), moveCanvas()

#### 12.82.3.4 void QwtPlotPanner::moveCanvas ( int *dx*, int *dy* ) [protected], [virtual], [slot]

Adjust the enabled axes according to dx/dy

**Parameters**

| | |
|---|---|
| *dx* | Pixel offset in x direction |
| *dy* | Pixel offset in y direction |

**See Also**

QwtPanner::panned()

#### 12.82.3.5 void QwtPlotPanner::setAxisEnabled ( int *axis*, bool *on* )

En/Disable an axis.

Axes that are enabled will be synchronized to the result of panning. All other axes will remain unchanged.

**Parameters**

| | |
|---|---|
| *axis* | Axis, see QwtPlot::Axis |
| *on* | On/Off |

**See Also**

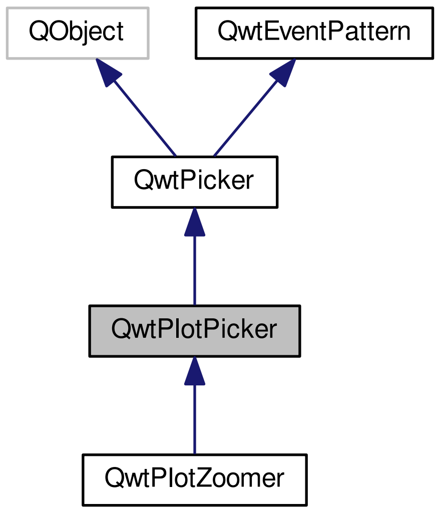
isAxisEnabled(), moveCanvas()

## 12.83 QwtPlotPicker Class Reference

QwtPlotPicker provides selections on a plot canvas.

`#include <qwt_plot_picker.h>`

Inheritance diagram for QwtPlotPicker:



## Signals

- void selected (const QPointF &pos)
- void selected (const QRectF &rect)
- void selected (const QVector< QPointF > &pa)
- void appended (const QPointF &pos)
- void moved (const QPointF &pos)

## Public Member Functions

- QwtPlotPicker (QWidget ∗canvas)

  *Create a plot picker.*
- virtual ∼QwtPlotPicker ()

  *Destructor.*
- QwtPlotPicker (int xAxis, int yAxis, QWidget ∗)
- QwtPlotPicker (int xAxis, int yAxis, RubberBand rubberBand, DisplayMode trackerMode, QWidget ∗)
- virtual void setAxis (int xAxis, int yAxis)
- int xAxis () const

  *Return x axis.*
- int yAxis () const

  *Return y axis.*
- QwtPlot ∗ plot ()
- const QwtPlot ∗ plot () const
- QWidget ∗ canvas ()
- const QWidget ∗ canvas () const

#### Protected Member Functions

- QRectF scaleRect () const
- QRectF invTransform (const QRect &) const
- QRect transform (const QRectF &) const
- QPointF invTransform (const QPoint &) const
- QPoint transform (const QPointF &) const
- virtual QwtText trackerText (const QPoint &) const
- virtual QwtText trackerTextF (const QPointF &) const

  *Translate a position into a position string.*
- virtual void move (const QPoint &)
- virtual void append (const QPoint &)
- virtual bool end (bool ok=true)

#### Additional Inherited Members

### 12.83.1 Detailed Description

QwtPlotPicker provides selections on a plot canvas.

QwtPlotPicker is a QwtPicker tailored for selections on a plot canvas. It is set to a x-Axis and y-Axis and translates all pixel coordinates into this coordinate system.

### 12.83.2 Constructor & Destructor Documentation

#### 12.83.2.1 QwtPlotPicker::QwtPlotPicker ( QWidget ∗ *canvas* ) [explicit]

Create a plot picker.

The picker is set to those x- and y-axis of the plot that are enabled. If both or no x-axis are enabled, the picker is set to QwtPlot::xBottom. If both or no y-axis are enabled, it is set to QwtPlot::yLeft.

**Parameters**

| | |
|---|---|
| *canvas* | Plot canvas to observe, also the parent object |

**See Also**

QwtPlot::autoReplot(), QwtPlot::replot(), scaleRect()

#### 12.83.2.2 QwtPlotPicker::QwtPlotPicker ( int *xAxis,* int *yAxis,* QWidget ∗ *canvas* ) [explicit]

Create a plot picker

**Parameters**

| | |
|---|---|
| *xAxis* | Set the x axis of the picker |
| *yAxis* | Set the y axis of the picker |
| *canvas* | Plot canvas to observe, also the parent object |

**See Also**

QwtPlot::autoReplot(), QwtPlot::replot(), scaleRect()

#### 12.83.2.3 QwtPlotPicker::QwtPlotPicker ( int *xAxis,* int *yAxis,* RubberBand *rubberBand,* DisplayMode *trackerMode,* QWidget ∗ *canvas* ) [explicit]

Create a plot picker

**Parameters**

| | |
|---|---|
| *xAxis* | X axis of the picker |
| *yAxis* | Y axis of the picker |
| *rubberBand* | Rubber band style |
| *trackerMode* | Tracker mode |
| *canvas* | Plot canvas to observe, also the parent object |

**See Also**

QwtPicker, QwtPicker::setSelectionFlags(), QwtPicker::setRubberBand(), QwtPicker::setTrackerMode QwtPlot::autoReplot(), QwtPlot::replot(), scaleRect()

### 12.83.3 Member Function Documentation

#### 12.83.3.1 void QwtPlotPicker::append ( const QPoint & *pos* ) `[protected]`, `[virtual]`

Append a point to the selection and update rubber band and tracker.

**Parameters**

| | |
|---|---|
| *pos* | Additional point |

**See Also**

isActive, begin(), end(), move(), appended()

**Note**

The appended(const QPoint &), appended(const QDoublePoint &) signals are emitted.

Reimplemented from QwtPicker.

#### 12.83.3.2 void QwtPlotPicker::appended ( const QPointF & *pos* ) `[signal]`

A signal emitted when a point has been appended to the selection

**Parameters**

| | |
|---|---|
| *pos* | Position of the appended point. |

**See Also**

append(). moved()

#### 12.83.3.3 QWidget ∗ QwtPlotPicker::canvas ( )

**Returns**

Observed plot canvas

#### 12.83.3.4 const QWidget ∗ QwtPlotPicker::canvas ( ) const

**Returns**

Observed plot canvas

#### 12.83.3.5 bool QwtPlotPicker::end ( bool *ok* = `true` ) `[protected]`, `[virtual]`

Close a selection setting the state to inactive.

**Parameters**

| | |
|---|---|
| *ok* | If true, complete the selection and emit selected signals otherwise discard the selection. |

**Returns**

True if the selection has been accepted, false otherwise

Reimplemented from QwtPicker.

Reimplemented in QwtPlotZoomer.

#### 12.83.3.6 QRectF QwtPlotPicker::invTransform ( const QRect & *rect* ) const [protected]

Translate a rectangle from pixel into plot coordinates

**Returns**

Rectangle in plot coordinates

**See Also**

transform()

#### 12.83.3.7 QPointF QwtPlotPicker::invTransform ( const QPoint & *pos* ) const [protected]

Translate a point from pixel into plot coordinates

**Returns**

Point in plot coordinates

**See Also**

transform()

#### 12.83.3.8 void QwtPlotPicker::move ( const QPoint & *pos* ) [protected], [virtual]

Move the last point of the selection

**Parameters**

| | |
|---|---|
| *pos* | New position |

**See Also**

isActive, begin(), end(), append()

**Note**

The moved(const QPoint &), moved(const QDoublePoint &) signals are emitted.

Reimplemented from QwtPicker.

#### 12.83.3.9 void QwtPlotPicker::moved ( const QPointF & *pos* ) [signal]

A signal emitted whenever the last appended point of the selection has been moved.

**Parameters**

| | |
|---|---|
| *pos* | Position of the moved last point of the selection. |

**See Also**

move(), appended()

#### 12.83.3.10 QwtPlot ∗ QwtPlotPicker::plot ( )

**Returns**

Plot widget, containing the observed plot canvas

#### 12.83.3.11 const QwtPlot ∗ QwtPlotPicker::plot ( ) const

**Returns**

Plot widget, containing the observed plot canvas

#### 12.83.3.12 QRectF QwtPlotPicker::scaleRect ( ) const `[protected]`

**Returns**

Normalized bounding rectangle of the axes

**See Also**

QwtPlot::autoReplot(), QwtPlot::replot().

#### 12.83.3.13 void QwtPlotPicker::selected ( const QPointF & *pos* ) `[signal]`

A signal emitted in case of QwtPickerMachine::PointSelection.

**Parameters**

| | |
|---|---|
| *pos* | Selected point |

#### 12.83.3.14 void QwtPlotPicker::selected ( const QRectF & *rect* ) `[signal]`

A signal emitted in case of QwtPickerMachine::RectSelection.

**Parameters**

| | |
|---|---|
| *rect* | Selected rectangle |

#### 12.83.3.15 void QwtPlotPicker::selected ( const QVector< QPointF > & *pa* ) `[signal]`

A signal emitting the selected points, at the end of a selection.

**Parameters**

| | |
|---|---|
| *pa* | Selected points |

#### 12.83.3.16 void QwtPlotPicker::setAxis ( int *xAxis,* int *yAxis* ) `[virtual]`

Set the x and y axes of the picker

**Parameters**

| | |
|---|---|
| *xAxis* | X axis |
| *yAxis* | Y axis |

Reimplemented in QwtPlotZoomer.

#### 12.83.3.17 QwtText QwtPlotPicker::trackerText ( const QPoint & *pos* ) const [protected], [virtual]

Translate a pixel position into a position string

**Parameters**

| | |
|---|---|
| *pos* | Position in pixel coordinates |

**Returns**

Position string

Reimplemented from QwtPicker.

#### 12.83.3.18 QwtText QwtPlotPicker::trackerTextF ( const QPointF & *pos* ) const [protected], [virtual]

Translate a position into a position string.

In case of HLineRubberBand the label is the value of the y position, in case of VLineRubberBand the value of the x position. Otherwise the label contains x and y position separated by a ',' .

The format for the double to string conversion is "%.4f".

**Parameters**

| | |
|---|---|
| *pos* | Position |

**Returns**

Position string

#### 12.83.3.19 QRect QwtPlotPicker::transform ( const QRectF & *rect* ) const [protected]

Translate a rectangle from plot into pixel coordinates

**Returns**

Rectangle in pixel coordinates

**See Also**

invTransform()

#### 12.83.3.20 QPoint QwtPlotPicker::transform ( const QPointF & *pos* ) const [protected]

Translate a point from plot into pixel coordinates

**Returns**

Point in pixel coordinates

**See Also**

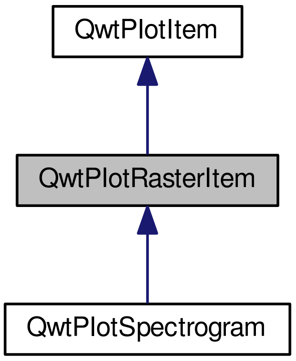
invTransform()

## 12.84 QwtPlotRasterItem Class Reference

A class, which displays raster data.

`#include <qwt_plot_rasteritem.h>`

Inheritance diagram for QwtPlotRasterItem:



### Public Types

- enum CachePolicy { NoCache, PaintCache }

    *Cache policy The default policy is NoCache.*
- enum PaintAttribute { PaintInDeviceResolution = 1 }
- typedef QFlags< PaintAttribute > PaintAttributes

    *Paint attributes.*

### Public Member Functions

- QwtPlotRasterItem (const QString &title=QString::null)

    *Constructor.*
- QwtPlotRasterItem (const QwtText &title)

    *Constructor.*
- virtual ∼QwtPlotRasterItem ()

    *Destructor.*
- void setPaintAttribute (PaintAttribute, bool on=true)
- bool testPaintAttribute (PaintAttribute) const
- void setAlpha (int alpha)

    *Set an alpha value for the raster data.*
- int alpha () const
- void setCachePolicy (CachePolicy)
- CachePolicy cachePolicy () const
- void invalidateCache ()
- virtual void draw (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &rect) const

    *Draw the raster data.*
- virtual QRectF pixelHint (const QRectF &) const

*Pixel hint.*
- virtual QwtInterval interval (Qt::Axis) const
- virtual QRectF boundingRect () const

#### Protected Member Functions

- virtual QImage renderImage (const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &area, const QSize &imageSize) const =0

  *Render an image.*
- virtual QwtScaleMap imageMap (Qt::Orientation, const QwtScaleMap &map, const QRectF &area, const Q-Size &imageSize, double pixelSize) const

  *Calculate a scale map for painting to an image.*

### 12.84.1 Detailed Description

A class, which displays raster data.

Raster data is a grid of pixel values, that can be represented as a QImage. It is used for many types of information like spectrograms, cartograms, geographical maps ...

Often a plot has several types of raster data organized in layers. ( f.e a geographical map, with weather statistics ). Using setAlpha() raster items can be stacked easily.

QwtPlotRasterItem is only implemented for images of the following formats: QImage::Format_Indexed8, QImage::-Format_ARGB32.

**See Also**

QwtPlotSpectrogram

### 12.84.2 Member Enumeration Documentation

#### 12.84.2.1 enum QwtPlotRasterItem::CachePolicy

Cache policy The default policy is NoCache.

**Enumerator**

***NoCache*** renderImage() is called each time the item has to be repainted

***PaintCache*** renderImage() is called, whenever the image cache is not valid, or the scales, or the size of the canvas has changed.

This type of cache is useful for improving the performance of hide/show operations or manipulations of the alpha value. All other situations are handled by the canvas backing store.

#### 12.84.2.2 enum QwtPlotRasterItem::PaintAttribute

Attributes to modify the drawing algorithm.

**See Also**

setPaintAttribute(), testPaintAttribute()

**Enumerator**

***PaintInDeviceResolution*** When the image is rendered according to the data pixels ( QwtRasterData::pixel-Hint() ) it can be expanded to paint device resolution before it is passed to QPainter. The expansion algorithm rounds the pixel borders in the same way as the axis ticks, what is usually better than the scaling algorithm implemented in Qt. Disabling this flag might make sense, to reduce the size of a document/file. If this is possible for a document format depends on the implementation of the specific QPaintEngine.

### 12.84.3 Member Function Documentation

#### 12.84.3.1 int QwtPlotRasterItem::alpha ( ) const

**Returns**

Alpha value of the raster item

**See Also**

setAlpha()

#### 12.84.3.2 QRectF QwtPlotRasterItem::boundingRect ( ) const [virtual]

**Returns**

Bounding rectangle of the data

**See Also**

QwtPlotRasterItem::interval()

Reimplemented from QwtPlotItem.

#### 12.84.3.3 QwtPlotRasterItem::CachePolicy QwtPlotRasterItem::cachePolicy ( ) const

**Returns**

Cache policy

**See Also**

CachePolicy, setCachePolicy()

#### 12.84.3.4 void QwtPlotRasterItem::draw ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect* ) const [virtual]

Draw the raster data.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | X-Scale Map |
| *yMap* | Y-Scale Map |
| *canvasRect* | Contents rectangle of the plot canvas |

Implements QwtPlotItem.

Reimplemented in QwtPlotSpectrogram.

#### 12.84.3.5 QwtScaleMap QwtPlotRasterItem::imageMap ( Qt::Orientation *orientation*, const QwtScaleMap & *map*, const QRectF & *area*, const QSize & *imageSize*, double *pixelSize* ) const [protected], [virtual]

Calculate a scale map for painting to an image.

**Parameters**

| | |
|---|---|
| *orientation* | Orientation, Qt::Horizontal means a X axis |
| *map* | Scale map for rendering the plot item |
| *area* | Area to be painted on the image |
| *imageSize* | Image size |
| *pixelSize* | Width/Height of a data pixel |

**Returns**

Calculated scale map

#### 12.84.3.6 QwtInterval QwtPlotRasterItem::interval ( Qt::Axis *axis* ) const [virtual]

**Returns**

Bounding interval for an axis

This method is intended to be reimplemented by derived classes. The default implementation returns an invalid interval.

**Parameters**

| | |
|---|---|
| *axis* | X, Y, or Z axis |

Reimplemented in QwtPlotSpectrogram.

#### 12.84.3.7 void QwtPlotRasterItem::invalidateCache ( )

Invalidate the paint cache

**See Also**

setCachePolicy()

#### 12.84.3.8 QRectF QwtPlotRasterItem::pixelHint ( const QRectF & *area* ) const [virtual]

Pixel hint.

The geometry of a pixel is used to calculated the resolution and alignment of the rendered image.

Width and height of the hint need to be the horizontal and vertical distances between 2 neighbored points. The center of the hint has to be the position of any point ( it doesn't matter which one ).

Limiting the resolution of the image might significantly improve the performance and heavily reduce the amount of memory when rendering a QImage from the raster data.

The default implementation returns an empty rectangle (QRectF()), meaning, that the image will be rendered in target device ( f.e screen ) resolution.

**Parameters**

| | |
|---|---|
| *area* | In most implementations the resolution of the data doesn't depend on the requested area. |

**Returns**

Bounding rectangle of a pixel

**See Also**

render(), renderImage()

Reimplemented in QwtPlotSpectrogram.

#### 12.84.3.9 virtual QImage QwtPlotRasterItem::renderImage ( const **QwtScaleMap** & *xMap,* const **QwtScaleMap** & *yMap,* const QRectF & *area,* const QSize & *imageSize* ) const `[protected], [pure virtual]`

Render an image.

An implementation of render() might iterate over all pixels of imageRect. Each pixel has to be translated into the corresponding position in scale coordinates using the maps. This position can be used to look up a value in a implementation specific way and to map it into a color.

**Parameters**

| | |
|---|---|
| *xMap* | X-Scale Map |
| *yMap* | Y-Scale Map |
| *area* | Requested area for the image in scale coordinates |
| *imageSize* | Requested size of the image |

**Returns**

Rendered image

Implemented in QwtPlotSpectrogram.

#### 12.84.3.10 void QwtPlotRasterItem::setAlpha ( int *alpha* )

Set an alpha value for the raster data.

Often a plot has several types of raster data organized in layers. ( f.e a geographical map, with weather statistics ). Using setAlpha() raster items can be stacked easily.

The alpha value is a value [0, 255] to control the transparency of the image. 0 represents a fully transparent color, while 255 represents a fully opaque color.

**Parameters**

| | |
|---|---|
| *alpha* | Alpha value |

- alpha $>=$ 0
  All alpha values of the pixels returned by renderImage() will be set to alpha, beside those with an alpha value of 0 (invalid pixels).
- alpha $<$ 0 The alpha values returned by renderImage() are not changed.

The default alpha value is -1.

**See Also**

alpha()

#### 12.84.3.11 void QwtPlotRasterItem::setCachePolicy ( **QwtPlotRasterItem::CachePolicy** *policy* )

Change the cache policy

The default policy is NoCache

**Parameters**

| | |
|---|---|
| *policy* | Cache policy |

**See Also**

CachePolicy, cachePolicy()

#### 12.84.3.12 void QwtPlotRasterItem::setPaintAttribute ( **PaintAttribute** *attribute,* bool *on* = `true` )

Specify an attribute how to draw the raster item

**Parameters**

| | |
|---|---|
| *attribute* | Paint attribute |
| *on* | On/Off /sa PaintAttribute, testPaintAttribute() |

#### 12.84.3.13 bool QwtPlotRasterItem::testPaintAttribute ( PaintAttribute *attribute* ) const

**Returns**

True, when attribute is enabled

**See Also**

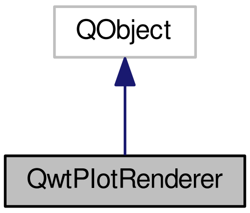
PaintAttribute, setPaintAttribute()

## 12.85 QwtPlotRenderer Class Reference

Renderer for exporting a plot to a document, a printer or anything else, that is supported by QPainter/QPaintDevice.

```
#include <qwt_plot_renderer.h>
```

Inheritance diagram for QwtPlotRenderer:



**Public Types**

- enum DiscardFlag {
  DiscardNone = 0x00, DiscardBackground = 0x01, DiscardTitle = 0x02, DiscardLegend = 0x04,
  DiscardCanvasBackground = 0x08, DiscardFooter = 0x10, DiscardCanvasFrame = 0x20 }

  *Disard flags.*
- enum LayoutFlag { DefaultLayout = 0x00, FrameWithScales = 0x01 }

  *Layout flags.*
- typedef QFlags< DiscardFlag > DiscardFlags

  *Disard flags.*
- typedef QFlags< LayoutFlag > LayoutFlags

  *Layout flags.*

**Public Member Functions**

- QwtPlotRenderer (QObject ∗=NULL)
- virtual ∼QwtPlotRenderer ()

  *Destructor.*

- void setDiscardFlag (DiscardFlag flag, bool on=true)
- bool testDiscardFlag (DiscardFlag flag) const
- void setDiscardFlags (DiscardFlags flags)
- DiscardFlags discardFlags () const
- void setLayoutFlag (LayoutFlag flag, bool on=true)
- bool testLayoutFlag (LayoutFlag flag) const
- void setLayoutFlags (LayoutFlags flags)
- LayoutFlags layoutFlags () const
- void renderDocument (QwtPlot ∗, const QString &fileName, const QSizeF &sizeMM, int resolution=85)
- void renderDocument (QwtPlot ∗, const QString &fileName, const QString &format, const QSizeF &sizeMM, int resolution=85)
- void renderTo (QwtPlot ∗, QPrinter &) const

  *Render the plot to a QPrinter.*
- void renderTo (QwtPlot ∗, QPaintDevice &p) const

  *Render the plot to a `QPaintDevice`.*
- virtual void render (QwtPlot ∗, QPainter ∗, const QRectF &rect) const
- virtual void renderTitle (const QwtPlot ∗, QPainter ∗, const QRectF &) const
- virtual void renderFooter (const QwtPlot ∗, QPainter ∗, const QRectF &) const
- virtual void renderScale (const QwtPlot ∗, QPainter ∗, int axisId, int startDist, int endDist, int baseDist, const QRectF &) const

  *Paint a scale into a given rectangle. Paint the scale into a given rectangle.*
- virtual void renderCanvas (const QwtPlot ∗, QPainter ∗, const QRectF &canvasRect, const QwtScaleMap ∗maps) const
- virtual void renderLegend (const QwtPlot ∗, QPainter ∗, const QRectF &) const
- bool exportTo (QwtPlot ∗, const QString &documentName, const QSizeF &sizeMM=QSizeF(300, 200), int resolution=85)

  *Execute a file dialog and render the plot to the selected file.*

### 12.85.1 Detailed Description

Renderer for exporting a plot to a document, a printer or anything else, that is supported by QPainter/QPaintDevice.

### 12.85.2 Member Enumeration Documentation

#### 12.85.2.1 enum QwtPlotRenderer::DiscardFlag

Disard flags.

**Enumerator**

***DiscardNone*** Render all components of the plot.

***DiscardBackground*** Don't render the background of the plot.

***DiscardTitle*** Don't render the title of the plot.

***DiscardLegend*** Don't render the legend of the plot.

***DiscardCanvasBackground*** Don't render the background of the canvas.

***DiscardFooter*** Don't render the footer of the plot.

***DiscardCanvasFrame*** Don't render the frame of the canvas

**Note**

This flag has no effect when using style sheets, where the frame is part of the background

#### 12.85.2.2 enum QwtPlotRenderer::LayoutFlag

Layout flags.

**See Also**

setLayoutFlag(), testLayoutFlag()

**Enumerator**

***DefaultLayout*** Use the default layout as on screen.

***FrameWithScales*** Instead of the scales a box is painted around the plot canvas, where the scale ticks are aligned to.

### 12.85.3 Constructor & Destructor Documentation

#### 12.85.3.1 QwtPlotRenderer::QwtPlotRenderer ( QObject ∗ *parent* = `NULL` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *parent* | Parent object |

### 12.85.4 Member Function Documentation

#### 12.85.4.1 QwtPlotRenderer::DiscardFlags QwtPlotRenderer::discardFlags ( ) const

**Returns**

Flags, indicating what to discard from rendering

**See Also**

DiscardFlag, setDiscardFlags(), setDiscardFlag(), testDiscardFlag()

#### 12.85.4.2 bool QwtPlotRenderer::exportTo ( QwtPlot ∗ *plot*, const QString & *documentName*, const QSizeF & *sizeMM* = `QSizeF( 300, 200 )`, int *resolution* = `85` )

Execute a file dialog and render the plot to the selected file.

**Parameters**

| | |
|---|---|
| *plot* | Plot widget |
| *documentName* | Default document name |
| *sizeMM* | Size for the document in millimeters. |
| *resolution* | Resolution in dots per Inch (dpi) |

**Returns**

True, when exporting was successful

**See Also**

renderDocument()

#### 12.85.4.3 QwtPlotRenderer::LayoutFlags QwtPlotRenderer::layoutFlags ( ) const

**Returns**

Layout flags

**See Also**

LayoutFlag, setLayoutFlags(), setLayoutFlag(), testLayoutFlag()

#### 12.85.4.4 void QwtPlotRenderer::render ( QwtPlot ∗ *plot,* QPainter ∗ *painter,* const QRectF & *plotRect* ) const [virtual]

Paint the contents of a QwtPlot instance into a given rectangle.

**Parameters**

| | |
|---|---|
| *plot* | Plot to be rendered |
| *painter* | Painter |
| *plotRect* | Bounding rectangle |

**See Also**

renderDocument(), renderTo(), QwtPainter::setRoundingAlignment()

#### 12.85.4.5 void QwtPlotRenderer::renderCanvas ( const QwtPlot ∗ *plot,* QPainter ∗ *painter,* const QRectF & *canvasRect,* const QwtScaleMap ∗ *map* ) const [virtual]

Render the canvas into a given rectangle.

**Parameters**

| | |
|---|---|
| *plot* | Plot widget |
| *painter* | Painter |
| *map* | Maps mapping between plot and paint device coordinates |
| *canvasRect* | Canvas rectangle |

#### 12.85.4.6 void QwtPlotRenderer::renderDocument ( QwtPlot ∗ *plot,* const QString & *fileName,* const QSizeF & *sizeMM,* int *resolution* = 85 )

Render a plot to a file

The format of the document will be auto-detected from the suffix of the file name.

**Parameters**

| | |
|---|---|
| *plot* | Plot widget |
| *fileName* | Path of the file, where the document will be stored |
| *sizeMM* | Size for the document in millimeters. |
| *resolution* | Resolution in dots per Inch (dpi) |

#### 12.85.4.7 void QwtPlotRenderer::renderDocument ( QwtPlot ∗ *plot,* const QString & *fileName,* const QString & *format,* const QSizeF & *sizeMM,* int *resolution* = 85 )

Render a plot to a file

Supported formats are:

- pdf

  Portable Document Format PDF

- ps

  Postcript

- svg

  Scalable Vector Graphics SVG

- all image formats supported by Qt

  see QImageWriter::supportedImageFormats()

Scalable vector graphic formats like PDF or SVG are superior to raster graphics formats.

**Parameters**

| | |
|---|---|
| *plot* | Plot widget |
| *fileName* | Path of the file, where the document will be stored |
| *format* | Format for the document |
| *sizeMM* | Size for the document in millimeters. |
| *resolution* | Resolution in dots per Inch (dpi) |

**See Also**

renderTo(), render(), QwtPainter::setRoundingAlignment()

#### 12.85.4.8 void QwtPlotRenderer::renderFooter ( const **QwtPlot** ∗ *plot,* QPainter ∗ *painter,* const QRectF & *rect* ) const `[virtual]`

Render the footer into a given rectangle.

**Parameters**

| | |
|---|---|
| *plot* | Plot widget |
| *painter* | Painter |
| *rect* | Bounding rectangle |

#### 12.85.4.9 void QwtPlotRenderer::renderLegend ( const **QwtPlot** ∗ *plot,* QPainter ∗ *painter,* const QRectF & *rect* ) const `[virtual]`

Render the legend into a given rectangle.

**Parameters**

| | |
|---|---|
| *plot* | Plot widget |
| *painter* | Painter |
| *rect* | Bounding rectangle |

#### 12.85.4.10 void QwtPlotRenderer::renderScale ( const **QwtPlot** ∗ *plot,* QPainter ∗ *painter,* int *axisId,* int *startDist,* int *endDist,* int *baseDist,* const QRectF & *rect* ) const `[virtual]`

Paint a scale into a given rectangle. Paint the scale into a given rectangle.

**Parameters**

| | |
|---|---|
| *plot* | Plot widget |
| *painter* | Painter |
| *axisId* | Axis |

| | |
|---|---|
| *startDist* | Start border distance |
| *endDist* | End border distance |
| *baseDist* | Base distance |
| *rect* | Bounding rectangle |

#### 12.85.4.11 void QwtPlotRenderer::renderTitle ( const **QwtPlot** ∗ *plot,* QPainter ∗ *painter,* const QRectF & *rect* ) const `[virtual]`

Render the title into a given rectangle.

**Parameters**

| | |
|---|---|
| *plot* | Plot widget |
| *painter* | Painter |
| *rect* | Bounding rectangle |

#### 12.85.4.12 void QwtPlotRenderer::renderTo ( **QwtPlot** ∗ *plot,* QPrinter & *printer* ) const

Render the plot to a QPrinter.

This function renders the contents of a QwtPlot instance to `QPaintDevice` object. The size is derived from the printer metrics.

**Parameters**

| | |
|---|---|
| *plot* | Plot to be rendered |
| *printer* | Printer to paint on |

**See Also**

renderDocument(), render(), QwtPainter::setRoundingAlignment()

#### 12.85.4.13 void QwtPlotRenderer::renderTo ( **QwtPlot** ∗ *plot,* QPaintDevice & *paintDevice* ) const

Render the plot to a `QPaintDevice`.

This function renders the contents of a QwtPlot instance to `QPaintDevice` object. The target rectangle is derived from its device metrics.

**Parameters**

| | |
|---|---|
| *plot* | Plot to be rendered |
| *paintDevice* | device to paint on, f.e a QImage |

**See Also**

renderDocument(), render(), QwtPainter::setRoundingAlignment()

#### 12.85.4.14 void QwtPlotRenderer::setDiscardFlag ( **DiscardFlag** *flag,* bool *on* = `true` )

Change a flag, indicating what to discard from rendering

**Parameters**

| | |
|---|---|
| *flag* | Flag to change |
| *on* | On/Off |

**See Also**

DiscardFlag, testDiscardFlag(), setDiscardFlags(), discardFlags()

#### 12.85.4.15 void QwtPlotRenderer::setDiscardFlags ( DiscardFlags *flags* )

Set the flags, indicating what to discard from rendering

**Parameters**

| | |
|---|---|
| *flags* | Flags |

**See Also**

DiscardFlag, setDiscardFlag(), testDiscardFlag(), discardFlags()

#### 12.85.4.16 void QwtPlotRenderer::setLayoutFlag ( **LayoutFlag** *flag*, bool *on* = `true` )

Change a layout flag

**Parameters**

| | |
|---|---|
| *flag* | Flag to change |
| *on* | On/Off |

**See Also**

LayoutFlag, testLayoutFlag(), setLayoutFlags(), layoutFlags()

#### 12.85.4.17 void QwtPlotRenderer::setLayoutFlags ( **LayoutFlags** *flags* )

Set the layout flags

**Parameters**

| | |
|---|---|
| *flags* | Flags |

**See Also**

LayoutFlag, setLayoutFlag(), testLayoutFlag(), layoutFlags()

#### 12.85.4.18 bool QwtPlotRenderer::testDiscardFlag ( **DiscardFlag** *flag* ) const

**Returns**

True, if flag is enabled.

**Parameters**

| | |
|---|---|
| *flag* | Flag to be tested |

**See Also**

DiscardFlag, setDiscardFlag(), setDiscardFlags(), discardFlags()

#### 12.85.4.19 bool QwtPlotRenderer::testLayoutFlag ( **LayoutFlag** *flag* ) const

**Returns**

True, if flag is enabled.

**Parameters**

| | |
|---|---|
| *flag* | Flag to be tested |

**See Also**

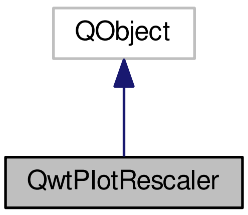
LayoutFlag, setLayoutFlag(), setLayoutFlags(), layoutFlags()

## 12.86 QwtPlotRescaler Class Reference

QwtPlotRescaler takes care of fixed aspect ratios for plot scales.

```
#include <qwt_plot_rescaler.h>
```

Inheritance diagram for QwtPlotRescaler:



**Public Types**

- enum RescalePolicy { Fixed, Expanding, Fitting }
- enum ExpandingDirection { ExpandUp, ExpandDown, ExpandBoth }

**Public Member Functions**

- QwtPlotRescaler (QWidget ∗canvas, int referenceAxis=QwtPlot::xBottom, RescalePolicy=Expanding)
- virtual ∼QwtPlotRescaler ()

  *Destructor.*
- void setEnabled (bool)

  *En/disable the rescaler.*
- bool isEnabled () const
- void setRescalePolicy (RescalePolicy)
- RescalePolicy rescalePolicy () const
- void setExpandingDirection (ExpandingDirection)
- void setExpandingDirection (int axis, ExpandingDirection)
- ExpandingDirection expandingDirection (int axis) const
- void setReferenceAxis (int axis)
- int referenceAxis () const
- void setAspectRatio (double ratio)
- void setAspectRatio (int axis, double ratio)
- double aspectRatio (int axis) const
- void setIntervalHint (int axis, const QwtInterval &)
- QwtInterval intervalHint (int axis) const
- QWidget ∗ canvas ()

- const QWidget ∗ canvas () const
- QwtPlot ∗ plot ()
- const QwtPlot ∗ plot () const
- virtual bool eventFilter (QObject ∗, QEvent ∗)

  *Event filter for the plot canvas.*
- void rescale () const

  *Adjust the plot axes scales.*

**Protected Member Functions**

- virtual void canvasResizeEvent (QResizeEvent ∗)
- virtual void rescale (const QSize &oldSize, const QSize &newSize) const
- virtual QwtInterval expandScale (int axis, const QSize &oldSize, const QSize &newSize) const
- virtual QwtInterval syncScale (int axis, const QwtInterval &reference, const QSize &size) const
- virtual void updateScales (QwtInterval intervals[QwtPlot::axisCnt]) const
- Qt::Orientation orientation (int axis) const
- QwtInterval interval (int axis) const
- QwtInterval expandInterval (const QwtInterval &, double width, ExpandingDirection) const

### 12.86.1 Detailed Description

QwtPlotRescaler takes care of fixed aspect ratios for plot scales.

QwtPlotRescaler auto adjusts the axes of a QwtPlot according to fixed aspect ratios.

### 12.86.2 Member Enumeration Documentation

#### 12.86.2.1 enum QwtPlotRescaler::ExpandingDirection

When rescalePolicy() is set to Expanding its direction depends on ExpandingDirection

**Enumerator**

***ExpandUp*** The upper limit of the scale is adjusted.

***ExpandDown*** The lower limit of the scale is adjusted.

***ExpandBoth*** Both limits of the scale are adjusted.

#### 12.86.2.2 enum QwtPlotRescaler::RescalePolicy

The rescale policy defines how to rescale the reference axis and their depending axes.

**See Also**

ExpandingDirection, setIntervalHint()

**Enumerator**

***Fixed*** The interval of the reference axis remains unchanged, when the geometry of the canvas changes. All other axes will be adjusted according to their aspect ratio.

***Expanding*** The interval of the reference axis will be shrunk/expanded, when the geometry of the canvas changes. All other axes will be adjusted according to their aspect ratio.

The interval, that is represented by one pixel is fixed.

***Fitting*** The intervals of the axes are calculated, so that all axes include their interval hint.

### 12.86.3 Constructor & Destructor Documentation

#### 12.86.3.1 QwtPlotRescaler::QwtPlotRescaler ( QWidget ∗ *canvas*, int *referenceAxis* = QwtPlot::xBottom, RescalePolicy *policy* = Expanding ) [explicit]

Constructor

**Parameters**

| | |
|---:|---|
| *canvas* | Canvas |
| *referenceAxis* | Reference axis, see RescalePolicy |
| *policy* | Rescale policy |

**See Also**

setRescalePolicy(), setReferenceAxis()

#### 12.86.4 Member Function Documentation

##### 12.86.4.1 double QwtPlotRescaler::aspectRatio ( int *axis* ) const

**Returns**

Aspect ratio between an axis and the reference axis.

**Parameters**

| | |
|---:|---|
| *axis* | Axis index ( see QwtPlot::AxisId ) |

**See Also**

setAspectRatio()

##### 12.86.4.2 QWidget ∗ QwtPlotRescaler::canvas ( )

**Returns**

plot canvas

##### 12.86.4.3 const QWidget ∗ QwtPlotRescaler::canvas ( ) const

**Returns**

plot canvas

##### 12.86.4.4 void QwtPlotRescaler::canvasResizeEvent ( QResizeEvent ∗ *event* ) `[protected]`, `[virtual]`

Event handler for resize events of the plot canvas

**Parameters**

| | |
|---:|---|
| *event* | Resize event |

**See Also**

rescale()

##### 12.86.4.5 QwtPlotRescaler::ExpandingDirection QwtPlotRescaler::expandingDirection ( int *axis* ) const

**Returns**

Direction in which an axis should be expanded

**Parameters**

| | |
|---|---|
| *axis* | Axis index ( see QwtPlot::AxisId ) |

**See Also**

setExpandingDirection()

#### 12.86.4.6 QwtInterval QwtPlotRescaler::expandInterval ( const QwtInterval & *interval*, double *width*, ExpandingDirection *direction* ) const [protected]

Expand the interval

**Parameters**

| | |
|---|---|
| *interval* | Interval to be expanded |
| *width* | Distance to be added to the interval |
| *direction* | Direction of the expand operation |

**Returns**

Expanded interval

#### 12.86.4.7 QwtInterval QwtPlotRescaler::expandScale ( int *axis*, const QSize & *oldSize*, const QSize & *newSize* ) const [protected], [virtual]

Calculate the new scale interval of a plot axis

**Parameters**

| | |
|---|---|
| *axis* | Axis index ( see QwtPlot::AxisId ) |
| *oldSize* | Previous size of the canvas |
| *newSize* | New size of the canvas |

**Returns**

Calculated new interval for the axis

#### 12.86.4.8 QwtInterval QwtPlotRescaler::interval ( int *axis* ) const [protected]

**Parameters**

| | |
|---|---|
| *axis* | Axis index ( see QwtPlot::AxisId ) |

**Returns**

Normalized interval of an axis

#### 12.86.4.9 QwtInterval QwtPlotRescaler::intervalHint ( int *axis* ) const

**Parameters**

| | |
|---|---|
| *axis* | Axis, see QwtPlot::Axis |

**Returns**

Interval hint

**See Also**

setIntervalHint(), RescalePolicy

#### 12.86.4.10 bool QwtPlotRescaler::isEnabled ( ) const

**Returns**

true when enabled, false otherwise

**See Also**

setEnabled, eventFilter()

#### 12.86.4.11 Qt::Orientation QwtPlotRescaler::orientation ( int *axis* ) const [protected]

**Returns**

Orientation of an axis

**Parameters**

| | |
|---|---|
| *axis* | Axis index ( see QwtPlot::AxisId ) |

#### 12.86.4.12 QwtPlot ∗ QwtPlotRescaler::plot ( )

**Returns**

plot widget

#### 12.86.4.13 const QwtPlot ∗ QwtPlotRescaler::plot ( ) const

**Returns**

plot widget

#### 12.86.4.14 int QwtPlotRescaler::referenceAxis ( ) const

**Returns**

Reference axis ( see RescalePolicy )

**See Also**

setReferenceAxis()

#### 12.86.4.15 void QwtPlotRescaler::rescale ( const QSize & *oldSize*, const QSize & *newSize* ) const [protected], [virtual]

Adjust the plot axes scales

**Parameters**

| | |
|---|---|
| *oldSize* | Previous size of the canvas |
| *newSize* | New size of the canvas |

#### 12.86.4.16 QwtPlotRescaler::RescalePolicy QwtPlotRescaler::rescalePolicy ( ) const

**Returns**

Rescale policy

**See Also**

setRescalePolicy()

#### 12.86.4.17 void QwtPlotRescaler::setAspectRatio ( double *ratio* )

Set the aspect ratio between the scale of the reference axis and the other scales. The default ratio is 1.0

**Parameters**

| | |
|---|---|
| *ratio* | Aspect ratio |

**See Also**

aspectRatio()

#### 12.86.4.18 void QwtPlotRescaler::setAspectRatio ( int *axis*, double *ratio* )

Set the aspect ratio between the scale of the reference axis and another scale. The default ratio is 1.0

**Parameters**

| | |
|---|---|
| *axis* | Axis index ( see QwtPlot::AxisId ) |
| *ratio* | Aspect ratio |

**See Also**

aspectRatio()

#### 12.86.4.19 void QwtPlotRescaler::setEnabled ( bool *on* )

En/disable the rescaler.

When enabled is true an event filter is installed for the canvas, otherwise the event filter is removed.

**Parameters**

| | |
|---|---|
| *on* | true or false |

**See Also**

isEnabled(), eventFilter()

#### 12.86.4.20 void QwtPlotRescaler::setExpandingDirection ( ExpandingDirection *direction* )

Set the direction in which all axis should be expanded

**Parameters**

| | |
|---|---|
| *direction* | Direction |

**See Also**

expandingDirection()

#### 12.86.4.21 void QwtPlotRescaler::setExpandingDirection ( int *axis*, ExpandingDirection *direction* )

Set the direction in which an axis should be expanded

**Parameters**

| | |
|---|---|
| *axis* | Axis index ( see QwtPlot::AxisId ) |
| *direction* | Direction |

**See Also**

expandingDirection()

#### 12.86.4.22 void QwtPlotRescaler::setIntervalHint ( int *axis*, const QwtInterval & *interval* )

Set an interval hint for an axis

In Fitting mode, the hint is used as minimal interval that always needs to be displayed.

**Parameters**

| | |
|---:|---|
| *axis* | Axis, see QwtPlot::Axis |
| *interval* | Axis |

**See Also**

intervalHint(), RescalePolicy

#### 12.86.4.23 void QwtPlotRescaler::setReferenceAxis ( int *axis* )

Set the reference axis ( see RescalePolicy )

**Parameters**

| | |
|---:|---|
| *axis* | Axis index ( QwtPlot::Axis ) |

**See Also**

referenceAxis()

#### 12.86.4.24 void QwtPlotRescaler::setRescalePolicy ( **RescalePolicy** *policy* )

Change the rescale policy

**Parameters**

| | |
|---:|---|
| *policy* | Rescale policy |

**See Also**

rescalePolicy()

#### 12.86.4.25 **QwtInterval** QwtPlotRescaler::syncScale ( int *axis,* const **QwtInterval** & *reference,* const QSize & *size* ) const [protected], [virtual]

Synchronize an axis scale according to the scale of the reference axis

**Parameters**

| | |
|---:|---|
| *axis* | Axis index ( see QwtPlot::AxisId ) |
| *reference* | Interval of the reference axis |
| *size* | Size of the canvas |

**Returns**

New interval for axis

#### 12.86.4.26 void QwtPlotRescaler::updateScales ( **QwtInterval** *intervals[QwtPlot::axisCnt]* ) const [protected], [virtual]

Update the axes scales

**Parameters**

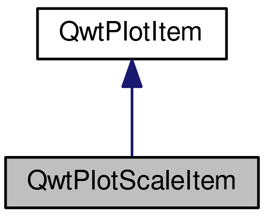
| | |
|---:|---|
| *intervals* | Scale intervals |

## 12.87 QwtPlotScaleItem Class Reference

A class which draws a scale inside the plot canvas.

```
#include <qwt_plot_scaleitem.h>
```

Inheritance diagram for QwtPlotScaleItem:



### Public Member Functions

- QwtPlotScaleItem (QwtScaleDraw::Alignment=QwtScaleDraw::BottomScale, const double pos=0.0)

  *Constructor for scale item at the position pos.*
- virtual ∼QwtPlotScaleItem ()

  *Destructor.*
- virtual int rtti () const
- void setScaleDiv (const QwtScaleDiv &)

  *Assign a scale division.*
- const QwtScaleDiv & scaleDiv () const
- void setScaleDivFromAxis (bool on)
- bool isScaleDivFromAxis () const
- void setPalette (const QPalette &)
- QPalette palette () const
- void setFont (const QFont &)
- QFont font () const
- void setScaleDraw (QwtScaleDraw ∗)

  *Set a scale draw.*
- const QwtScaleDraw ∗ scaleDraw () const
- QwtScaleDraw ∗ scaleDraw ()
- void setPosition (double pos)
- double position () const
- void setBorderDistance (int numPixels)

  *Align the scale to the canvas.*
- int borderDistance () const
- void setAlignment (QwtScaleDraw::Alignment)
- virtual void draw (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &rect) const

  *Draw the scale.*
- virtual void updateScaleDiv (const QwtScaleDiv &, const QwtScaleDiv &)

  *Update the item to changes of the axes scale division.*

#### Additional Inherited Members

### 12.87.1 Detailed Description

A class which draws a scale inside the plot canvas.

QwtPlotScaleItem can be used to draw an axis inside the plot canvas. It might by synchronized to one of the axis of the plot, but can also display its own ticks and labels.

It is allowed to synchronize the scale item with a disabled axis. In plots with vertical and horizontal scale items, it might be necessary to remove ticks at the intersections, by overloading updateScaleDiv().

The scale might be at a specific position (f.e 0.0) or it might be aligned to a canvas border.

**Example**

The following example shows how to replace the left axis, by a scale item at the x position 0.0.

```
QwtPlotScaleItem *scaleItem =
    new QwtPlotScaleItem(QwtScaleDraw::RightScale, 0.0);
scaleItem->setFont(plot->axisWidget(QwtPlot::yLeft)->font());
scaleItem->attach(plot);

plot->enableAxis(QwtPlot::yLeft, false);
```

### 12.87.2 Constructor & Destructor Documentation

#### 12.87.2.1 QwtPlotScaleItem::QwtPlotScaleItem ( QwtScaleDraw::Alignment *alignment* = QwtScaleDraw::BottomScale, const double *pos* = 0.0 ) [explicit]

Constructor for scale item at the position pos.

**Parameters**

| | |
|---|---|
| *alignment* | In case of QwtScaleDraw::BottomScale or QwtScaleDraw::TopScale the scale item is corresponding to the xAxis(), otherwise it corresponds to the yAxis(). |
| *pos* | x or y position, depending on the corresponding axis. |

**See Also**

setPosition(), setAlignment()

### 12.87.3 Member Function Documentation

#### 12.87.3.1 int QwtPlotScaleItem::borderDistance ( ) const

**Returns**

Distance from a canvas border

**See Also**

setBorderDistance(), setPosition()

#### 12.87.3.2 QFont QwtPlotScaleItem::font ( ) const

**Returns**

tick label font

**See Also**

setFont()

#### 12.87.3.3 bool QwtPlotScaleItem::isScaleDivFromAxis ( ) const

**Returns**

True, if the synchronization of the scale division with the corresponding axis is enabled.

**See Also**

setScaleDiv(), setScaleDivFromAxis()

#### 12.87.3.4 QPalette QwtPlotScaleItem::palette ( ) const

**Returns**

palette

**See Also**

setPalette()

#### 12.87.3.5 double QwtPlotScaleItem::position ( ) const

**Returns**

Position of the scale

**See Also**

setPosition(), setAlignment()

#### 12.87.3.6 int QwtPlotScaleItem::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotScale

Reimplemented from QwtPlotItem.

#### 12.87.3.7 const QwtScaleDiv & QwtPlotScaleItem::scaleDiv ( ) const

**Returns**

Scale division

#### 12.87.3.8 const QwtScaleDraw * QwtPlotScaleItem::scaleDraw ( ) const

**Returns**

Scale draw

**See Also**

setScaleDraw()

#### 12.87.3.9 QwtScaleDraw * QwtPlotScaleItem::scaleDraw ( )

**Returns**

Scale draw

**See Also**

setScaleDraw()

#### 12.87.3.10 void QwtPlotScaleItem::setAlignment ( QwtScaleDraw::Alignment *alignment* )

Change the alignment of the scale

The alignment sets the orientation of the scale and the position of the ticks:

- QwtScaleDraw::BottomScale: horizontal, ticks below
- QwtScaleDraw::TopScale: horizontal, ticks above
- QwtScaleDraw::LeftScale: vertical, ticks left
- QwtScaleDraw::RightScale: vertical, ticks right

For horizontal scales the position corresponds to QwtPlotItem::yAxis(), otherwise to QwtPlotItem::xAxis().

**See Also**

scaleDraw(), QwtScaleDraw::alignment(), setPosition()

#### 12.87.3.11 void QwtPlotScaleItem::setBorderDistance ( int *distance* )

Align the scale to the canvas.

If distance is $>=$ 0 the scale will be aligned to a border of the contents rectangle of the canvas. If alignment() is QwtScaleDraw::LeftScale, the scale will be aligned to the right border, if it is QwtScaleDraw::TopScale it will be aligned to the bottom (and vice versa),

If distance is $<$ 0 the scale will be at the position().

**Parameters**

| | |
|---|---|
| *distance* | Number of pixels between the canvas border and the backbone of the scale. |

**See Also**

setPosition(), borderDistance()

#### 12.87.3.12 void QwtPlotScaleItem::setFont ( const QFont & *font* )

Change the tick label font

**See Also**

font()

#### 12.87.3.13 void QwtPlotScaleItem::setPalette ( const QPalette & *palette* )

Set the palette

**See Also**

QwtAbstractScaleDraw::draw(), palette()

#### 12.87.3.14 void QwtPlotScaleItem::setPosition ( double *pos* )

Change the position of the scale

The position is interpreted as y value for horizontal axes and as x value for vertical axes.

The border distance is set to -1.

**Parameters**

| | |
|---|---|
| *pos* | New position |

**See Also**

position(), setAlignment()

### 12.87.3.15 void QwtPlotScaleItem::setScaleDiv ( const QwtScaleDiv & *scaleDiv* )

Assign a scale division.

When assigning a scaleDiv the scale division won't be synchronized with the corresponding axis anymore.

**Parameters**

| | |
|---|---|
| *scaleDiv* | Scale division |

**See Also**

scaleDiv(), setScaleDivFromAxis(), isScaleDivFromAxis()

### 12.87.3.16 void QwtPlotScaleItem::setScaleDivFromAxis ( bool *on* )

Enable/Disable the synchronization of the scale division with the corresponding axis.

**Parameters**

| | |
|---|---|
| *on* | true/false |

**See Also**

isScaleDivFromAxis()

### 12.87.3.17 void QwtPlotScaleItem::setScaleDraw ( QwtScaleDraw ∗ *scaleDraw* )

Set a scale draw.

**Parameters**

| | |
|---|---|
| *scaleDraw* | object responsible for drawing scales. |

The main use case for replacing the default QwtScaleDraw is to overload QwtAbstractScaleDraw::label, to replace or swallow tick labels.

**See Also**

scaleDraw()

### 12.87.3.18 void QwtPlotScaleItem::updateScaleDiv ( const QwtScaleDiv & *xScaleDiv,* const QwtScaleDiv & *yScaleDiv* ) `[virtual]`

Update the item to changes of the axes scale division.

In case of isScaleDivFromAxis(), the scale draw is synchronized to the correspond axis.

**Parameters**

| | |
|---|---|
| *xScaleDiv* | Scale division of the x-axis |
| *yScaleDiv* | Scale division of the y-axis |

**See Also**

QwtPlot::updateAxes()

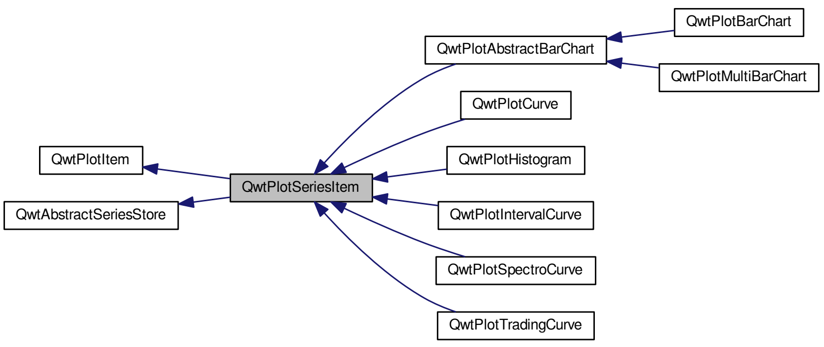
Reimplemented from QwtPlotItem.

## 12.88 QwtPlotSeriesItem Class Reference

Base class for plot items representing a series of samples.

```
#include <qwt_plot_seriesitem.h>
```

Inheritance diagram for QwtPlotSeriesItem:



**Public Member Functions**

- QwtPlotSeriesItem (const QString &title=QString::null)
- QwtPlotSeriesItem (const QwtText &title)
- virtual ∼QwtPlotSeriesItem ()

  *Destructor.*
- void setOrientation (Qt::Orientation)
- Qt::Orientation orientation () const
- virtual void draw (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &) const

  *Draw the complete series.*
- virtual void drawSeries (QPainter ∗painter, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const =0
- virtual QRectF boundingRect () const
- virtual void updateScaleDiv (const QwtScaleDiv &, const QwtScaleDiv &)

  *Update the item to changes of the axes scale division.*

**Protected Member Functions**

- virtual void dataChanged ()

  *dataChanged() indicates, that the series has been changed.*

**Additional Inherited Members**

### 12.88.1 Detailed Description

Base class for plot items representing a series of samples.

### 12.88.2 Constructor & Destructor Documentation

#### 12.88.2.1 QwtPlotSeriesItem::QwtPlotSeriesItem ( const QString & *title* = `QString::null` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

#### 12.88.2.2 QwtPlotSeriesItem::QwtPlotSeriesItem ( const QwtText & *title* ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

### 12.88.3 Member Function Documentation

#### 12.88.3.1 QRectF QwtPlotSeriesItem::boundingRect ( ) const `[virtual]`

**Returns**

An invalid bounding rect: QRectF(1.0, 1.0, -2.0, -2.0)

**Note**

A width or height $< 0.0$ is ignored by the autoscaler

Reimplemented from QwtPlotItem.

Reimplemented in QwtPlotTradingCurve, QwtPlotIntervalCurve, QwtPlotHistogram, QwtPlotBarChart, and QwtPlot-MultiBarChart.

#### 12.88.3.2 void QwtPlotSeriesItem::draw ( QPainter * *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect* ) const `[virtual]`

Draw the complete series.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas |

Implements QwtPlotItem.

#### 12.88.3.3 virtual void QwtPlotSeriesItem::drawSeries ( QPainter * *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect*, int *from*, int *to* ) const `[pure virtual]`

Draw a subset of the samples

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted. If to $<$ 0 the curve will be painted to its last point. |

Implemented in QwtPlotCurve, QwtPlotTradingCurve, QwtPlotIntervalCurve, QwtPlotHistogram, QwtPlotBarChart, QwtPlotMultiBarChart, and QwtPlotSpectroCurve.

#### 12.88.3.4 Qt::Orientation QwtPlotSeriesItem::orientation ( ) const

**Returns**

Orientation of the plot item

**See Also**

setOrientation()

#### 12.88.3.5 void QwtPlotSeriesItem::setOrientation ( Qt::Orientation *orientation* )

Set the orientation of the item.

The orientation() might be used in specific way by a plot item. F.e. a QwtPlotCurve uses it to identify how to display the curve int QwtPlotCurve::Steps or QwtPlotCurve::Sticks style.

**See Also**

orientation()

#### 12.88.3.6 void QwtPlotSeriesItem::updateScaleDiv ( const QwtScaleDiv & *xScaleDiv*, const QwtScaleDiv & *yScaleDiv* ) [virtual]

Update the item to changes of the axes scale division.

Update the item, when the axes of plot have changed. The default implementation does nothing, but items that depend on the scale division (like QwtPlotGrid()) have to reimplement updateScaleDiv()

updateScaleDiv() is only called when the ScaleInterest interest is enabled. The default implementation does nothing.

**Parameters**

| | |
|---:|---|
| *xScaleDiv* | Scale division of the x-axis |
| *yScaleDiv* | Scale division of the y-axis |

**See Also**

QwtPlot::updateAxes(), ScaleInterest

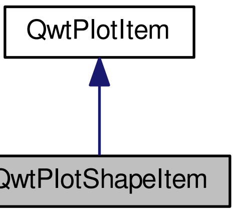
Reimplemented from QwtPlotItem.

## 12.89 QwtPlotShapeItem Class Reference

A plot item, which displays any graphical shape, that can be defined by a QPainterPath.

```
#include <qwt_plot_shapeitem.h>
```

Inheritance diagram for QwtPlotShapeItem:



### Public Types

- enum PaintAttribute { ClipPolygons = 0x01 }
- enum LegendMode { LegendShape, LegendColor }

  *Mode how to display the item on the legend.*
- typedef QFlags< PaintAttribute > PaintAttributes

  *Paint attributes.*

### Public Member Functions

- QwtPlotShapeItem (const QString &title=QString::null)

  *Constructor.*
- QwtPlotShapeItem (const QwtText &title)

  *Constructor.*
- virtual ∼QwtPlotShapeItem ()

  *Destructor.*
- void setPaintAttribute (PaintAttribute, bool on=true)
- bool testPaintAttribute (PaintAttribute) const
- void setLegendMode (LegendMode)
- LegendMode legendMode () const
- void setRect (const QRectF &)

  *Set a path built from a rectangle.*
- void setPolygon (const QPolygonF &)

  *Set a path built from a polygon.*
- void setShape (const QPainterPath &)

  *Set the shape to be displayed.*
- QPainterPath shape () const
- void setPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setPen (const QPen &)

  *Assign a pen.*
- QPen pen () const
- void setBrush (const QBrush &)
- QBrush brush () const
- void setRenderTolerance (double)

  *Set the tolerance for the weeding optimization.*
- double renderTolerance () const

- virtual QRectF boundingRect () const

  *Bounding rectangle of the shape.*
- virtual void draw (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &rect) const
- virtual QwtGraphic legendIcon (int index, const QSizeF &) const
- virtual int rtti () const

#### Additional Inherited Members

### 12.89.1 Detailed Description

A plot item, which displays any graphical shape, that can be defined by a QPainterPath.

A QPainterPath is a shape composed from intersecting and uniting regions, rectangles, ellipses or irregular areas defined by lines, and curves. QwtPlotShapeItem displays a shape with a pen and brush.

QwtPlotShapeItem offers a couple of optimizations like clipping or weeding. These algorithms need to convert the painter path into polygons that might be less performant for paths built from curves and ellipses.

**See Also**

QwtPlotZone

### 12.89.2 Member Enumeration Documentation

#### 12.89.2.1 enum QwtPlotShapeItem::LegendMode

Mode how to display the item on the legend.

**Enumerator**

***LegendShape*** Display a scaled down version of the shape.

***LegendColor*** Display a filled rectangle.

#### 12.89.2.2 enum QwtPlotShapeItem::PaintAttribute

Attributes to modify the drawing algorithm. The default disables all attributes

**See Also**

setPaintAttribute(), testPaintAttribute()

**Enumerator**

***ClipPolygons*** Clip polygons before painting them. In situations, where points are far outside the visible area (f.e when zooming deep) this might be a substantial improvement for the painting performance

But polygon clipping will convert the painter path into polygons what might introduce a negative impact on the performance of paths composed from curves or ellipses.

### 12.89.3 Constructor & Destructor Documentation

#### 12.89.3.1 QwtPlotShapeItem::QwtPlotShapeItem ( const QString & *title* = `QString::null` ) `[explicit]`

Constructor.

Sets the following item attributes:

- QwtPlotItem::AutoScale: true
- QwtPlotItem::Legend: false

**Parameters**

| | |
|---|---|
| *title* | Title |

#### 12.89.3.2 QwtPlotShapeItem::QwtPlotShapeItem ( const QwtText & *title* ) [explicit]

Constructor.

Sets the following item attributes:

- QwtPlotItem::AutoScale: true
- QwtPlotItem::Legend: false

**Parameters**

| | |
|---|---|
| *title* | Title |

### 12.89.4 Member Function Documentation

#### 12.89.4.1 QBrush QwtPlotShapeItem::brush ( ) const

**Returns**

Brush used to fill the shape

**See Also**

setBrush(), pen()

#### 12.89.4.2 void QwtPlotShapeItem::draw ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect* ) const [virtual]

Draw the shape item

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | X-Scale Map |
| *yMap* | Y-Scale Map |
| *canvasRect* | Contents rect of the plot canvas |

Implements QwtPlotItem.

#### 12.89.4.3 QwtGraphic QwtPlotShapeItem::legendIcon ( int *index*, const QSizeF & *size* ) const [virtual]

**Returns**

A rectangle filled with the color of the brush ( or the pen )

**Parameters**

| | |
|---|---|
| *index* | Index of the legend entry ( usually there is only one ) |
| *size* | Icon size |

**See Also**

setLegendIconSize(), legendData()

Reimplemented from QwtPlotItem.

#### 12.89.4.4 QwtPlotShapeItem::LegendMode QwtPlotShapeItem::legendMode ( ) const

**Returns**

Mode how to represent the item on the legend

**See Also**

legendMode()

#### 12.89.4.5 QPen QwtPlotShapeItem::pen ( ) const

**Returns**

Pen used to draw the outline of the shape

**See Also**

setPen(), brush()

#### 12.89.4.6 double QwtPlotShapeItem::renderTolerance ( ) const

**Returns**

Tolerance for the weeding optimization

**See Also**

setRenderTolerance()

#### 12.89.4.7 int QwtPlotShapeItem::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotShape

Reimplemented from QwtPlotItem.

#### 12.89.4.8 void QwtPlotShapeItem::setBrush ( const QBrush & *brush* )

Assign a brush.

The brush is used to fill the path

**Parameters**

| | |
|---|---|
| *brush* | Brush |

**See Also**

brush(), pen()

#### 12.89.4.9 void QwtPlotShapeItem::setLegendMode ( LegendMode *mode* )

Set the mode how to represent the item on the legend

**Parameters**

| | |
|---|---|
| *mode* | Mode |

**See Also**

legendMode()

#### 12.89.4.10 void QwtPlotShapeItem::setPaintAttribute ( PaintAttribute *attribute,* bool *on* = `true` )

Specify an attribute how to draw the shape

**Parameters**

| | |
|---|---|
| *attribute* | Paint attribute |
| *on* | On/Off |

**See Also**

testPaintAttribute()

#### 12.89.4.11 void QwtPlotShapeItem::setPen ( const QColor & *color,* qreal *width* = `0.0`, Qt::PenStyle *style* = `Qt::SolidLine` )

Build and assign a pen

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.89.4.12 void QwtPlotShapeItem::setPen ( const QPen & *pen* )

Assign a pen.

The pen is used to draw the outline of the shape

**Parameters**

| | |
|---|---|
| *pen* | Pen |

**See Also**

pen(), brush()

#### 12.89.4.13 void QwtPlotShapeItem::setPolygon ( const QPolygonF & *polygon* )

Set a path built from a polygon.

**Parameters**

| | |
|---|---|
| *polygon* | Polygon |

**See Also**

setShape(), setRect(), shape()

#### 12.89.4.14 void QwtPlotShapeItem::setRect ( const QRectF & *rect* )

Set a path built from a rectangle.

**Parameters**

| | |
|---|---|
| *rect* | Rectangle |

**See Also**

setShape(), setPolygon(), shape()

#### 12.89.4.15 void QwtPlotShapeItem::setRenderTolerance ( double *tolerance* )

Set the tolerance for the weeding optimization.

After translating the shape into target device coordinate ( usually widget geometries ) the painter path can be simplified by a point weeding algorithm ( Douglas-Peucker ).

For shapes built from curves and ellipses weeding might have the opposite effect because they have to be expanded to polygons.

**Parameters**

| | |
|---|---|
| *tolerance* | Accepted error when reducing the number of points A value <= 0.0 disables weeding. |

**See Also**

renderTolerance(), QwtWeedingCurveFitter

#### 12.89.4.16 void QwtPlotShapeItem::setShape ( const QPainterPath & *shape* )

Set the shape to be displayed.

**Parameters**

| | |
|---|---|
| *shape* | Shape |

**See Also**

setShape(), shape()

#### 12.89.4.17 QPainterPath QwtPlotShapeItem::shape ( ) const

**Returns**

Shape to be displayed

**See Also**

setShape()

#### 12.89.4.18 bool QwtPlotShapeItem::testPaintAttribute ( PaintAttribute *attribute* ) const

**Returns**

True, when attribute is enabled

**See Also**

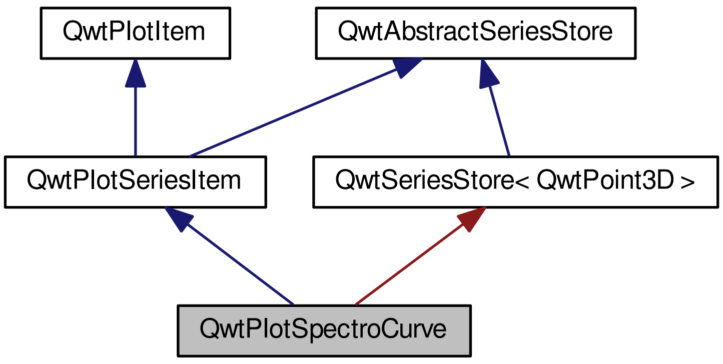
setPaintAttribute()

## 12.90 QwtPlotSpectroCurve Class Reference

Curve that displays 3D points as dots, where the z coordinate is mapped to a color.

`#include <qwt_plot_spectrocurve.h>`

Inheritance diagram for QwtPlotSpectroCurve:



**Public Types**

- enum PaintAttribute { ClipPoints = 1 }

  *Paint attributes.*
- typedef QFlags< PaintAttribute > PaintAttributes

  *Paint attributes.*

**Public Member Functions**

- QwtPlotSpectroCurve (const QString &title=QString::null)
- QwtPlotSpectroCurve (const QwtText &title)
- virtual ∼QwtPlotSpectroCurve ()

  *Destructor.*
- virtual int rtti () const
- void setPaintAttribute (PaintAttribute, bool on=true)
- bool testPaintAttribute (PaintAttribute) const
- void setSamples (const QVector< QwtPoint3D > &)
- void setSamples (QwtSeriesData< QwtPoint3D > ∗)
- void setColorMap (QwtColorMap ∗)

- const QwtColorMap ∗ colorMap () const
- void setColorRange (const QwtInterval &)
- QwtInterval & colorRange () const
- virtual void drawSeries (QPainter ∗, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- void setPenWidth (double width)
- double penWidth () const

#### Protected Member Functions

- virtual void drawDots (QPainter ∗, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const

### 12.90.1 Detailed Description

Curve that displays 3D points as dots, where the z coordinate is mapped to a color.

### 12.90.2 Member Enumeration Documentation

#### 12.90.2.1 enum QwtPlotSpectroCurve::PaintAttribute

Paint attributes.

**Enumerator**

***ClipPoints*** Clip points outside the canvas rectangle.

### 12.90.3 Constructor & Destructor Documentation

#### 12.90.3.1 QwtPlotSpectroCurve::QwtPlotSpectroCurve ( const QString & *title* = `QString::null` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

#### 12.90.3.2 QwtPlotSpectroCurve::QwtPlotSpectroCurve ( const QwtText & *title* ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

### 12.90.4 Member Function Documentation

#### 12.90.4.1 const QwtColorMap ∗ QwtPlotSpectroCurve::colorMap ( ) const

**Returns**

Color Map used for mapping the intensity values to colors

**See Also**

setColorMap(), setColorRange(), QwtColorMap::color()

#### 12.90.4.2 QwtInterval & QwtPlotSpectroCurve::colorRange ( ) const

**Returns**

Value interval, that corresponds to the color map

**See Also**

setColorRange(), setColorMap(), QwtColorMap::color()

#### 12.90.4.3 void QwtPlotSpectroCurve::drawDots ( QPainter ∗ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect,* int *from,* int *to* ) const [protected], [virtual]

Draw a subset of the points

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first sample to be painted |
| *to* | Index of the last sample to be painted. If to $<$ 0 the series will be painted to its last sample. |

**See Also**

drawSeries()

#### 12.90.4.4 void QwtPlotSpectroCurve::drawSeries ( QPainter ∗ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect,* int *from,* int *to* ) const [virtual]

Draw a subset of the points

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first sample to be painted |
| *to* | Index of the last sample to be painted. If to $<$ 0 the series will be painted to its last sample. |

**See Also**

drawDots()

Implements QwtPlotSeriesItem.

#### 12.90.4.5 double QwtPlotSpectroCurve::penWidth ( ) const

**Returns**

Pen width used to draw a dot

**See Also**

setPenWidth()

#### 12.90.4.6 int QwtPlotSpectroCurve::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotSpectroCurve

Reimplemented from QwtPlotItem.

#### 12.90.4.7 void QwtPlotSpectroCurve::setColorMap ( **QwtColorMap** ∗ *colorMap* )

Change the color map

Often it is useful to display the mapping between intensities and colors as an additional plot axis, showing a color bar.

**Parameters**

| | |
|---|---|
| *colorMap* | Color Map |

**See Also**

colorMap(), setColorRange(), QwtColorMap::color(), QwtScaleWidget::setColorBarEnabled(), QwtScale-Widget::setColorMap()

#### 12.90.4.8 void QwtPlotSpectroCurve::setColorRange ( const **QwtInterval** & *interval* )

Set the value interval, that corresponds to the color map

**Parameters**

| | |
|---|---|
| *interval* | interval.minValue() corresponds to 0.0, interval.maxValue() to 1.0 on the color map. |

**See Also**

colorRange(), setColorMap(), QwtColorMap::color()

#### 12.90.4.9 void QwtPlotSpectroCurve::setPaintAttribute ( **PaintAttribute** *attribute,* bool *on* = true )

Specify an attribute how to draw the curve

**Parameters**

| | |
|---|---|
| *attribute* | Paint attribute |
| *on* | On/Off /sa PaintAttribute, testPaintAttribute() |

#### 12.90.4.10 void QwtPlotSpectroCurve::setPenWidth ( double *penWidth* )

Assign a pen width

**Parameters**

| | |
|---|---|
| *penWidth* | New pen width |

**See Also**

penWidth()

#### 12.90.4.11 void QwtPlotSpectroCurve::setSamples ( const QVector< **QwtPoint3D** > & *samples* )

Initialize data with an array of samples.

**Parameters**

| | |
|---|---|
| *samples* | Vector of points |

#### 12.90.4.12 void QwtPlotSpectroCurve::setSamples ( QwtSeriesData< QwtPoint3D > * *data* )

Assign a series of samples

setSamples() is just a wrapper for setData() without any additional value - beside that it is easier to find for the developer.

**Parameters**

| | |
|---|---|
| *data* | Data |

**Warning**

The item takes ownership of the data object, deleting it when its not used anymore.

#### 12.90.4.13 bool QwtPlotSpectroCurve::testPaintAttribute ( PaintAttribute *attribute* ) const

**Returns**

True, when attribute is enabled

**See Also**

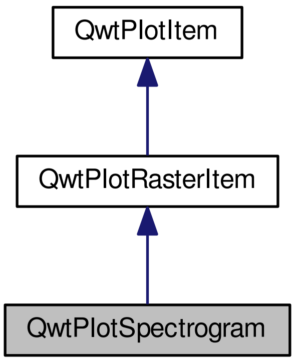
PaintAttribute, setPaintAttribute()

### 12.91 QwtPlotSpectrogram Class Reference

A plot item, which displays a spectrogram.

`#include <qwt_plot_spectrogram.h>`

Inheritance diagram for QwtPlotSpectrogram:



**Public Types**

- enum DisplayMode { ImageMode = 0x01, ContourMode = 0x02 }

- typedef QFlags< DisplayMode > DisplayModes

    *Display modes.*

### Public Member Functions

- QwtPlotSpectrogram (const QString &title=QString::null)
- virtual ∼QwtPlotSpectrogram ()

    *Destructor.*

- void setDisplayMode (DisplayMode, bool on=true)
- bool testDisplayMode (DisplayMode) const
- void setData (QwtRasterData ∗data)
- const QwtRasterData ∗ data () const
- QwtRasterData ∗ data ()
- void setColorMap (QwtColorMap ∗)
- const QwtColorMap ∗ colorMap () const
- virtual QwtInterval interval (Qt::Axis) const
- virtual QRectF pixelHint (const QRectF &) const

    *Pixel hint.*

- void setDefaultContourPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setDefaultContourPen (const QPen &)

    *Set the default pen for the contour lines.*

- QPen defaultContourPen () const
- virtual QPen contourPen (double level) const

    *Calculate the pen for a contour line.*

- void setConrecFlag (QwtRasterData::ConrecFlag, bool on)
- bool testConrecFlag (QwtRasterData::ConrecFlag) const
- void setContourLevels (const QList< double > &)
- QList< double > contourLevels () const
- virtual int rtti () const
- virtual void draw (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &rect) const

    *Draw the spectrogram.*

### Protected Member Functions

- virtual QImage renderImage (const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &area, const QSize &imageSize) const

    *Render an image from data and color map.*

- virtual QSize contourRasterSize (const QRectF &, const QRect &) const

    *Return the raster to be used by the CONREC contour algorithm.*

- virtual QwtRasterData::ContourLines renderContourLines (const QRectF &rect, const QSize &raster) const
- virtual void drawContourLines (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QwtRasterData::ContourLines &lines) const
- void renderTile (const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRect &imageRect, QImage ∗image) const

    *Render a tile of an image.*

#### 12.91.1 Detailed Description

A plot item, which displays a spectrogram.

A spectrogram displays 3-dimensional data, where the 3rd dimension ( the intensity ) is displayed using colors. The colors are calculated from the values using a color map.

On multi-core systems the performance of the image composition can often be improved by dividing the area into tiles - each of them rendered in a different thread ( see QwtPlotItem::setRenderThreadCount() ).

In ContourMode contour lines are painted for the contour levels.

**See Also**

QwtRasterData, QwtColorMap, QwtPlotItem::setRenderThreadCount()

#### 12.91.2 Member Enumeration Documentation

##### 12.91.2.1 enum QwtPlotSpectrogram::DisplayMode

The display mode controls how the raster data will be represented.

**See Also**

setDisplayMode(), testDisplayMode()

**Enumerator**

***ImageMode*** The values are mapped to colors using a color map.

***ContourMode*** The data is displayed using contour lines.

#### 12.91.3 Constructor & Destructor Documentation

##### 12.91.3.1 QwtPlotSpectrogram::QwtPlotSpectrogram ( const QString & *title* = `QString::null` ) `[explicit]`

Sets the following item attributes:

- QwtPlotItem::AutoScale: true
- QwtPlotItem::Legend: false

The z value is initialized by 8.0.

**Parameters**

| | |
|---|---|
| *title* | Title |

**See Also**

QwtPlotItem::setItemAttribute(), QwtPlotItem::setZ()

#### 12.91.4 Member Function Documentation

##### 12.91.4.1 const QwtColorMap ∗ QwtPlotSpectrogram::colorMap ( ) const

**Returns**

Color Map used for mapping the intensity values to colors

**See Also**

setColorMap()

#### 12.91.4.2 QList< double > QwtPlotSpectrogram::contourLevels ( ) const

**Returns**

Levels of the contour lines.

The levels are sorted in increasing order.

**See Also**

contourLevels(), renderContourLines(), QwtRasterData::contourLines()

#### 12.91.4.3 QPen QwtPlotSpectrogram::contourPen ( double *level* ) const `[virtual]`

Calculate the pen for a contour line.

The color of the pen is the color for level calculated by the color map

**Parameters**

| | |
|---|---|
| *level* | Contour level |

**Returns**

Pen for the contour line

**Note**

contourPen is only used if defaultContourPen().style() == Qt::NoPen

**See Also**

setDefaultContourPen(), setColorMap(), setContourLevels()

#### 12.91.4.4 QSize QwtPlotSpectrogram::contourRasterSize ( const QRectF & *area,* const QRect & *rect* ) const `[protected], [virtual]`

Return the raster to be used by the CONREC contour algorithm.

A larger size will improve the precision of the CONREC algorithm, but will slow down the time that is needed to calculate the lines.

The default implementation returns rect.size() / 2 bounded to the resolution depending on pixelSize().

**Parameters**

| | |
|---|---|
| *area* | Rectangle, where to calculate the contour lines |
| *rect* | Rectangle in pixel coordinates, where to paint the contour lines |

**Returns**

Raster to be used by the CONREC contour algorithm.

**Note**

The size will be bounded to rect.size().

**See Also**

drawContourLines(), QwtRasterData::contourLines()

#### 12.91.4.5 const **QwtRasterData** ∗ QwtPlotSpectrogram::data ( ) const

**Returns**

Spectrogram data

**See Also**

setData()

#### 12.91.4.6 **QwtRasterData** ∗ QwtPlotSpectrogram::data ( )

**Returns**

Spectrogram data

**See Also**

setData()

#### 12.91.4.7 QPen QwtPlotSpectrogram::defaultContourPen ( ) const

**Returns**

Default contour pen

**See Also**

setDefaultContourPen()

#### 12.91.4.8 void QwtPlotSpectrogram::draw ( QPainter ∗ *painter,* const **QwtScaleMap** & *xMap,* const **QwtScaleMap** & *yMap,* const QRectF & *canvasRect* ) const `[virtual]`

Draw the spectrogram.

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas in painter coordinates |

**See Also**

setDisplayMode(), renderImage(), QwtPlotRasterItem::draw(), drawContourLines()

Reimplemented from QwtPlotRasterItem.

#### 12.91.4.9 void QwtPlotSpectrogram::drawContourLines ( QPainter ∗ *painter,* const **QwtScaleMap** & *xMap,* const **QwtScaleMap** & *yMap,* const **QwtRasterData::ContourLines** & *contourLines* ) const `[protected]`, `[virtual]`

Paint the contour lines

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *contourLines* | Contour lines |

**See Also**

renderContourLines(), defaultContourPen(), contourPen()

#### 12.91.4.10 QwtInterval QwtPlotSpectrogram::interval ( Qt::Axis *axis* ) const [virtual]

**Returns**

Bounding interval for an axis

The default implementation returns the interval of the associated raster data object.

**Parameters**

| | |
|---|---|
| *axis* | X, Y, or Z axis |

**See Also**

QwtRasterData::interval()

Reimplemented from QwtPlotRasterItem.

#### 12.91.4.11 QRectF QwtPlotSpectrogram::pixelHint ( const QRectF & *area* ) const [virtual]

Pixel hint.

The geometry of a pixel is used to calculated the resolution and alignment of the rendered image.

The default implementation returns data()->pixelHint( rect );

**Parameters**

| | |
|---|---|
| *area* | In most implementations the resolution of the data doesn't depend on the requested area. |

**Returns**

Bounding rectangle of a pixel

**See Also**

QwtPlotRasterItem::pixelHint(), QwtRasterData::pixelHint(), render(), renderImage()

Reimplemented from QwtPlotRasterItem.

#### 12.91.4.12 QwtRasterData::ContourLines QwtPlotSpectrogram::renderContourLines ( const QRectF & *rect,* const QSize & *raster* ) const [protected], [virtual]

Calculate contour lines

**Parameters**

| | |
|---:|---|
| *rect* | Rectangle, where to calculate the contour lines |
| *raster* | Raster, used by the CONREC algorithm |

**Returns**

Calculated contour lines

**See Also**

contourLevels(), setConrecFlag(), QwtRasterData::contourLines()

#### 12.91.4.13 QImage QwtPlotSpectrogram::renderImage ( const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *area*, const QSize & *imageSize* ) const [protected], [virtual]

Render an image from data and color map.

For each pixel of area the value is mapped into a color.

**Parameters**

| | |
|---:|---|
| *xMap* | X-Scale Map |
| *yMap* | Y-Scale Map |
| *area* | Requested area for the image in scale coordinates |
| *imageSize* | Size of the requested image |

**Returns**

A QImage::Format_Indexed8 or QImage::Format_ARGB32 depending on the color map.

**See Also**

QwtRasterData::value(), QwtColorMap::rgb(), QwtColorMap::colorIndex()

Implements QwtPlotRasterItem.

#### 12.91.4.14 void QwtPlotSpectrogram::renderTile ( const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRect & *tile*, QImage ∗ *image* ) const [protected]

Render a tile of an image.

Rendering in tiles can be used to composite an image in parallel threads.

**Parameters**

| | |
|---:|---|
| *xMap* | X-Scale Map |
| *yMap* | Y-Scale Map |
| *tile* | Geometry of the tile in image coordinates |
| *image* | Image to be rendered |

#### 12.91.4.15 int QwtPlotSpectrogram::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotSpectrogram

Reimplemented from QwtPlotItem.

#### 12.91.4.16 void QwtPlotSpectrogram::setColorMap ( QwtColorMap ∗ *colorMap* )

Change the color map

Often it is useful to display the mapping between intensities and colors as an additional plot axis, showing a color bar.

**Parameters**

| | |
|---|---|
| *colorMap* | Color Map |

**See Also**

colorMap(), QwtScaleWidget::setColorBarEnabled(), QwtScaleWidget::setColorMap()

#### 12.91.4.17 void QwtPlotSpectrogram::setConrecFlag ( QwtRasterData::ConrecFlag *flag*, bool *on* )

Modify an attribute of the CONREC algorithm, used to calculate the contour lines.

**Parameters**

| | |
|---|---|
| *flag* | CONREC flag |
| *on* | On/Off |

**See Also**

testConrecFlag(), renderContourLines(), QwtRasterData::contourLines()

#### 12.91.4.18 void QwtPlotSpectrogram::setContourLevels ( const QList< double > & *levels* )

Set the levels of the contour lines

**Parameters**

| | |
|---|---|
| *levels* | Values of the contour levels |

**See Also**

contourLevels(), renderContourLines(), QwtRasterData::contourLines()

**Note**

contourLevels returns the same levels but sorted.

#### 12.91.4.19 void QwtPlotSpectrogram::setData ( QwtRasterData ∗ *data* )

Set the data to be displayed

**Parameters**

| | |
|---|---|
| *data* | Spectrogram Data |

**See Also**

data()

#### 12.91.4.20 void QwtPlotSpectrogram::setDefaultContourPen ( const QColor & *color*, qreal *width* = `0.0`, Qt::PenStyle *style* = `Qt::SolidLine` )

Build and assign the default pen for the contour lines

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.91.4.21 void QwtPlotSpectrogram::setDefaultContourPen ( const QPen & *pen* )

Set the default pen for the contour lines.

If the spectrogram has a valid default contour pen a contour line is painted using the default contour pen. Otherwise (pen.style() == Qt::NoPen) the pen is calculated for each contour level using contourPen().

**See Also**

defaultContourPen(), contourPen()

#### 12.91.4.22 void QwtPlotSpectrogram::setDisplayMode ( DisplayMode *mode*, bool *on* = `true` )

The display mode controls how the raster data will be represented.

**Parameters**

| | |
|---|---|
| *mode* | Display mode |
| *on* | On/Off |

The default setting enables ImageMode.

**See Also**

DisplayMode, displayMode()

#### 12.91.4.23 bool QwtPlotSpectrogram::testConrecFlag ( QwtRasterData::ConrecFlag *flag* ) const

Test an attribute of the CONREC algorithm, used to calculate the contour lines.

**Parameters**

| | |
|---|---|
| *flag* | CONREC flag |

**Returns**

true, is enabled

The default setting enables QwtRasterData::IgnoreAllVerticesOnLevel

**See Also**

setConrecClag(), renderContourLines(), QwtRasterData::contourLines()

#### 12.91.4.24 bool QwtPlotSpectrogram::testDisplayMode ( DisplayMode *mode* ) const

The display mode controls how the raster data will be represented.

**Parameters**

| | |
|---|---|
| *mode* | Display mode |

**Returns**

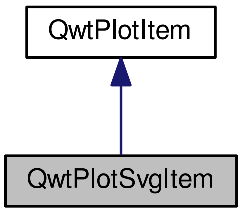
true if mode is enabled

## 12.92 QwtPlotSvgItem Class Reference

A plot item, which displays data in Scalable Vector Graphics (SVG) format.

`#include <qwt_plot_svgitem.h>`

Inheritance diagram for QwtPlotSvgItem:



**Public Member Functions**

- QwtPlotSvgItem (const QString &title=QString::null)

  *Constructor.*
- QwtPlotSvgItem (const QwtText &title)

  *Constructor.*
- virtual ∼QwtPlotSvgItem ()

  *Destructor.*
- bool loadFile (const QRectF &, const QString &fileName)
- bool loadData (const QRectF &, const QByteArray &)
- virtual QRectF boundingRect () const

  *Bounding rectangle of the item.*
- virtual void draw (QPainter ∗p, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &rect) const
- virtual int rtti () const

**Protected Member Functions**

- const QSvgRenderer & renderer () const
- QSvgRenderer & renderer ()
- void render (QPainter ∗painter, const QRectF &viewBox, const QRectF &rect) const
- QRectF viewBox (const QRectF &area) const

#### Additional Inherited Members

### 12.92.1 Detailed Description

A plot item, which displays data in Scalable Vector Graphics (SVG) format.

SVG images are often used to display maps

### 12.92.2 Constructor & Destructor Documentation

#### 12.92.2.1 QwtPlotSvgItem::QwtPlotSvgItem ( const QString & *title* = `QString::null` ) `[explicit]`

Constructor.

Sets the following item attributes:

- QwtPlotItem::AutoScale: true
- QwtPlotItem::Legend: false

**Parameters**

| | |
|---|---|
| *title* | Title |

#### 12.92.2.2 QwtPlotSvgItem::QwtPlotSvgItem ( const QwtText & *title* ) `[explicit]`

Constructor.

Sets the following item attributes:

- QwtPlotItem::AutoScale: true
- QwtPlotItem::Legend: false

**Parameters**

| | |
|---|---|
| *title* | Title |

### 12.92.3 Member Function Documentation

#### 12.92.3.1 void QwtPlotSvgItem::draw ( QPainter $*$ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect* ) const `[virtual]`

Draw the SVG item

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | X-Scale Map |
| *yMap* | Y-Scale Map |
| *canvasRect* | Contents rect of the plot canvas |

Implements QwtPlotItem.

#### 12.92.3.2 bool QwtPlotSvgItem::loadData ( const QRectF & *rect*, const QByteArray & *data* )

Load SVG data

**Parameters**

| | |
|---|---|
| *rect* | Bounding rectangle |
| *data* | in SVG format |

**Returns**

true, if the SVG data could be loaded

#### 12.92.3.3 bool QwtPlotSvgItem::loadFile ( const QRectF & *rect*, const QString & *fileName* )

Load a SVG file

**Parameters**

| | |
|---|---|
| *rect* | Bounding rectangle |
| *fileName* | SVG file name |

**Returns**

true, if the SVG file could be loaded

#### 12.92.3.4 void QwtPlotSvgItem::render ( QPainter ∗ *painter*, const QRectF & *viewBox*, const QRectF & *rect* ) const [protected]

Render the SVG data

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *viewBox* | View Box, see QSvgRenderer::viewBox() |
| *rect* | Target rectangle on the paint device |

#### 12.92.3.5 const QSvgRenderer & QwtPlotSvgItem::renderer ( ) const [protected]

**Returns**

Renderer used to render the SVG data

#### 12.92.3.6 QSvgRenderer & QwtPlotSvgItem::renderer ( ) [protected]

**Returns**

Renderer used to render the SVG data

#### 12.92.3.7 int QwtPlotSvgItem::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotSVG

Reimplemented from QwtPlotItem.

#### 12.92.3.8 QRectF QwtPlotSvgItem::viewBox ( const QRectF & *rect* ) const [protected]

Calculate the view box from rect and boundingRect().

#### Parameters

| | |
|---|---|
| *rect* | Rectangle in scale coordinates |

#### Returns

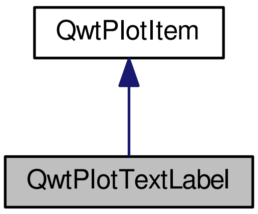
View box, see QSvgRenderer::viewBox()

## 12.93 QwtPlotTextLabel Class Reference

A plot item, which displays a text label.

`#include <qwt_plot_textlabel.h>`

Inheritance diagram for QwtPlotTextLabel:



#### Public Member Functions

- QwtPlotTextLabel ()

  *Constructor.*
- virtual ∼QwtPlotTextLabel ()

  *Destructor.*
- virtual int rtti () const
- void setText (const QwtText &)
- QwtText text () const
- void setMargin (int margin)
- int margin () const
- virtual QRectF textRect (const QRectF &, const QSizeF &) const

  *Align the text label.*

#### Protected Member Functions

- virtual void draw (QPainter ∗, const QwtScaleMap &, const QwtScaleMap &, const QRectF &) const
- void invalidateCache ()

  *Invalidate all internal cache.*

#### Additional Inherited Members

### 12.93.1 Detailed Description

A plot item, which displays a text label.

QwtPlotTextLabel displays a text label aligned to the plot canvas.

In opposite to QwtPlotMarker the position of the label is unrelated to plot coordinates.

As drawing a text is an expensive operation the label is cached in a pixmap to speed up replots.

**Example**

The following code shows how to add a title.

```
QwtText title( "Plot Title" );
title.setRenderFlags( Qt::AlignHCenter | Qt::AlignTop );

QFont font;
font.setBold( true );
title.setFont( font );

QwtPlotTextLabel *titleItem = new QwtPlotTextLabel();
titleItem->setText( title );
titleItem->attach( this );
```

**See Also**

QwtPlotMarker

### 12.93.2 Constructor & Destructor Documentation

#### 12.93.2.1 QwtPlotTextLabel::QwtPlotTextLabel ( )

Constructor.

Initializes an text label with an empty text

Sets the following item attributes:

- QwtPlotItem::AutoScale: true
- QwtPlotItem::Legend: false

The z value is initialized by 150

**See Also**

QwtPlotItem::setItemAttribute(), QwtPlotItem::setZ()

### 12.93.3 Member Function Documentation

#### 12.93.3.1 void QwtPlotTextLabel::draw ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect* ) const `[protected]`, `[virtual]`

Draw the text label

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | x Scale Map |
| *yMap* | y Scale Map |

| | |
|---|---|
| *canvasRect* | Contents rectangle of the canvas in painter coordinates |

**See Also**

textRect()

Implements QwtPlotItem.

#### 12.93.3.2 int QwtPlotTextLabel::margin ( ) const

**Returns**

Margin added to the contentsMargins() of the canvas

**See Also**

setMargin()

#### 12.93.3.3 int QwtPlotTextLabel::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotTextLabel

Reimplemented from QwtPlotItem.

#### 12.93.3.4 void QwtPlotTextLabel::setMargin ( int *margin* )

Set the margin

The margin is the distance between the contentsRect() of the plot canvas and the rectangle where the label can be displayed.

**Parameters**

| | |
|---|---|
| *margin* | Margin |

**See Also**

margin(), textRect()

#### 12.93.3.5 void QwtPlotTextLabel::setText ( const QwtText & *text* )

Set the text

The label will be aligned to the plot canvas according to the alignment flags of text.

**Parameters**

| | |
|---|---|
| *text* | Text to be displayed |

**See Also**

text(), QwtText::renderFlags()

#### 12.93.3.6 QwtText QwtPlotTextLabel::text ( ) const

**Returns**

Text to be displayed

**See Also**

setText()

#### 12.93.3.7 QRectF QwtPlotTextLabel::textRect ( const QRectF & *rect,* const QSizeF & *textSize* ) const [virtual]

Align the text label.

**Parameters**

| | |
|---|---|
| *rect* | Canvas rectangle with margins subtracted |
| *textSize* | Size required to draw the text |

**Returns**

A rectangle aligned according the the alignment flags of the text.

**See Also**

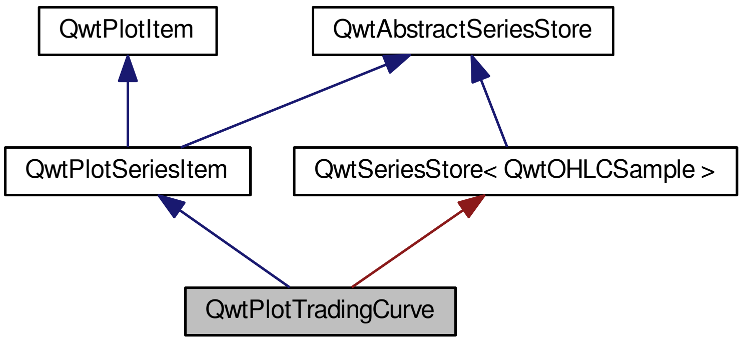
setMargin(), QwtText::renderFlags(), QwtText::textSize()

## 12.94 QwtPlotTradingCurve Class Reference

QwtPlotTradingCurve illustrates movements in the price of a financial instrument over time.

`#include <qwt_plot_tradingcurve.h>`

Inheritance diagram for QwtPlotTradingCurve:



**Public Types**

- enum SymbolStyle { NoSymbol = -1, Bar, CandleStick, UserSymbol = 100 }

  *Symbol styles.*
- enum Direction { Increasing, Decreasing }

  *Direction of a price movement.*
- enum PaintAttribute { ClipSymbols = 0x01 }
- typedef QFlags< PaintAttribute > PaintAttributes

  *Paint attributes.*

**Public Member Functions**

- QwtPlotTradingCurve (const QString &title=QString::null)
- QwtPlotTradingCurve (const QwtText &title)
- virtual ~QwtPlotTradingCurve ()

  *Destructor.*

- virtual int rtti () const
- void setPaintAttribute (PaintAttribute, bool on=true)
- bool testPaintAttribute (PaintAttribute) const
- void setSamples (const QVector< QwtOHLCSample > &)
- void setSamples (QwtSeriesData< QwtOHLCSample > ∗)
- void setSymbolStyle (SymbolStyle style)
- SymbolStyle symbolStyle () const
- void setSymbolPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setSymbolPen (const QPen &)

    *Set the symbol pen.*
- QPen symbolPen () const
- void setSymbolBrush (Direction, const QBrush &)
- QBrush symbolBrush (Direction) const
- void setSymbolExtent (double width)

    *Set the extent of the symbol.*
- double symbolExtent () const
- void setMinSymbolWidth (double)
- double minSymbolWidth () const
- void setMaxSymbolWidth (double)
- double maxSymbolWidth () const
- virtual void drawSeries (QPainter ∗painter, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect, int from, int to) const
- virtual QRectF boundingRect () const
- virtual QwtGraphic legendIcon (int index, const QSizeF &) const

### Protected Member Functions

- void init ()

    *Initialize internal members.*
- virtual void drawSymbols (QPainter ∗, const QwtScaleMap &xMap, const QwtScaleMap &yMap, const Q-RectF &canvasRect, int from, int to) const
- virtual void drawUserSymbol (QPainter ∗, SymbolStyle, const QwtOHLCSample &, Qt::Orientation, bool inverted, double width) const

    *Draw a symbol for a symbol style >= UserSymbol.*
- void drawBar (QPainter ∗painter, const QwtOHLCSample &, Qt::Orientation, bool inverted, double width) const

    *Draw a bar.*
- void drawCandleStick (QPainter ∗, const QwtOHLCSample &, Qt::Orientation, double width) const

    *Draw a candle stick.*
- virtual double scaledSymbolWidth (const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QRectF &canvasRect) const

### 12.94.1 Detailed Description

QwtPlotTradingCurve illustrates movements in the price of a financial instrument over time.

QwtPlotTradingCurve supports candlestick or bar ( OHLC ) charts that are used in the domain of technical analysis.

While the length ( height or width depending on orientation() ) of each symbol depends on the corresponding OHLC sample the size of the other dimension can be controlled using:

- setSymbolExtent()
- setSymbolMinWidth()

- setSymbolMaxWidth()

The extent is a size in scale coordinates, so that the symbol width is increasing when the plot is zoomed in. Minimum/Maximum width is in widget coordinates independent from the zoom level. When setting the minimum and maximum to the same value, the width of the symbol is fixed.

### 12.94.2 Member Enumeration Documentation

#### 12.94.2.1 enum QwtPlotTradingCurve::Direction

Direction of a price movement.

**Enumerator**

***Increasing*** The closing price is higher than the opening price.

***Decreasing*** The closing price is lower than the opening price.

#### 12.94.2.2 enum QwtPlotTradingCurve::PaintAttribute

Attributes to modify the drawing algorithm.

**See Also**

setPaintAttribute(), testPaintAttribute()

**Enumerator**

***ClipSymbols*** Check if a symbol is on the plot canvas before painting it.

#### 12.94.2.3 enum QwtPlotTradingCurve::SymbolStyle

Symbol styles.

The default setting is QwtPlotSeriesItem::CandleStick.

**See Also**

setSymbolStyle(), symbolStyle()

**Enumerator**

***NoSymbol*** Nothing is displayed.

***Bar*** A line on the chart shows the price range (the highest and lowest prices) over one unit of time, e.g. one day or one hour. Tick marks project from each side of the line indicating the opening and closing price.

***CandleStick*** The range between opening/closing price are displayed as a filled box. The fill brush depends on the direction of the price movement. The box is connected to the highest/lowest values by lines.

***UserSymbol*** SymbolTypes >= UserSymbol are displayed by drawUserSymbol(), that needs to be overloaded and implemented in derived curve classes.

**See Also**

drawUserSymbol()

### 12.94.3 Constructor & Destructor Documentation

#### 12.94.3.1 QwtPlotTradingCurve::QwtPlotTradingCurve ( const QString & *title* = `QString::null` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

#### 12.94.3.2 QwtPlotTradingCurve::QwtPlotTradingCurve ( const QwtText & *title* ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *title* | Title of the curve |

### 12.94.4 Member Function Documentation

#### 12.94.4.1 QRectF QwtPlotTradingCurve::boundingRect ( ) const `[virtual]`

**Returns**

Bounding rectangle of all samples. For an empty series the rectangle is invalid.

Reimplemented from QwtPlotSeriesItem.

#### 12.94.4.2 void QwtPlotTradingCurve::drawBar ( QPainter ∗ *painter,* const QwtOHLCSample & *sample,* Qt::Orientation *orientation,* bool *inverted,* double *width* ) const `[protected]`

Draw a bar.

**Parameters**

| | |
|---|---|
| *painter* | Qt painter, initialized with pen/brush |
| *sample* | Sample, already translated into paint device coordinates |
| *orientation* | Vertical or horizontal |
| *inverted* | When inverted is false the open tick is painted to the left/top, otherwise it is painted right/bottom. The close tick is painted in the opposite direction of the open tick. painted in the opposite d opposite direction. |
| *width* | Width or height of the candle, depending on the orientation |

**See Also**

Bar

#### 12.94.4.3 void QwtPlotTradingCurve::drawCandleStick ( QPainter ∗ *painter,* const QwtOHLCSample & *sample,* Qt::Orientation *orientation,* double *width* ) const `[protected]`

Draw a candle stick.

**Parameters**

| | |
|---|---|
| *painter* | Qt painter, initialized with pen/brush |
| *sample* | Samples already translated into paint device coordinates |
| *orientation* | Vertical or horizontal |
| *width* | Width or height of the candle, depending on the orientation |

**See Also**

CandleStick

#### 12.94.4.4 void QwtPlotTradingCurve::drawSeries ( QPainter ∗ *painter,* const QwtScaleMap & *xMap,* const QwtScaleMap & *yMap,* const QRectF & *canvasRect,* int *from,* int *to* ) const `[virtual]`

Draw an interval of the curve

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted. If to $<$ 0 the curve will be painted to its last point. |

**See Also**

drawSymbols()

Implements QwtPlotSeriesItem.

#### 12.94.4.5 void QwtPlotTradingCurve::drawSymbols ( QPainter ∗ *painter,* const **QwtScaleMap** & *xMap,* const **QwtScaleMap** & *yMap,* const QRectF & *canvasRect,* int *from,* int *to* ) const `[protected], [virtual]`

Draw symbols

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | x map |
| *yMap* | y map |
| *canvasRect* | Contents rectangle of the canvas |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted |

**See Also**

drawSeries()

#### 12.94.4.6 void QwtPlotTradingCurve::drawUserSymbol ( QPainter ∗ *painter,* **SymbolStyle** *symbolStyle,* const **QwtOHLCSample** & *sample,* Qt::Orientation *orientation,* bool *inverted,* double *symbolWidth* ) const `[protected], [virtual]`

Draw a symbol for a symbol style >= UserSymbol.

The implementation does nothing and is intended to be overloaded

**Parameters**

| | |
|---|---|
| *painter* | Qt painter, initialized with pen/brush |
| *symbolStyle* | Symbol style |
| *sample* | Samples already translated into paint device coordinates |
| *orientation* | Vertical or horizontal |
| *inverted* | True, when the opposite scale ( Qt::Vertical: x, Qt::Horizontal: y ) is increasing in the opposite direction as QPainter coordinates. |
| *symbolWidth* | Width of the symbol in paint device coordinates |

#### 12.94.4.7 **QwtGraphic** QwtPlotTradingCurve::legendIcon ( int *index,* const QSizeF & *size* ) const `[virtual]`

**Returns**

A rectangle filled with the color of the symbol pen

**Parameters**

| | |
|---:|---|
| *index* | Index of the legend entry ( usually there is only one ) |
| *size* | Icon size |

**See Also**

setLegendIconSize(), legendData()

Reimplemented from QwtPlotItem.

#### 12.94.4.8 double QwtPlotTradingCurve::maxSymbolWidth ( ) const

**Returns**

Maximum for the symbol width

**See Also**

setMaxSymbolWidth(), minSymbolWidth(), symbolExtent()

#### 12.94.4.9 double QwtPlotTradingCurve::minSymbolWidth ( ) const

**Returns**

Minmum for the symbol width

**See Also**

setMinSymbolWidth(), maxSymbolWidth(), symbolExtent()

#### 12.94.4.10 int QwtPlotTradingCurve::rtti ( ) const `[virtual]`

**Returns**

QwtPlotItem::Rtti_PlotTradingCurve

Reimplemented from QwtPlotItem.

#### 12.94.4.11 double QwtPlotTradingCurve::scaledSymbolWidth ( const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect* ) const `[protected]`, `[virtual]`

Calculate the symbol width in paint coordinates

The width is calculated by scaling the symbol extent into paint device coordinates bounded by the minimum/maximum symbol width.

**Parameters**

| | |
|---:|---|
| *xMap* | Maps x-values into pixel coordinates. |
| *yMap* | Maps y-values into pixel coordinates. |
| *canvasRect* | Contents rectangle of the canvas |

**Returns**

Symbol width in paint coordinates

**See Also**

symbolExtent(), minSymbolWidth(), maxSymbolWidth()

#### 12.94.4.12 void QwtPlotTradingCurve::setMaxSymbolWidth ( double *width* )

Set a maximum for the symbol width

A value $<=$ 0.0 means an unlimited width

**Parameters**

| | |
|---|---|
| *width* | Width in paint device coordinates |

**See Also**

maxSymbolWidth(), setMinSymbolWidth(), setSymbolExtent()

#### 12.94.4.13 void QwtPlotTradingCurve::setMinSymbolWidth ( double *width* )

Set a minimum for the symbol width

**Parameters**

| | |
|---|---|
| *width* | Width in paint device coordinates |

**See Also**

minSymbolWidth(), setMaxSymbolWidth(), setSymbolExtent()

#### 12.94.4.14 void QwtPlotTradingCurve::setPaintAttribute ( PaintAttribute *attribute*, bool *on* = `true` )

Specify an attribute how to draw the curve

**Parameters**

| | |
|---|---|
| *attribute* | Paint attribute |
| *on* | On/Off |

**See Also**

testPaintAttribute()

#### 12.94.4.15 void QwtPlotTradingCurve::setSamples ( const QVector< QwtOHLCSample > & *samples* )

Initialize data with an array of samples.

**Parameters**

| | |
|---|---|
| *samples* | Vector of samples |

**See Also**

QwtPlotSeriesItem::setData()

#### 12.94.4.16 void QwtPlotTradingCurve::setSamples ( QwtSeriesData< QwtOHLCSample > * *data* )

Assign a series of samples

setSamples() is just a wrapper for setData() without any additional value - beside that it is easier to find for the developer.

**Parameters**

| | |
|---|---|
| *data* | Data |

**Warning**

The item takes ownership of the data object, deleting it when its not used anymore.

#### 12.94.4.17 void QwtPlotTradingCurve::setSymbolBrush ( Direction *direction*, const QBrush & *brush* )

Set the symbol brush

**Parameters**

| | |
|---|---|
| *direction* | Direction type |
| *brush* | Brush used to fill the body of all candlestick symbols with the direction |

**See Also**

symbolBrush(), setSymbolPen()

#### 12.94.4.18 void QwtPlotTradingCurve::setSymbolExtent ( double *extent* )

Set the extent of the symbol.

The width of the symbol is given in scale coordinates. When painting a symbol the width is scaled into paint device coordinates by scaledSymbolWidth(). The scaled width is bounded by minSymbolWidth(), maxSymbolWidth()

**Parameters**

| | |
|---|---|
| *extent* | Symbol width in scale coordinates |

**See Also**

symbolExtent(), scaledSymbolWidth(), setMinSymbolWidth(), setMaxSymbolWidth()

#### 12.94.4.19 void QwtPlotTradingCurve::setSymbolPen ( const QColor & *color*, qreal *width* = `0.0`, Qt::PenStyle *style* = `Qt::SolidLine` )

Build and assign the symbol pen

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.94.4.20 void QwtPlotTradingCurve::setSymbolPen ( const QPen & *pen* )

Set the symbol pen.

The symbol pen is used for rendering the lines of the bar or candlestick symbols

**See Also**

symbolPen(), setSymbolBrush()

#### 12.94.4.21 void QwtPlotTradingCurve::setSymbolStyle ( SymbolStyle *style* )

Set the symbol style

**Parameters**

| | |
|---|---|
| *style* | Symbol style |

**See Also**

symbolStyle(), setSymbolExtent(), setSymbolPen(), setSymbolBrush()

#### 12.94.4.22 QBrush QwtPlotTradingCurve::symbolBrush ( Direction *direction* ) const

**Parameters**

| | |
|---|---|
| *direction* | |

**Returns**

Brush used to fill the body of all candlestick symbols with the direction

**See Also**

setSymbolPen(), symbolBrush()

#### 12.94.4.23 double QwtPlotTradingCurve::symbolExtent ( ) const

**Returns**

Extent of a symbol in scale coordinates

**See Also**

setSymbolExtent(), scaledSymbolWidth(), minSymbolWidth(), maxSymbolWidth()

#### 12.94.4.24 QPen QwtPlotTradingCurve::symbolPen ( ) const

**Returns**

Symbol pen

**See Also**

setSymbolPen(), symbolBrush()

#### 12.94.4.25 QwtPlotTradingCurve::SymbolStyle QwtPlotTradingCurve::symbolStyle ( ) const

**Returns**

Symbol style

**See Also**

setSymbolStyle(), symbolExtent(), symbolPen(), symbolBrush()

#### 12.94.4.26 bool QwtPlotTradingCurve::testPaintAttribute ( PaintAttribute *attribute* ) const

**Returns**

True, when attribute is enabled

**See Also**

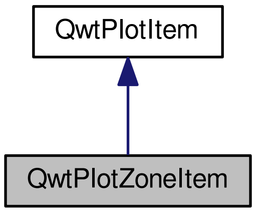
PaintAttribute, setPaintAttribute()

## 12.95 QwtPlotZoneItem Class Reference

A plot item, which displays a zone.

`#include <qwt_plot_zoneitem.h>`

Inheritance diagram for QwtPlotZoneItem:



### Public Member Functions

- QwtPlotZoneItem ()

  *Constructor.*
- virtual ∼QwtPlotZoneItem ()

  *Destructor.*
- virtual int rtti () const
- void setOrientation (Qt::Orientation)

  *Set the orientation of the zone.*
- Qt::Orientation orientation ()
- void setInterval (double min, double max)
- void setInterval (const QwtInterval &)
- QwtInterval interval () const
- void setPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setPen (const QPen &)

  *Assign a pen.*
- const QPen & pen () const
- void setBrush (const QBrush &)

  *Assign a brush.*
- const QBrush & brush () const
- virtual void draw (QPainter $*$, const QwtScaleMap &, const QwtScaleMap &, const QRectF &) const
- virtual QRectF boundingRect () const

### Additional Inherited Members

### 12.95.1 Detailed Description

A plot item, which displays a zone.

A horizontal zone highlights an interval of the y axis - a vertical zone an interval of the x axis - and is unbounded in the opposite direction. It is filled with a brush and its border lines are optionally displayed with a pen.

**Note**

For displaying an area that is bounded for x and y coordinates use QwtPlotShapeItem

### 12.95.2 Constructor & Destructor Documentation

#### 12.95.2.1 QwtPlotZoneItem::QwtPlotZoneItem ( ) [explicit]

Constructor.

Initializes the zone with no pen and a semi transparent gray brush

Sets the following item attributes:

- QwtPlotItem::AutoScale: false
- QwtPlotItem::Legend: false

The z value is initialized by 5

**See Also**

QwtPlotItem::setItemAttribute(), QwtPlotItem::setZ()

### 12.95.3 Member Function Documentation

#### 12.95.3.1 QRectF QwtPlotZoneItem::boundingRect ( ) const [virtual]

The bounding rectangle is build from the interval in one direction and something invalid for the opposite direction.

**Returns**

An invalid rectangle with valid boundaries in one direction

Reimplemented from QwtPlotItem.

#### 12.95.3.2 const QBrush & QwtPlotZoneItem::brush ( ) const

**Returns**

Brush used to fill the zone

**See Also**

setPen(), brush()

#### 12.95.3.3 void QwtPlotZoneItem::draw ( QPainter ∗ *painter*, const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *canvasRect* ) const [virtual]

Draw the zone

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *xMap* | x Scale Map |
| *yMap* | y Scale Map |
| *canvasRect* | Contents rectangle of the canvas in painter coordinates |

Implements QwtPlotItem.

#### 12.95.3.4 QwtInterval QwtPlotZoneItem::interval ( ) const

**Returns**

Zone interval

**See Also**

setInterval(), orientation()

#### 12.95.3.5 Qt::Orientation QwtPlotZoneItem::orientation ( )

**Returns**

Orientation of the zone

**See Also**

setOrientation()

#### 12.95.3.6 const QPen & QwtPlotZoneItem::pen ( ) const

**Returns**

Pen used to draw the border lines

**See Also**

setPen(), brush()

#### 12.95.3.7 int QwtPlotZoneItem::rtti ( ) const [virtual]

**Returns**

QwtPlotItem::Rtti_PlotZone

Reimplemented from QwtPlotItem.

#### 12.95.3.8 void QwtPlotZoneItem::setBrush ( const QBrush & *brush* )

Assign a brush.

The brush is used to fill the zone

**Parameters**

| | |
|---|---|
| *brush* | Brush |

**See Also**

pen(), setBrush()

#### 12.95.3.9 void QwtPlotZoneItem::setInterval ( double *min*, double *max* )

Set the interval of the zone

For a horizontal zone the interval is related to the y axis, for a vertical zone it is related to the x axis.

**Parameters**

| | |
|---|---|
| *min* | Minimum of the interval |
| *max* | Maximum of the interval |

**See Also**

interval(), setOrientation()

#### 12.95.3.10 void QwtPlotZoneItem::setInterval ( const QwtInterval & *interval* )

Set the interval of the zone

For a horizontal zone the interval is related to the y axis, for a vertical zone it is related to the x axis.

**Parameters**

| | |
|---:|---|
| *interval* | Zone interval |

**See Also**

interval(), setOrientation()

#### 12.95.3.11 void QwtPlotZoneItem::setOrientation ( Qt::Orientation *orientation* )

Set the orientation of the zone.

A horizontal zone highlights an interval of the y axis, a vertical zone of the x axis. It is unbounded in the opposite direction.

**See Also**

orientation(), QwtPlotItem::setAxes()

#### 12.95.3.12 void QwtPlotZoneItem::setPen ( const QColor & *color*, qreal *width* = `0.0`, Qt::PenStyle *style* = `Qt::SolidLine` )

Build and assign a pen

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---:|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.95.3.13 void QwtPlotZoneItem::setPen ( const QPen & *pen* )

Assign a pen.

The pen is used to draw the border lines of the zone

**Parameters**

| | |
|---:|---|
| *pen* | Pen |

**See Also**

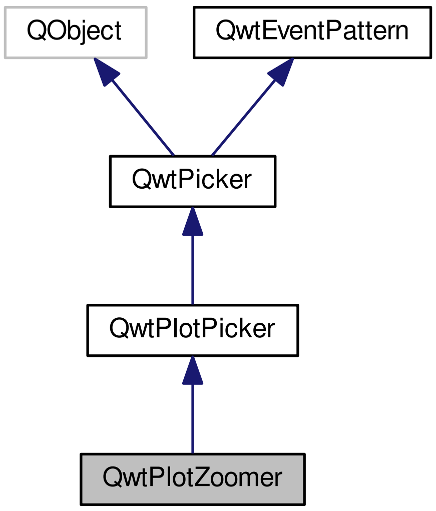
pen(), setBrush()

## 12.96 QwtPlotZoomer Class Reference

QwtPlotZoomer provides stacked zooming for a plot widget.

```
#include <qwt_plot_zoomer.h>
```

Inheritance diagram for QwtPlotZoomer:



#### Public Slots

- void moveBy (double x, double y)
- virtual void moveTo (const QPointF &)
- virtual void zoom (const QRectF &)

    *Zoom in.*
- virtual void zoom (int up)

    *Zoom in or out.*

#### Signals

- void zoomed (const QRectF &rect)

#### Public Member Functions

- QwtPlotZoomer (QWidget ∗, bool doReplot=true)

    *Create a zoomer for a plot canvas.*
- QwtPlotZoomer (int xAxis, int yAxis, QWidget ∗, bool doReplot=true)

    *Create a zoomer for a plot canvas.*
- virtual void setZoomBase (bool doReplot=true)
- virtual void setZoomBase (const QRectF &)

    *Set the initial size of the zoomer.*
- QRectF zoomBase () const
- QRectF zoomRect () const
- virtual void setAxis (int xAxis, int yAxis)
- void setMaxStackDepth (int)

    *Limit the number of recursive zoom operations to depth.*
- int maxStackDepth () const

- const QStack< QRectF > & zoomStack () const
- void setZoomStack (const QStack< QRectF > &, int zoomRectIndex=-1)

  *Assign a zoom stack.*
- uint zoomRectIndex () const

### Protected Member Functions

- virtual void rescale ()
- virtual QSizeF minZoomSize () const

  *Limit zooming by a minimum rectangle.*
- virtual void widgetMouseReleaseEvent (QMouseEvent ∗)
- virtual void widgetKeyPressEvent (QKeyEvent ∗)
- virtual void begin ()
- virtual bool end (bool ok=true)
- virtual bool accept (QPolygon &) const

  *Check and correct a selected rectangle.*

### Additional Inherited Members

### 12.96.1 Detailed Description

QwtPlotZoomer provides stacked zooming for a plot widget.

QwtPlotZoomer selects rectangles from user inputs ( mouse or keyboard ) translates them into plot coordinates and adjusts the axes to them. The selection is supported by a rubber band and optionally by displaying the coordinates of the current mouse position.

Zooming can be repeated as often as possible, limited only by maxStackDepth() or minZoomSize(). Each rectangle is pushed on a stack.

The default setting how to select rectangles is a QwtPickerDragRectMachine with the following bindings:

- QwtEventPattern::MouseSelect1

  The first point of the zoom rectangle is selected by a mouse press, the second point from the position, where the mouse is released.
- QwtEventPattern::KeySelect1

  The first key press selects the first, the second key press selects the second point.
- QwtEventPattern::KeyAbort

  Discard the selection in the state, where the first point is selected.

To traverse the zoom stack the following bindings are used:

- QwtEventPattern::MouseSelect3, QwtEventPattern::KeyUndo

  Zoom out one position on the zoom stack
- QwtEventPattern::MouseSelect6, QwtEventPattern::KeyRedo

  Zoom in one position on the zoom stack
- QwtEventPattern::MouseSelect2, QwtEventPattern::KeyHome

  Zoom to the zoom base

The setKeyPattern() and setMousePattern() functions can be used to configure the zoomer actions. The following example shows, how to configure the 'I' and 'O' keys for zooming in and out one position on the zoom stack. The "Home" key is used to "unzoom" the plot.

```
zoomer = new QwtPlotZoomer( plot );
zoomer->setKeyPattern( QwtEventPattern::KeyRedo, Qt::Key_I, Qt::ShiftModifier );
zoomer->setKeyPattern( QwtEventPattern::KeyUndo, Qt::Key_O, Qt::ShiftModifier );
zoomer->setKeyPattern( QwtEventPattern::KeyHome, Qt::Key_Home );
```

QwtPlotZoomer is tailored for plots with one x and y axis, but it is allowed to attach a second QwtPlotZoomer ( without rubber band and tracker ) for the other axes.

**Note**

The realtime example includes an derived zoomer class that adds scrollbars to the plot canvas.

**See Also**

QwtPlotPanner, QwtPlotMagnifier

### 12.96.2 Constructor & Destructor Documentation

#### 12.96.2.1 QwtPlotZoomer::QwtPlotZoomer ( QWidget * *canvas*, bool *doReplot* = `true` ) `[explicit]`

Create a zoomer for a plot canvas.

The zoomer is set to those x- and y-axis of the parent plot of the canvas that are enabled. If both or no x-axis are enabled, the picker is set to QwtPlot::xBottom. If both or no y-axis are enabled, it is set to QwtPlot::yLeft.

The zoomer is initialized with a QwtPickerDragRectMachine, the tracker mode is set to QwtPicker::ActiveOnly and the rubber band is set to QwtPicker::RectRubberBand

**Parameters**

| | |
|---|---|
| *canvas* | Plot canvas to observe, also the parent object |
| *doReplot* | Call QwtPlot::replot() for the attached plot before initializing the zoomer with its scales. This might be necessary, when the plot is in a state with pending scale changes. |

**See Also**

QwtPlot::autoReplot(), QwtPlot::replot(), setZoomBase()

#### 12.96.2.2 QwtPlotZoomer::QwtPlotZoomer ( int *xAxis*, int *yAxis*, QWidget * *canvas*, bool *doReplot* = `true` ) `[explicit]`

Create a zoomer for a plot canvas.

The zoomer is initialized with a QwtPickerDragRectMachine, the tracker mode is set to QwtPicker::ActiveOnly and the rubber band is set to QwtPicker;;RectRubberBand

**Parameters**

| | |
|---|---|
| *xAxis* | X axis of the zoomer |
| *yAxis* | Y axis of the zoomer |
| *canvas* | Plot canvas to observe, also the parent object |
| *doReplot* | Call QwtPlot::replot() for the attached plot before initializing the zoomer with its scales. This might be necessary, when the plot is in a state with pending scale changes. |

**See Also**

QwtPlot::autoReplot(), QwtPlot::replot(), setZoomBase()

### 12.96.3 Member Function Documentation

#### 12.96.3.1 bool QwtPlotZoomer::accept ( QPolygon & *pa* ) const [protected], [virtual]

Check and correct a selected rectangle.

Reject rectangles with a height or width $<$ 2, otherwise expand the selected rectangle to a minimum size of 11x11 and accept it.

**Returns**

true If the rectangle is accepted, or has been changed to an accepted one.

Reimplemented from QwtPicker.

#### 12.96.3.2 void QwtPlotZoomer::begin ( ) [protected], [virtual]

Rejects selections, when the stack depth is too deep, or the zoomed rectangle is minZoomSize().

**See Also**

minZoomSize(), maxStackDepth()

Reimplemented from QwtPicker.

#### 12.96.3.3 bool QwtPlotZoomer::end ( bool *ok* = true ) [protected], [virtual]

Expand the selected rectangle to minZoomSize() and zoom in if accepted.

**Parameters**

| | |
|---|---|
| *ok* | If true, complete the selection and emit selected signals otherwise discard the selection. |

**See Also**

accept(), minZoomSize()

**Returns**

True if the selection has been accepted, false otherwise

Reimplemented from QwtPlotPicker.

#### 12.96.3.4 int QwtPlotZoomer::maxStackDepth ( ) const

**Returns**

Maximal depth of the zoom stack.

**See Also**

setMaxStackDepth()

#### 12.96.3.5 QSizeF QwtPlotZoomer::minZoomSize ( ) const [protected], [virtual]

Limit zooming by a minimum rectangle.

**Returns**

zoomBase().width() / 10e4, zoomBase().height() / 10e4

#### 12.96.3.6 void QwtPlotZoomer::moveBy ( double *dx*, double *dy* ) [slot]

Move the current zoom rectangle.

**Parameters**

| | |
|---|---|
| *dx* | X offset |
| *dy* | Y offset |

**Note**

The changed rectangle is limited by the zoom base

#### 12.96.3.7 void QwtPlotZoomer::moveTo ( const QPointF & *pos* ) [virtual], [slot]

Move the the current zoom rectangle.

**Parameters**

| | |
|---|---|
| *pos* | New position |

**See Also**

QRectF::moveTo()

**Note**

The changed rectangle is limited by the zoom base

#### 12.96.3.8 void QwtPlotZoomer::rescale ( ) [protected], [virtual]

Adjust the observed plot to zoomRect()

**Note**

Initiates QwtPlot::replot()

#### 12.96.3.9 void QwtPlotZoomer::setAxis ( int *xAxis,* int *yAxis* ) [virtual]

Reinitialize the axes, and set the zoom base to their scales.

**Parameters**

| | |
|---|---|
| *xAxis* | X axis |
| *yAxis* | Y axis |

Reimplemented from QwtPlotPicker.

#### 12.96.3.10 void QwtPlotZoomer::setMaxStackDepth ( int *depth* )

Limit the number of recursive zoom operations to depth.

A value of -1 set the depth to unlimited, 0 disables zooming. If the current zoom rectangle is below depth, the plot is unzoomed.

**Parameters**

| | |
|---|---|
| *depth* | Maximum for the stack depth |

**See Also**

maxStackDepth()

**Note**

depth doesn't include the zoom base, so zoomStack().count() might be maxStackDepth() + 1.

#### 12.96.3.11 void QwtPlotZoomer::setZoomBase ( bool *doReplot* = `true` ) `[virtual]`

Reinitialized the zoom stack with scaleRect() as base.

**Parameters**

| | |
|---|---|
| *doReplot* | Call QwtPlot::replot() for the attached plot before initializing the zoomer with its scales. This might be necessary, when the plot is in a state with pending scale changes. |

**See Also**

zoomBase(), scaleRect() QwtPlot::autoReplot(), QwtPlot::replot().

#### 12.96.3.12 void QwtPlotZoomer::setZoomBase ( const QRectF & *base* ) [virtual]

Set the initial size of the zoomer.

base is united with the current scaleRect() and the zoom stack is reinitialized with it as zoom base. plot is zoomed to scaleRect().

**Parameters**

| | |
|---|---|
| *base* | Zoom base |

**See Also**

zoomBase(), scaleRect()

#### 12.96.3.13 void QwtPlotZoomer::setZoomStack ( const QStack< QRectF > & *zoomStack*, int *zoomRectIndex* = -1 )

Assign a zoom stack.

In combination with other types of navigation it might be useful to modify to manipulate the complete zoom stack.

**Parameters**

| | |
|---|---|
| *zoomStack* | New zoom stack |
| *zoomRectIndex* | Index of the current position of zoom stack. In case of -1 the current position is at the top of the stack. |

**Note**

The zoomed signal might be emitted.

**See Also**

zoomStack(), zoomRectIndex()

#### 12.96.3.14 void QwtPlotZoomer::widgetKeyPressEvent ( QKeyEvent * *ke* ) [protected], [virtual]

Qt::Key_Plus zooms in, Qt::Key_Minus zooms out one position on the zoom stack, Qt::Key_Escape zooms out to the zoom base.

Changes the current position on the stack, but doesn't pop any rectangle.

**Note**

The keys codes can be changed, using QwtEventPattern::setKeyPattern: 3, 4, 5

Reimplemented from QwtPicker.

#### 12.96.3.15 void QwtPlotZoomer::widgetMouseReleaseEvent ( QMouseEvent * *me* ) [protected], [virtual]

Qt::MidButton zooms out one position on the zoom stack, Qt::RightButton to the zoom base.

Changes the current position on the stack, but doesn't pop any rectangle.

**Note**

> The mouse events can be changed, using QwtEventPattern::setMousePattern: 2, 1

Reimplemented from QwtPicker.

#### 12.96.3.16 void QwtPlotZoomer::zoom ( const QRectF & *rect* ) `[virtual], [slot]`

Zoom in.

Clears all rectangles above the current position of the zoom stack and pushes the normalized rectangle on it.

**Note**

> If the maximal stack depth is reached, zoom is ignored.
> The zoomed signal is emitted.

#### 12.96.3.17 void QwtPlotZoomer::zoom ( int *offset* ) `[virtual], [slot]`

Zoom in or out.

Activate a rectangle on the zoom stack with an offset relative to the current position. Negative values of offset will zoom out, positive zoom in. A value of 0 zooms out to the zoom base.

**Parameters**

| | |
|---|---|
| *offset* | Offset relative to the current position of the zoom stack. |

**Note**

> The zoomed signal is emitted.

**See Also**

> zoomRectIndex()

#### 12.96.3.18 QRectF QwtPlotZoomer::zoomBase ( ) const

**Returns**

> Initial rectangle of the zoomer

**See Also**

> setZoomBase(), zoomRect()

#### 12.96.3.19 void QwtPlotZoomer::zoomed ( const QRectF & *rect* ) `[signal]`

A signal emitting the zoomRect(), when the plot has been zoomed in or out.

**Parameters**

| | |
|---|---|
| *rect* | Current zoom rectangle. |

#### 12.96.3.20 QRectF QwtPlotZoomer::zoomRect ( ) const

**Returns**

> Rectangle at the current position on the zoom stack.

**See Also**

> zoomRectIndex(), scaleRect().

#### 12.96.3.21 uint QwtPlotZoomer::zoomRectIndex ( ) const

**Returns**

Index of current position of zoom stack.

#### 12.96.3.22 const QStack< QRectF > & QwtPlotZoomer::zoomStack ( ) const

**Returns**

The zoom stack. zoomStack()[0] is the zoom base, zoomStack()[1] the first zoomed rectangle.

**See Also**

setZoomStack(), zoomRectIndex()

## 12.97 QwtPoint3D Class Reference

QwtPoint3D class defines a 3D point in double coordinates.

`#include <qwt_point_3d.h>`

### Public Member Functions

- QwtPoint3D ()
- QwtPoint3D (double x, double y, double z)

  *Constructs a point with coordinates specified by x, y and z.*
- QwtPoint3D (const QwtPoint3D &)
- QwtPoint3D (const QPointF &)
- bool isNull () const
- double x () const
- double y () const
- double z () const
- double & rx ()
- double & ry ()
- double & rz ()
- void setX (double x)

  *Sets the x-coordinate of the point to the value specified by x.*
- void setY (double y)

  *Sets the y-coordinate of the point to the value specified by y.*
- void setZ (double y)

  *Sets the z-coordinate of the point to the value specified by z.*
- QPointF toPoint () const
- bool operator== (const QwtPoint3D &) const
- bool operator!= (const QwtPoint3D &) const

### 12.97.1 Detailed Description

QwtPoint3D class defines a 3D point in double coordinates.

### 12.97.2 Constructor & Destructor Documentation

#### 12.97.2.1 QwtPoint3D::QwtPoint3D ( ) `[inline]`

Constructs a null point.

**See Also**

isNull()

#### 12.97.2.2 QwtPoint3D::QwtPoint3D ( const QwtPoint3D & *other* ) `[inline]`

Copy constructor. Constructs a point using the values of the point specified.

#### 12.97.2.3 QwtPoint3D::QwtPoint3D ( const QPointF & *other* ) `[inline]`

Constructs a point with x and y coordinates from a 2D point, and a z coordinate of 0.

### 12.97.3 Member Function Documentation

#### 12.97.3.1 bool QwtPoint3D::isNull ( ) const `[inline]`

**Returns**

True if the point is null; otherwise returns false.

A point is considered to be null if x, y and z-coordinates are equal to zero.

#### 12.97.3.2 bool QwtPoint3D::operator!= ( const QwtPoint3D & *other* ) const `[inline]`

**Returns**

True if this rect and other are different; otherwise returns false.

#### 12.97.3.3 bool QwtPoint3D::operator== ( const QwtPoint3D & *other* ) const `[inline]`

**Returns**

True, if this point and other are equal; otherwise returns false.

#### 12.97.3.4 double & QwtPoint3D::rx ( ) `[inline]`

**Returns**

A reference to the x-coordinate of the point.

#### 12.97.3.5 double & QwtPoint3D::ry ( ) `[inline]`

**Returns**

A reference to the y-coordinate of the point.

#### 12.97.3.6 double & QwtPoint3D::rz ( ) `[inline]`

**Returns**

A reference to the z-coordinate of the point.

#### 12.97.3.7 QPointF QwtPoint3D::toPoint ( ) const [inline]

**Returns**

2D point, where the z coordinate is dropped.

#### 12.97.3.8 double QwtPoint3D::x ( ) const [inline]

**Returns**

The x-coordinate of the point.

#### 12.97.3.9 double QwtPoint3D::y ( ) const [inline]

**Returns**

The y-coordinate of the point.

#### 12.97.3.10 double QwtPoint3D::z ( ) const [inline]

**Returns**

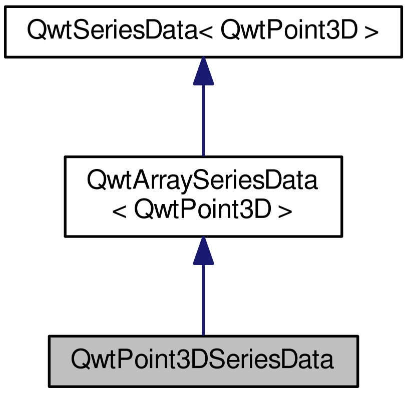
The z-coordinate of the point.

## 12.98 QwtPoint3DSeriesData Class Reference

Interface for iterating over an array of 3D points.

`#include <qwt_series_data.h>`

Inheritance diagram for QwtPoint3DSeriesData:



**Public Member Functions**

- QwtPoint3DSeriesData (const QVector< QwtPoint3D > &=QVector< QwtPoint3D >())
- virtual QRectF boundingRect () const

  *Calculate the bounding rectangle.*

#### Additional Inherited Members

### 12.98.1 Detailed Description

Interface for iterating over an array of 3D points.

### 12.98.2 Constructor & Destructor Documentation

#### 12.98.2.1 QwtPoint3DSeriesData::QwtPoint3DSeriesData ( const QVector< QwtPoint3D > & *samples* = `QVector<`**QwtPoint3D**`>()` )

Constructor

**Parameters**

| | |
|---|---|
| *samples* | Samples |

### 12.98.3 Member Function Documentation

#### 12.98.3.1 QRectF QwtPoint3DSeriesData::boundingRect ( ) const `[virtual]`

Calculate the bounding rectangle.

The bounding rectangle is calculated once by iterating over all points and is stored for all following requests.

**Returns**

Bounding rectangle

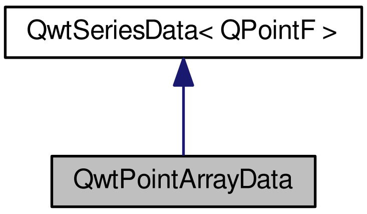
Implements QwtSeriesData< QwtPoint3D >.

## 12.99 QwtPointArrayData Class Reference

Interface for iterating over two QVector<double> objects.

`#include <qwt_point_data.h>`

Inheritance diagram for QwtPointArrayData:



#### Public Member Functions

- QwtPointArrayData (const QVector< double > &x, const QVector< double > &y)
- QwtPointArrayData (const double *x, const double *y, size_t size)

- virtual QRectF boundingRect () const

  *Calculate the bounding rectangle.*
- virtual size_t size () const
- virtual QPointF sample (size_t i) const
- const QVector< double > & xData () const
- const QVector< double > & yData () const

**Additional Inherited Members**

### 12.99.1 Detailed Description

Interface for iterating over two QVector<double> objects.

### 12.99.2 Constructor & Destructor Documentation

#### 12.99.2.1 QwtPointArrayData::QwtPointArrayData ( const QVector< double > & *x*, const QVector< double > & *y* )

Constructor

**Parameters**

| | |
|---:|---|
| *x* | Array of x values |
| *y* | Array of y values |

**See Also**

QwtPlotCurve::setData(), QwtPlotCurve::setSamples()

#### 12.99.2.2 QwtPointArrayData::QwtPointArrayData ( const double ∗ *x*, const double ∗ *y*, size_t *size* )

Constructor

**Parameters**

| | |
|---:|---|
| *x* | Array of x values |
| *y* | Array of y values |
| *size* | Size of the x and y arrays |

**See Also**

QwtPlotCurve::setData(), QwtPlotCurve::setSamples()

### 12.99.3 Member Function Documentation

#### 12.99.3.1 QRectF QwtPointArrayData::boundingRect ( ) const [virtual]

Calculate the bounding rectangle.

The bounding rectangle is calculated once by iterating over all points and is stored for all following requests.

**Returns**

Bounding rectangle

Implements QwtSeriesData< QPointF >.

#### 12.99.3.2 QPointF QwtPointArrayData::sample ( size_t *index* ) const [virtual]

Return the sample at position i

**Parameters**

| | |
|---|---|
| *index* | Index |

**Returns**

Sample at position i

Implements QwtSeriesData< QPointF >.

#### 12.99.3.3 size_t QwtPointArrayData::size ( ) const [virtual]

**Returns**

Size of the data set

Implements QwtSeriesData< QPointF >.

#### 12.99.3.4 const QVector< double > & QwtPointArrayData::xData ( ) const

**Returns**

Array of the x-values

#### 12.99.3.5 const QVector< double > & QwtPointArrayData::yData ( ) const

**Returns**

Array of the y-values

## 12.100 QwtPointMapper Class Reference

A helper class for translating a series of points.

`#include <qwt_point_mapper.h>`

### Public Types

- enum TransformationFlag { RoundPoints = 0x01, WeedOutPoints = 0x02 }

  *Flags affecting the transformation process.*
- typedef QFlags
  < TransformationFlag > TransformationFlags

  *Flags affecting the transformation process.*

### Public Member Functions

- QwtPointMapper ()

  *Constructor.*
- ∼QwtPointMapper ()

  *Destructor.*
- void setFlags (TransformationFlags)
- TransformationFlags flags () const
- void setFlag (TransformationFlag, bool on=true)
- bool testFlag (TransformationFlag) const
- void setBoundingRect (const QRectF &)
- QRectF boundingRect () const
- QPolygonF toPolygonF (const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QwtSeriesData< QPointF > *series, int from, int to) const

*Translate a series of points into a QPolygonF.*

- QPolygon toPolygon (const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QwtSeriesData< QPointF > ∗series, int from, int to) const

  *Translate a series of points into a QPolygon.*
- QPolygon toPoints (const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QwtSeriesData< QPointF > ∗series, int from, int to) const

  *Translate a series of points into a QPolygon.*
- QPolygonF toPointsF (const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QwtSeriesData< QPointF > ∗series, int from, int to) const

  *Translate a series into a QPolygonF.*
- QImage toImage (const QwtScaleMap &xMap, const QwtScaleMap &yMap, const QwtSeriesData< QPointF > ∗series, int from, int to, const QPen &, bool antialiased, uint numThreads) const

  *Translate a series into a QImage.*

#### 12.100.1 Detailed Description

A helper class for translating a series of points.

QwtPointMapper is a collection of methods and optimizations for translating a series of points into paint device coordinates. It is used by QwtPlotCurve but might also be useful for similar plot items displaying a QwtSeriesData<QPointF>.

#### 12.100.2 Member Typedef Documentation

##### 12.100.2.1 typedef QFlags<TransformationFlag> QwtPointMapper::TransformationFlags

Flags affecting the transformation process.

**See Also**

setFlag(), setFlags()

#### 12.100.3 Member Enumeration Documentation

##### 12.100.3.1 enum QwtPointMapper::TransformationFlag

Flags affecting the transformation process.

**See Also**

setFlag(), setFlags()

**Enumerator**

| | |
|---|---|
| ***RoundPoints*** | Round points to integer values. |
| ***WeedOutPoints*** | Try to remove points, that are translated to the same position. |

#### 12.100.4 Member Function Documentation

##### 12.100.4.1 QRectF QwtPointMapper::boundingRect ( ) const

**Returns**

Bounding rectangle

**See Also**

setBoundingRect()

#### 12.100.4.2 QwtPointMapper::TransformationFlags QwtPointMapper::flags ( ) const

**Returns**

Flags affecting the transformation process

**See Also**

setFlags(), setFlag()

#### 12.100.4.3 void QwtPointMapper::setBoundingRect ( const QRectF & *rect* )

Set a bounding rectangle for the point mapping algorithm

A valid bounding rectangle can be used for optimizations

**Parameters**

| | |
|---|---|
| *rect* | Bounding rectangle |

**See Also**

boundingRect()

#### 12.100.4.4 void QwtPointMapper::setFlag ( TransformationFlag *flag*, bool *on* = `true` )

Modify a flag affecting the transformation process

**Parameters**

| | |
|---|---|
| *flag* | Flag type |
| *on* | Value |

**See Also**

flag(), setFlags()

#### 12.100.4.5 void QwtPointMapper::setFlags ( TransformationFlags *flags* )

Set the flags affecting the transformation process

**Parameters**

| | |
|---|---|
| *flags* | Flags |

**See Also**

flags(), setFlag()

#### 12.100.4.6 bool QwtPointMapper::testFlag ( TransformationFlag *flag* ) const

**Returns**

True, when the flag is set

**Parameters**

| | |
|---|---|
| *flag* | Flag type |

**See Also**

setFlag(), setFlags()

#### 12.100.4.7 QImage QwtPointMapper::toImage ( const **QwtScaleMap** & *xMap*, const **QwtScaleMap** & *yMap*, const **QwtSeriesData**< QPointF > ∗ *series*, int *from*, int *to*, const QPen & *pen*, bool *antialiased*, uint *numThreads* ) const

Translate a series into a QImage.

**Parameters**

| | |
|---|---|
| *xMap* | x map |
| *yMap* | y map |
| *series* | Series of points to be mapped |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted |
| *pen* | Pen used for drawing a point of the image, where a point is mapped to |
| *antialiased* | True, when the dots should be displayed antialiased |
| *numThreads* | Number of threads to be used for rendering. If numThreads is set to 0, the system specific ideal thread count is used. |

**Returns**

Image displaying the series

#### 12.100.4.8 QPolygon QwtPointMapper::toPoints ( const **QwtScaleMap** & *xMap*, const **QwtScaleMap** & *yMap*, const **QwtSeriesData**< QPointF > ∗ *series*, int *from*, int *to* ) const

Translate a series of points into a QPolygon.

- WeedOutPoints & boundingRect().isValid() All points that are mapped to the same position will be one point. Points outside of the bounding rectangle are ignored.
- WeedOutPoints & !boundingRect().isValid() All consecutive points that are mapped to the same position will one point
- !WeedOutPoints & boundingRect().isValid() Points outside of the bounding rectangle are ignored.

**Parameters**

| | |
|---|---|
| *xMap* | x map |
| *yMap* | y map |
| *series* | Series of points to be mapped |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted |

**Returns**

Translated polygon

#### 12.100.4.9 QPolygonF QwtPointMapper::toPointsF ( const **QwtScaleMap** & *xMap*, const **QwtScaleMap** & *yMap*, const **QwtSeriesData**< QPointF > ∗ *series*, int *from*, int *to* ) const

Translate a series into a QPolygonF.

- WeedOutPoints & RoundPoints & boundingRect().isValid() All points that are mapped to the same position will be one point. Points outside of the bounding rectangle are ignored.
- WeedOutPoints & RoundPoints & !boundingRect().isValid() All consecutive points that are mapped to the same position will one point
- WeedOutPoints & !RoundPoints All consecutive points that are mapped to the same position will one point
- !WeedOutPoints & boundingRect().isValid() Points outside of the bounding rectangle are ignored.

When RoundPoints is set all points are rounded to integers but returned as PolygonF - what only makes sense when the further processing of the values need a QPolygonF.

**Parameters**

| | |
|---|---|
| *xMap* | x map |
| *yMap* | y map |
| *series* | Series of points to be mapped |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted |

**Returns**

Translated polygon

#### 12.100.4.10 QPolygon QwtPointMapper::toPolygon ( const **QwtScaleMap** & *xMap*, const **QwtScaleMap** & *yMap*, const **QwtSeriesData**< QPointF > ∗ *series*, int *from*, int *to* ) const

Translate a series of points into a QPolygon.

When the WeedOutPoints flag is enabled consecutive points, that are mapped to the same position will be one point.

**Parameters**

| | |
|---|---|
| *xMap* | x map |
| *yMap* | y map |
| *series* | Series of points to be mapped |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted |

**Returns**

Translated polygon

#### 12.100.4.11 QPolygonF QwtPointMapper::toPolygonF ( const **QwtScaleMap** & *xMap*, const **QwtScaleMap** & *yMap*, const **QwtSeriesData**< QPointF > ∗ *series*, int *from*, int *to* ) const

Translate a series of points into a QPolygonF.

When the WeedOutPoints flag is enabled consecutive points, that are mapped to the same position will be one point.

When RoundPoints is set all points are rounded to integers but returned as PolygonF - what only makes sense when the further processing of the values need a QPolygonF.

**Parameters**

| | |
|---:|---|
| *xMap* | x map |
| *yMap* | y map |
| *series* | Series of points to be mapped |
| *from* | Index of the first point to be painted |
| *to* | Index of the last point to be painted |

**Returns**

Translated polygon

## 12.101 QwtPointPolar Class Reference

A point in polar coordinates.

`#include <qwt_point_polar.h>`

### Public Member Functions

- QwtPointPolar ()
- QwtPointPolar (double azimuth, double radius)
- QwtPointPolar (const QwtPointPolar &)
- QwtPointPolar (const QPointF &)
- void setPoint (const QPointF &)
- QPointF toPoint () const
- bool isValid () const

  *Returns true if radius() >= 0.0.*
- bool isNull () const

  *Returns true if radius() >= 0.0.*
- double radius () const

  *Returns the radius.*
- double azimuth () const

  *Returns the azimuth.*
- double & rRadius ()

  *Returns the radius.*
- double & rAzimuth ()

  *Returns the azimuth.*
- void setRadius (double)

  *Sets the radius to radius.*
- void setAzimuth (double)

  *Sets the atimuth to atimuth.*
- bool operator== (const QwtPointPolar &) const

  *Compare 2 points.*
- bool operator!= (const QwtPointPolar &) const
- QwtPointPolar normalized () const

### 12.101.1 Detailed Description

A point in polar coordinates.

In polar coordinates a point is determined by an angle and a distance. See `http://en.wikipedia.-org/wiki/Polar_coordinate_system`

### 12.101.2 Constructor & Destructor Documentation

#### 12.101.2.1 QwtPointPolar::QwtPointPolar ( ) [inline]

Constructs a null point, with a radius and azimuth set to 0.0.

**See Also**

QPointF::isNull()

#### 12.101.2.2 QwtPointPolar::QwtPointPolar ( double *azimuth*, double *radius* ) [inline]

Constructs a point with coordinates specified by radius and azimuth.

**Parameters**

| | |
|---|---|
| *azimuth* | Azimuth |
| *radius* | Radius |

#### 12.101.2.3 QwtPointPolar::QwtPointPolar ( const QwtPointPolar & *other* ) [inline]

Constructs a point using the values of the point specified.

**Parameters**

| | |
|---|---|
| *other* | Other point |

#### 12.101.2.4 QwtPointPolar::QwtPointPolar ( const QPointF & *p* )

Convert and assign values from a point in Cartesian coordinates

**Parameters**

| | |
|---|---|
| *p* | Point in Cartesian coordinates |

**See Also**

setPoint(), toPoint()

### 12.101.3 Member Function Documentation

#### 12.101.3.1 QwtPointPolar QwtPointPolar::normalized ( ) const

Normalize radius and azimuth

When the radius is $<$ 0.0 it is set to 0.0. The azimuth is a value $>=$ 0.0 and $<$ 2 $*$ M_PI.

**Returns**

Normalized point

#### 12.101.3.2 bool QwtPointPolar::operator!= ( const QwtPointPolar & *other* ) const

Compare 2 points

Two points are equal to each other if radius and azimuth-coordinates are the same. Points are not equal, when the azimuth differs, but other.azimuth() == azimuth() % (2 $*$ PI).

**Returns**

True if the point is not equal to other; otherwise return false.

**See Also**

normalized()

#### 12.101.3.3 bool QwtPointPolar::operator== ( const QwtPointPolar & *other* ) const

Compare 2 points.

Two points are equal to each other if radius and azimuth-coordinates are the same. Points are not equal, when the azimuth differs, but other.azimuth() == azimuth() % (2 $*$ PI).

**Returns**

True if the point is equal to other; otherwise return false.

**See Also**

normalized()

#### 12.101.3.4 void QwtPointPolar::setPoint ( const QPointF & *p* )

Convert and assign values from a point in Cartesian coordinates

**Parameters**

| | |
|---|---|
| *p* | Point in Cartesian coordinates |

#### 12.101.3.5 QPointF QwtPointPolar::toPoint ( ) const

Convert and return values in Cartesian coordinates

**Returns**

Converted point in Cartesian coordinates

**Note**

Invalid or null points will be returned as QPointF(0.0, 0.0)

**See Also**

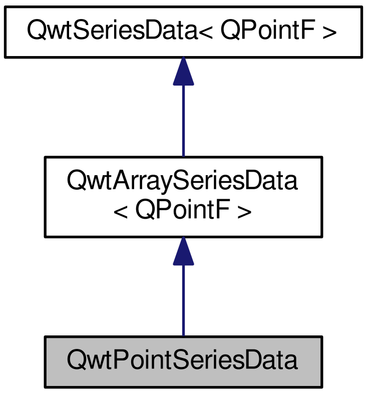
isValid(), isNull()

## 12.102 QwtPointSeriesData Class Reference

Interface for iterating over an array of points.

`#include <qwt_series_data.h>`

Inheritance diagram for QwtPointSeriesData:



**Public Member Functions**

- QwtPointSeriesData (const QVector< QPointF > &=QVector< QPointF >())
- virtual QRectF boundingRect () const

  *Calculate the bounding rectangle.*

**Additional Inherited Members**

### 12.102.1 Detailed Description

Interface for iterating over an array of points.

### 12.102.2 Constructor & Destructor Documentation

#### 12.102.2.1 QwtPointSeriesData::QwtPointSeriesData ( const QVector< QPointF > & *samples* = `QVector<QPointF>()` )

Constructor

**Parameters**

| | |
|---|---|
| *samples* | Samples |

### 12.102.3 Member Function Documentation

#### 12.102.3.1 QRectF QwtPointSeriesData::boundingRect ( ) const [virtual]

Calculate the bounding rectangle.

The bounding rectangle is calculated once by iterating over all points and is stored for all following requests.

**Returns**

Bounding rectangle

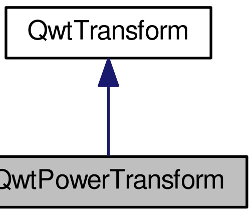
Implements QwtSeriesData< QPointF >.

## 12.103 QwtPowerTransform Class Reference

A transformation using pow()

`#include <qwt_transform.h>`

Inheritance diagram for QwtPowerTransform:



**Public Member Functions**

- QwtPowerTransform (double exponent)
- virtual ~QwtPowerTransform ()

  *Destructor.*
- virtual double transform (double value) const
- virtual double invTransform (double value) const
- virtual QwtTransform ∗ copy () const

### 12.103.1 Detailed Description

A transformation using pow()

QwtPowerTransform preserves the sign of a value. F.e. a transformation with a factor of 2 transforms a value of -3 to -9 and v.v. Thus QwtPowerTransform can be used for scales including negative values.

### 12.103.2 Constructor & Destructor Documentation

#### 12.103.2.1 QwtPowerTransform::QwtPowerTransform ( double *exponent* )

Constructor

**Parameters**

| | |
|---|---|
| *exponent* | Exponent |

#### 12.103.3 Member Function Documentation

##### 12.103.3.1 QwtTransform ∗ QwtPowerTransform::copy ( ) const [virtual]

**Returns**

Clone of the transformation

Implements QwtTransform.

##### 12.103.3.2 double QwtPowerTransform::invTransform ( double *value* ) const [virtual]

**Parameters**

| | |
|---|---|
| *value* | Value to be transformed |

**Returns**

Inverse exponentiation preserving the sign

Implements QwtTransform.

##### 12.103.3.3 double QwtPowerTransform::transform ( double *value* ) const [virtual]

**Parameters**

| | |
|---|---|
| *value* | Value to be transformed |

**Returns**

Exponentiation preserving the sign

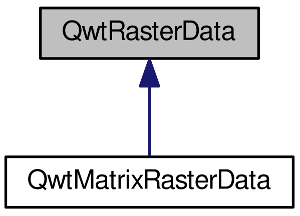
Implements QwtTransform.

## 12.104 QwtRasterData Class Reference

QwtRasterData defines an interface to any type of raster data.

`#include <qwt_raster_data.h>`

Inheritance diagram for QwtRasterData:



### Public Types

- enum ConrecFlag { IgnoreAllVerticesOnLevel = 0x01, IgnoreOutOfRange = 0x02 }

  *Flags to modify the contour algorithm.*
- typedef QMap< double, QPolygonF > ContourLines

  *Contour lines.*
- typedef QFlags< ConrecFlag > ConrecFlags

  *Flags to modify the contour algorithm.*

### Public Member Functions

- QwtRasterData ()

  *Constructor.*
- virtual ~QwtRasterData ()

  *Destructor.*
- virtual void setInterval (Qt::Axis, const QwtInterval &)
- const QwtInterval & interval (Qt::Axis) const
- virtual QRectF pixelHint (const QRectF &) const

  *Pixel hint.*
- virtual void initRaster (const QRectF &, const QSize &raster)

  *Initialize a raster.*
- virtual void discardRaster ()

  *Discard a raster.*
- virtual double value (double x, double y) const =0
- virtual ContourLines contourLines (const QRectF &rect, const QSize &raster, const QList< double > &levels, ConrecFlags) const

### 12.104.1 Detailed Description

QwtRasterData defines an interface to any type of raster data.

QwtRasterData is an abstract interface, that is used by QwtPlotRasterItem to find the values at the pixels of its raster.

Often a raster item is used to display values from a matrix. Then the derived raster data class needs to implement some sort of resampling, that maps the raster of the matrix into the requested raster of the raster item ( depending on resolution and scales of the canvas ).

### 12.104.2 Member Enumeration Documentation

#### 12.104.2.1 enum **QwtRasterData::ConrecFlag**

Flags to modify the contour algorithm.

**Enumerator**

| | |
|---|---|
| ***IgnoreAllVerticesOnLevel*** | Ignore all vertices on the same level. |
| ***IgnoreOutOfRange*** | Ignore all values, that are out of range. |

### 12.104.3 Member Function Documentation

#### 12.104.3.1 **QwtRasterData::ContourLines** QwtRasterData::contourLines ( const QRectF & *rect,* const QSize & *raster,* const QList< double > & *levels,* **ConrecFlags** *flags* ) const `[virtual]`

Calculate contour lines

**Parameters**

| | |
|---:|---|
| *rect* | Bounding rectangle for the contour lines |
| *raster* | Number of data pixels of the raster data |
| *levels* | List of limits, where to insert contour lines |
| *flags* | Flags to customize the contouring algorithm |

**Returns**

Calculated contour lines

An adaption of CONREC, a simple contouring algorithm. `http://local.wasp.uwa.edu.au/~pbourke/papers/conre`

#### 12.104.3.2 void QwtRasterData::discardRaster ( ) `[virtual]`

Discard a raster.

After the composition of an image QwtPlotSpectrogram calls discardRaster().

The default implementation does nothing, but if data has been loaded in initRaster(), it could deleted now.

**See Also**

initRaster(), value()

#### 12.104.3.3 void QwtRasterData::initRaster ( const QRectF & *area*, const QSize & *raster* ) `[virtual]`

Initialize a raster.

Before the composition of an image QwtPlotSpectrogram calls initRaster(), announcing the area and its resolution that will be requested.

The default implementation does nothing, but for data sets that are stored in files, it might be good idea to reimplement initRaster(), where the data is resampled and loaded into memory.

**Parameters**

| | |
|---:|---|
| *area* | Area of the raster |
| *raster* | Number of horizontal and vertical pixels |

**See Also**

initRaster(), value()

#### 12.104.3.4 const QwtInterval & QwtRasterData::interval ( Qt::Axis *axis* ) const `[inline]`

**Returns**

Bounding interval for a axis

**See Also**

setInterval

#### 12.104.3.5 QRectF QwtRasterData::pixelHint ( const QRectF & *area* ) const `[virtual]`

Pixel hint.

pixelHint() returns the geometry of a pixel, that can be used to calculate the resolution and alignment of the plot item, that is representing the data.

Width and height of the hint need to be the horizontal and vertical distances between 2 neighbored points. The center of the hint has to be the position of any point ( it doesn't matter which one ).

An empty hint indicates, that there are values for any detail level.

Limiting the resolution of the image might significantly improve the performance and heavily reduce the amount of memory when rendering a QImage from the raster data.

The default implementation returns an empty rectangle recommending to render in target device ( f.e. screen ) resolution.

**Parameters**

| | |
|---|---|
| *area* | In most implementations the resolution of the data doesn't depend on the requested area. |

**Returns**

Bounding rectangle of a pixel

Reimplemented in QwtMatrixRasterData.

#### 12.104.3.6 void QwtRasterData::setInterval ( Qt::Axis *axis*, const QwtInterval & *interval* ) [virtual]

Set the bounding interval for the x, y or z coordinates.

**Parameters**

| | |
|---|---|
| *axis* | Axis |
| *interval* | Bounding interval |

**See Also**

interval()

Reimplemented in QwtMatrixRasterData.

#### 12.104.3.7 virtual double QwtRasterData::value ( double *x*, double *y* ) const [pure virtual]

**Returns**

the value at a raster position

**Parameters**

| | |
|---|---|
| *x* | X value in plot coordinates |
| *y* | Y value in plot coordinates |

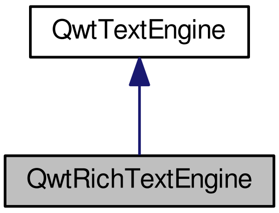
Implemented in QwtMatrixRasterData.

## 12.105 QwtRichTextEngine Class Reference

A text engine for Qt rich texts.

`#include <qwt_text_engine.h>`

Inheritance diagram for QwtRichTextEngine:



**Public Member Functions**

- QwtRichTextEngine ()

  *Constructor.*
- virtual double heightForWidth (const QFont &font, int flags, const QString &text, double width) const
- virtual QSizeF textSize (const QFont &font, int flags, const QString &text) const
- virtual void draw (QPainter ∗painter, const QRectF &rect, int flags, const QString &text) const
- virtual bool mightRender (const QString &) const
- virtual void textMargins (const QFont &, const QString &, double &left, double &right, double &top, double &bottom) const

**Additional Inherited Members**

### 12.105.1 Detailed Description

A text engine for Qt rich texts.

QwtRichTextEngine renders Qt rich texts using the classes of the Scribe framework of Qt.

### 12.105.2 Member Function Documentation

#### 12.105.2.1 void QwtRichTextEngine::draw ( QPainter ∗ *painter,* const QRectF & *rect,* int *flags,* const QString & *text* ) const `[virtual]`

Draw the text in a clipping rectangle

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Clipping rectangle |
| *flags* | Bitwise OR of the flags like in for QPainter::drawText() |
| *text* | Text to be rendered |

Implements QwtTextEngine.

#### 12.105.2.2 double QwtRichTextEngine::heightForWidth ( const QFont & *font,* int *flags,* const QString & *text,* double *width* ) const `[virtual]`

Find the height for a given width

**Parameters**

| | |
|---|---|
| *font* | Font of the text |
| *flags* | Bitwise OR of the flags used like in QPainter::drawText() |
| *text* | Text to be rendered |
| *width* | Width |

**Returns**

Calculated height

Implements QwtTextEngine.

#### 12.105.2.3 bool QwtRichTextEngine::mightRender ( const QString & *text* ) const `[virtual]`

Test if a string can be rendered by this text engine

**Parameters**

| | |
|---|---|
| *text* | Text to be tested |

**Returns**

Qt::mightBeRichText(text);

Implements QwtTextEngine.

#### 12.105.2.4 void QwtRichTextEngine::textMargins ( const QFont & , const QString & , double & *left,* double & *right,* double & *top,* double & *bottom* ) const `[virtual]`

Return margins around the texts

**Parameters**

| | |
|---|---|
| *left* | Return 0 |
| *right* | Return 0 |
| *top* | Return 0 |
| *bottom* | Return 0 |

Implements QwtTextEngine.

#### 12.105.2.5 QSizeF QwtRichTextEngine::textSize ( const QFont & *font,* int *flags,* const QString & *text* ) const `[virtual]`

Returns the size, that is needed to render text

**Parameters**

| | |
|---|---|
| *font* | Font of the text |
| *flags* | Bitwise OR of the flags used like in QPainter::drawText() |
| *text* | Text to be rendered |

**Returns**

Caluclated size

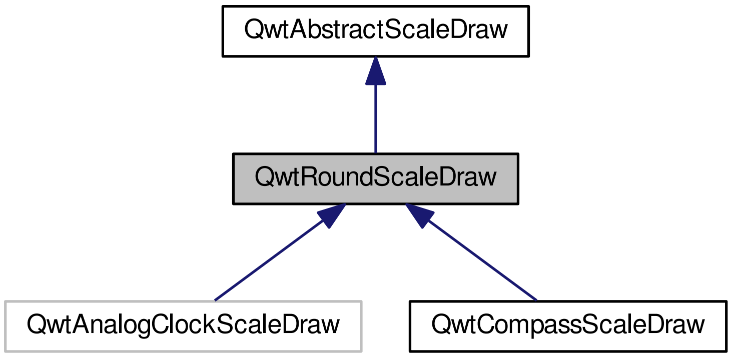
Implements QwtTextEngine.

## 12.106 QwtRoundScaleDraw Class Reference

A class for drawing round scales.

`#include <qwt_round_scale_draw.h>`

Inheritance diagram for QwtRoundScaleDraw:



#### Public Member Functions

- QwtRoundScaleDraw ()

  *Constructor.*
- virtual ∼QwtRoundScaleDraw ()

  *Destructor.*
- void setRadius (double radius)
- double radius () const
- void moveCenter (double x, double y)

  *Move the center of the scale draw, leaving the radius unchanged.*
- void moveCenter (const QPointF &)
- QPointF center () const

  *Get the center of the scale.*
- void setAngleRange (double angle1, double angle2)

  *Adjust the baseline circle segment for round scales.*
- virtual double extent (const QFont &) const

#### Protected Member Functions

- virtual void drawTick (QPainter ∗, double val, double len) const
- virtual void drawBackbone (QPainter ∗) const
- virtual void drawLabel (QPainter ∗, double val) const

#### Additional Inherited Members

### 12.106.1 Detailed Description

A class for drawing round scales.

QwtRoundScaleDraw can be used to draw round scales. The circle segment can be adjusted by setAngleRange(). The geometry of the scale can be specified with moveCenter() and setRadius().

After a scale division has been specified as a QwtScaleDiv object using QwtAbstractScaleDraw::setScaleDiv(const QwtScaleDiv &s), the scale can be drawn with the QwtAbstractScaleDraw::draw() member.

### 12.106.2 Constructor & Destructor Documentation

#### 12.106.2.1 QwtRoundScaleDraw::QwtRoundScaleDraw ( )

Constructor.

The range of the scale is initialized to [0, 100], The center is set to (50, 50) with a radius of 50. The angle range is set to [-135, 135].

### 12.106.3 Member Function Documentation

#### 12.106.3.1 void QwtRoundScaleDraw::drawBackbone ( QPainter ∗ *painter* ) const [protected], [virtual]

Draws the baseline of the scale

**Parameters**

| | |
|---|---|
| *painter* | Painter |

**See Also**

drawTick(), drawLabel()

Implements QwtAbstractScaleDraw.

#### 12.106.3.2 void QwtRoundScaleDraw::drawLabel ( QPainter ∗ *painter,* double *value* ) const [protected], [virtual]

Draws the label for a major scale tick

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *value* | Value |

**See Also**

drawTick(), drawBackbone()

Implements QwtAbstractScaleDraw.

#### 12.106.3.3 void QwtRoundScaleDraw::drawTick ( QPainter ∗ *painter,* double *value,* double *len* ) const [protected], [virtual]

Draw a tick

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *value* | Value of the tick |
| *len* | Lenght of the tick |

**See Also**

drawBackbone(), drawLabel()

Implements QwtAbstractScaleDraw.

#### 12.106.3.4 double QwtRoundScaleDraw::extent ( const QFont & *font* ) const [virtual]

Calculate the extent of the scale

The extent is the distance between the baseline to the outermost pixel of the scale draw. radius() + extent() is an upper limit for the radius of the bounding circle.

**Parameters**

| | |
|---:|---|
| *font* | Font used for painting the labels |

**Returns**

Calculated extent

**See Also**

setMinimumExtent(), minimumExtent()

**Warning**

The implemented algorithm is not too smart and calculates only an upper limit, that might be a few pixels too large

Implements QwtAbstractScaleDraw.

#### 12.106.3.5 void QwtRoundScaleDraw::moveCenter ( const QPointF & *center* )

Move the center of the scale draw, leaving the radius unchanged

**Parameters**

| | |
|---:|---|
| *center* | New center |

**See Also**

setRadius()

#### 12.106.3.6 double QwtRoundScaleDraw::radius ( ) const

Get the radius

Radius is the radius of the backbone without ticks and labels.

**Returns**

Radius of the scale

**See Also**

setRadius(), extent()

#### 12.106.3.7 void QwtRoundScaleDraw::setAngleRange ( double *angle1,* double *angle2* )

Adjust the baseline circle segment for round scales.

The baseline will be drawn from min(angle1,angle2) to max(angle1, angle2). The default setting is [ -135, 135 ]. An angle of 0 degrees corresponds to the 12 o'clock position, and positive angles count in a clockwise direction.

**Parameters**

| | |
|---:|---|
| *angle1* | |
| *angle2* | boundaries of the angle interval in degrees. |

**Warning**

- The angle range is limited to [-360, 360] degrees. Angles exceeding this range will be clipped.
- For angles more or equal than 360 degrees above or below min(angle1, angle2), scale marks will not be drawn.
- If you need a counterclockwise scale, use QwtScaleDiv::setInterval()

#### 12.106.3.8 void QwtRoundScaleDraw::setRadius ( double *radius* )

Change of radius the scale

Radius is the radius of the backbone without ticks and labels.

**Parameters**

| | |
|---|---|
| *radius* | New Radius |

**See Also**

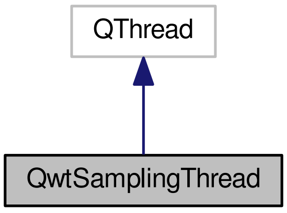
moveCenter()

## 12.107 QwtSamplingThread Class Reference

A thread collecting samples at regular intervals.

```
#include <qwt_sampling_thread.h>
```

Inheritance diagram for QwtSamplingThread:



**Public Slots**

- void setInterval (double interval)
- void stop ()

**Public Member Functions**

- virtual ~QwtSamplingThread ()

  *Destructor.*
- double interval () const
- double elapsed () const

**Protected Member Functions**

- QwtSamplingThread (QObject ∗parent=NULL)

  *Constructor.*
- virtual void run ()
- virtual void sample (double elapsed)=0

### 12.107.1 Detailed Description

A thread collecting samples at regular intervals.

Continuous signals are converted into a discrete signal by collecting samples at regular intervals. A discrete signal can be displayed by a QwtPlotSeriesItem on a QwtPlot widget.

QwtSamplingThread starts a thread calling periodically sample(), to collect and store ( or emit ) a single sample.

**See Also**

QwtPlotCurve, QwtPlotSeriesItem

### 12.107.2 Member Function Documentation

#### 12.107.2.1 double QwtSamplingThread::elapsed ( ) const

**Returns**

Time (in ms) since the thread was started

**See Also**

QThread::start(), run()

#### 12.107.2.2 double QwtSamplingThread::interval ( ) const

**Returns**

Interval (in ms), between 2 calls of sample()

**See Also**

setInterval()

#### 12.107.2.3 void QwtSamplingThread::run ( ) [protected], [virtual]

Loop collecting samples started from QThread::start()

**See Also**

stop()

#### 12.107.2.4 virtual void QwtSamplingThread::sample ( double *elapsed* ) [protected], [pure virtual]

Collect a sample

**Parameters**

| | |
|---|---|
| *elapsed* | Time since the thread was started in milliseconds |

#### 12.107.2.5 void QwtSamplingThread::setInterval ( double *interval* ) [slot]

Change the interval (in ms), when sample() is called. The default interval is 1000.0 ( = 1s )

**Parameters**

| | |
|---|---|
| *interval* | Interval |

**See Also**

interval()

#### 12.107.2.6 void QwtSamplingThread::stop ( ) [slot]

Terminate the collecting thread

**See Also**

QThread::start(), run()

## 12.108 QwtScaleArithmetic Class Reference

Arithmetic including a tolerance.

```
#include <qwt_scale_engine.h>
```

**Static Public Member Functions**

- static double ceilEps (double value, double intervalSize)
- static double floorEps (double value, double intervalSize)
- static double divideEps (double interval, double steps)

  *Divide an interval into steps.*
- static double divideInterval (double interval, int numSteps, uint base)

### 12.108.1 Detailed Description

Arithmetic including a tolerance.

### 12.108.2 Member Function Documentation

#### 12.108.2.1 double QwtScaleArithmetic::ceilEps ( double *value*, double *intervalSize* ) [static]

Ceil a value, relative to an interval

**Parameters**

| | |
|---|---|
| *value* | Value to be ceiled |
| *intervalSize* | Interval size |

**Returns**

Rounded value

**See Also**

floorEps()

#### 12.108.2.2 double QwtScaleArithmetic::divideEps ( double *intervalSize*, double *numSteps* ) [static]

Divide an interval into steps.

$stepSize = (intervalSize - intervalSize * 10e^{-6}) / numSteps$

**Parameters**

| | |
|---|---|
| *intervalSize* | Interval size |
| *numSteps* | Number of steps |

**Returns**

Step size

#### 12.108.2.3 double QwtScaleArithmetic::divideInterval ( double *intervalSize,* int *numSteps,* uint *base* ) `[static]`

Calculate a step size for a given interval

**Parameters**

| | |
|---|---|
| *intervalSize* | Interval size |
| *numSteps* | Number of steps |
| *base* | Base for the division ( usually 10 ) |

**Returns**

Calculated step size

#### 12.108.2.4 double QwtScaleArithmetic::floorEps ( double *value,* double *intervalSize* ) `[static]`

Floor a value, relative to an interval

**Parameters**

| | |
|---|---|
| *value* | Value to be floored |
| *intervalSize* | Interval size |

**Returns**

Rounded value

**See Also**

floorEps()

## 12.109 QwtScaleDiv Class Reference

A class representing a scale division.

`#include <qwt_scale_div.h>`

### Public Types

- enum TickType {
  NoTick = -1, MinorTick, MediumTick, MajorTick,
  NTickTypes }

  *Scale tick types.*

### Public Member Functions

- QwtScaleDiv (double lowerBound=0.0, double upperBound=0.0)
- QwtScaleDiv (const QwtInterval &, QList< double >[NTickTypes])

- QwtScaleDiv (double lowerBound, double upperBound, QList< double >[NTickTypes])
- QwtScaleDiv (double lowerBound, double upperBound, const QList< double > &minorTicks, const QList< double > &mediumTicks, const QList< double > &majorTicks)
- bool operator== (const QwtScaleDiv &) const

  *Equality operator.*
- bool operator!= (const QwtScaleDiv &) const

  *Inequality.*
- void setInterval (double lowerBound, double upperBound)
- void setInterval (const QwtInterval &)
- QwtInterval interval () const
- void setLowerBound (double)
- double lowerBound () const
- void setUpperBound (double)
- double upperBound () const
- double range () const
- bool contains (double value) const
- void setTicks (int tickType, const QList< double > &)
- QList< double > ticks (int tickType) const
- bool isEmpty () const

  *Check if the scale division is empty( lowerBound() == upperBound() )*
- bool isIncreasing () const

  *Check if the scale division is increasing( lowerBound() <= upperBound() )*
- void invert ()
- QwtScaleDiv inverted () const
- QwtScaleDiv bounded (double lowerBound, double upperBound) const

### 12.109.1 Detailed Description

A class representing a scale division.

A Qwt scale is defined by its boundaries and 3 list for the positions of the major, medium and minor ticks.

The upperLimit() might be smaller than the lowerLimit() to indicate inverted scales.

Scale divisions can be calculated from a QwtScaleEngine.

**See Also**

QwtScaleEngine::divideScale(), QwtPlot::setAxisScaleDiv(), QwtAbstractSlider::setScaleDiv()

### 12.109.2 Member Enumeration Documentation

#### 12.109.2.1 enum QwtScaleDiv::TickType

Scale tick types.

**Enumerator**

| | |
|---|---|
| ***NoTick*** | No ticks. |
| ***MinorTick*** | Minor ticks. |
| ***MediumTick*** | Medium ticks. |
| ***MajorTick*** | Major ticks. |
| ***NTickTypes*** | Number of valid tick types. |

#### 12.109.3 Constructor & Destructor Documentation

##### 12.109.3.1 QwtScaleDiv::QwtScaleDiv ( double *lowerBound* = `0.0`, double *upperBound* = `0.0` ) `[explicit]`

Construct a division without ticks

**Parameters**

| | |
|---|---|
| *lowerBound* | First boundary |
| *upperBound* | Second boundary |

**Note**

lowerBound might be greater than upperBound for inverted scales

#### 12.109.3.2 QwtScaleDiv::QwtScaleDiv ( const QwtInterval & *interval,* QList< double > *ticks[NTickTypes]* ) [explicit]

Construct a scale division

**Parameters**

| | |
|---|---|
| *interval* | Interval |
| *ticks* | List of major, medium and minor ticks |

#### 12.109.3.3 QwtScaleDiv::QwtScaleDiv ( double *lowerBound,* double *upperBound,* QList< double > *ticks[NTickTypes]* ) [explicit]

Construct a scale division

**Parameters**

| | |
|---|---|
| *lowerBound* | First boundary |
| *upperBound* | Second boundary |
| *ticks* | List of major, medium and minor ticks |

**Note**

lowerBound might be greater than upperBound for inverted scales

#### 12.109.3.4 QwtScaleDiv::QwtScaleDiv ( double *lowerBound,* double *upperBound,* const QList< double > & *minorTicks,* const QList< double > & *mediumTicks,* const QList< double > & *majorTicks* ) [explicit]

Construct a scale division

**Parameters**

| | |
|---|---|
| *lowerBound* | First boundary |
| *upperBound* | Second boundary |
| *minorTicks* | List of minor ticks |
| *mediumTicks* | List medium ticks |
| *majorTicks* | List of major ticks |

**Note**

lowerBound might be greater than upperBound for inverted scales

### 12.109.4 Member Function Documentation

#### 12.109.4.1 QwtScaleDiv QwtScaleDiv::bounded ( double *lowerBound,* double *upperBound* ) const

Return a scale division with an interval [lowerBound, upperBound] where all ticks outside this interval are removed

**Parameters**

| | |
|---|---|
| *lowerBound* | Lower bound |
| *upperBound* | Upper bound |

**Returns**

Scale division with all ticks inside of the given interval

**Note**

lowerBound might be greater than upperBound for inverted scales

#### 12.109.4.2 bool QwtScaleDiv::contains ( double *value* ) const

Return if a value is between lowerBound() and upperBound()

**Parameters**

| | |
|---|---|
| *value* | Value |

**Returns**

true/false

#### 12.109.4.3 QwtInterval QwtScaleDiv::interval ( ) const

**Returns**

lowerBound -> upperBound

#### 12.109.4.4 void QwtScaleDiv::invert ( )

Invert the scale division

**See Also**

inverted()

#### 12.109.4.5 QwtScaleDiv QwtScaleDiv::inverted ( ) const

**Returns**

A scale division with inverted boundaries and ticks

**See Also**

invert()

#### 12.109.4.6 double QwtScaleDiv::lowerBound ( ) const

**Returns**

First boundary

**See Also**

upperBound()

#### 12.109.4.7 bool QwtScaleDiv::operator!= ( const QwtScaleDiv & *other* ) const

Inequality.

**Returns**

true if this instance is not equal to other

#### 12.109.4.8 bool QwtScaleDiv::operator== ( const QwtScaleDiv & *other* ) const

Equality operator.

**Returns**

true if this instance is equal to other

#### 12.109.4.9 double QwtScaleDiv::range ( ) const

**Returns**

upperBound() - lowerBound()

#### 12.109.4.10 void QwtScaleDiv::setInterval ( double *lowerBound,* double *upperBound* )

Change the interval

**Parameters**

| | |
|---|---|
| *lowerBound* | First boundary |
| *upperBound* | Second boundary |

**Note**

lowerBound might be greater than upperBound for inverted scales

#### 12.109.4.11 void QwtScaleDiv::setInterval ( const QwtInterval & *interval* )

Change the interval

**Parameters**

| | |
|---|---|
| *interval* | Interval |

#### 12.109.4.12 void QwtScaleDiv::setLowerBound ( double *lowerBound* )

Set the first boundary

**Parameters**

| | |
|---|---|
| *lowerBound* | First boundary |

**See Also**

lowerBiound(), setUpperBound()

#### 12.109.4.13 void QwtScaleDiv::setTicks ( int *type,* const QList< double > & *ticks* )

Assign ticks

**Parameters**

| | |
|---:|---|
| *type* | MinorTick, MediumTick or MajorTick |
| *ticks* | Values of the tick positions |

#### 12.109.4.14 void QwtScaleDiv::setUpperBound ( double *upperBound* )

Set the second boundary

**Parameters**

| | |
|---:|---|
| *upperBound* | Second boundary |

**See Also**

upperBound(), setLowerBound()

#### 12.109.4.15 QList< double > QwtScaleDiv::ticks ( int *type* ) const

Return a list of ticks

**Parameters**

| | |
|---:|---|
| *type* | MinorTick, MediumTick or MajorTick |

**Returns**

Tick list

#### 12.109.4.16 double QwtScaleDiv::upperBound ( ) const

**Returns**

upper bound

**See Also**

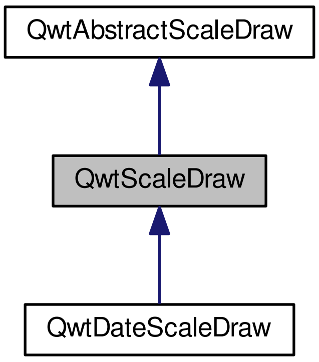
lowerBound()

## 12.110 QwtScaleDraw Class Reference

A class for drawing scales.

```
#include <qwt_scale_draw.h>
```

Inheritance diagram for QwtScaleDraw:



### Public Types

- enum Alignment { BottomScale, TopScale, LeftScale, RightScale }

### Public Member Functions

- QwtScaleDraw ()

  *Constructor.*
- virtual ∼QwtScaleDraw ()

  *Destructor.*
- void getBorderDistHint (const QFont &, int &start, int &end) const

  *Determine the minimum border distance.*
- int minLabelDist (const QFont &) const
- int minLength (const QFont &) const
- virtual double extent (const QFont &) const
- void move (double x, double y)
- void move (const QPointF &)

  *Move the position of the scale.*
- void setLength (double length)
- Alignment alignment () const
- void setAlignment (Alignment)
- Qt::Orientation orientation () const
- QPointF pos () const
- double length () const
- void setLabelAlignment (Qt::Alignment)

  *Change the label flags.*
- Qt::Alignment labelAlignment () const
- void setLabelRotation (double rotation)
- double labelRotation () const
- int maxLabelHeight (const QFont &) const
- int maxLabelWidth (const QFont &) const
- QPointF labelPosition (double val) const
- QRectF labelRect (const QFont &, double val) const

- QSizeF labelSize (const QFont &, double val) const
- QRect boundingLabelRect (const QFont &, double val) const

  *Find the bounding rectangle for the label.*

#### Protected Member Functions

- QTransform labelTransformation (const QPointF &, const QSizeF &) const
- virtual void drawTick (QPainter ∗, double val, double len) const
- virtual void drawBackbone (QPainter ∗) const
- virtual void drawLabel (QPainter ∗, double val) const

### 12.110.1 Detailed Description

A class for drawing scales.

QwtScaleDraw can be used to draw linear or logarithmic scales. A scale has a position, an alignment and a length, which can be specified . The labels can be rotated and aligned to the ticks using setLabelRotation() and setLabel-Alignment().

After a scale division has been specified as a QwtScaleDiv object using QwtAbstractScaleDraw::setScaleDiv(const QwtScaleDiv &s), the scale can be drawn with the QwtAbstractScaleDraw::draw() member.

### 12.110.2 Member Enumeration Documentation

#### 12.110.2.1 enum **QwtScaleDraw::Alignment**

Alignment of the scale draw

**See Also**

setAlignment(), alignment()

**Enumerator**

***BottomScale*** The scale is below.

***TopScale*** The scale is above.

***LeftScale*** The scale is left.

***RightScale*** The scale is right.

### 12.110.3 Constructor & Destructor Documentation

#### 12.110.3.1 QwtScaleDraw::QwtScaleDraw ( )

Constructor.

The range of the scale is initialized to [0, 100], The position is at (0, 0) with a length of 100. The orientation is QwtAbstractScaleDraw::Bottom.

### 12.110.4 Member Function Documentation

#### 12.110.4.1 **QwtScaleDraw::Alignment** QwtScaleDraw::alignment ( ) const

Return alignment of the scale

**See Also**

setAlignment()

**Returns**

Alignment of the scale

#### 12.110.4.2 QRect QwtScaleDraw::boundingLabelRect ( const QFont & *font*, double *value* ) const

Find the bounding rectangle for the label.

The coordinates of the rectangle are absolute ( calculated from pos() ). in direction of the tick.

**Parameters**

| | |
|---|---|
| *font* | Font used for painting |
| *value* | Value |

**Returns**

Bounding rectangle

**See Also**

labelRect()

#### 12.110.4.3 void QwtScaleDraw::drawBackbone ( QPainter ∗ *painter* ) const [protected], [virtual]

Draws the baseline of the scale

**Parameters**

| | |
|---|---|
| *painter* | Painter |

**See Also**

drawTick(), drawLabel()

Implements QwtAbstractScaleDraw.

#### 12.110.4.4 void QwtScaleDraw::drawLabel ( QPainter ∗ *painter*, double *value* ) const [protected], [virtual]

Draws the label for a major scale tick

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *value* | Value |

**See Also**

drawTick(), drawBackbone(), boundingLabelRect()

Implements QwtAbstractScaleDraw.

#### 12.110.4.5 void QwtScaleDraw::drawTick ( QPainter ∗ *painter*, double *value*, double *len* ) const [protected], [virtual]

Draw a tick

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *value* | Value of the tick |
| *len* | Length of the tick |

**See Also**

drawBackbone(), drawLabel()

Implements QwtAbstractScaleDraw.

#### 12.110.4.6 double QwtScaleDraw::extent ( const QFont & *font* ) const [virtual]

Calculate the width/height that is needed for a vertical/horizontal scale.

The extent is calculated from the pen width of the backbone, the major tick length, the spacing and the maximum width/height of the labels.

**Parameters**

| | |
|---:|---|
| *font* | Font used for painting the labels |

**Returns**

Extent

**See Also**

minLength()

Implements QwtAbstractScaleDraw.

#### 12.110.4.7 void QwtScaleDraw::getBorderDistHint ( const QFont & *font,* int & *start,* int & *end* ) const

Determine the minimum border distance.

This member function returns the minimum space needed to draw the mark labels at the scale's endpoints.

**Parameters**

| | |
|---:|---|
| *font* | Font |
| *start* | Start border distance |
| *end* | End border distance |

#### 12.110.4.8 Qt::Alignment QwtScaleDraw::labelAlignment ( ) const

**Returns**

the label flags

**See Also**

setLabelAlignment(), labelRotation()

#### 12.110.4.9 QPointF QwtScaleDraw::labelPosition ( double *value* ) const

Find the position, where to paint a label

The position has a distance that depends on the length of the ticks in direction of the alignment().

**Parameters**

| | |
|---|---|
| *value* | Value |

**Returns**

Position, where to paint a label

#### 12.110.4.10 QRectF QwtScaleDraw::labelRect ( const QFont & *font*, double *value* ) const

Find the bounding rectangle for the label. The coordinates of the rectangle are relative to spacing + tick length from the backbone in direction of the tick.

**Parameters**

| | |
|---|---|
| *font* | Font used for painting |
| *value* | Value |

**Returns**

Bounding rectangle that is needed to draw a label

#### 12.110.4.11 double QwtScaleDraw::labelRotation ( ) const

**Returns**

the label rotation

**See Also**

setLabelRotation(), labelAlignment()

#### 12.110.4.12 QSizeF QwtScaleDraw::labelSize ( const QFont & *font*, double *value* ) const

Calculate the size that is needed to draw a label

**Parameters**

| | |
|---|---|
| *font* | Label font |
| *value* | Value |

**Returns**

Size that is needed to draw a label

#### 12.110.4.13 QTransform QwtScaleDraw::labelTransformation ( const QPointF & *pos*, const QSizeF & *size* ) const [protected]

Calculate the transformation that is needed to paint a label depending on its alignment and rotation.

**Parameters**

| | |
|---|---|
| *pos* | Position where to paint the label |
| *size* | Size of the label |

**Returns**

Transformation matrix

**See Also**

setLabelAlignment(), setLabelRotation()

#### 12.110.4.14 double QwtScaleDraw::length ( ) const

**Returns**

the length of the backbone

**See Also**

setLength(), pos()

#### 12.110.4.15 int QwtScaleDraw::maxLabelHeight ( const QFont & *font* ) const

**Parameters**

| | |
|---|---|
| *font* | Font |

**Returns**

the maximum height of a label

#### 12.110.4.16 int QwtScaleDraw::maxLabelWidth ( const QFont & *font* ) const

**Parameters**

| | |
|---|---|
| *font* | Font |

**Returns**

the maximum width of a label

#### 12.110.4.17 int QwtScaleDraw::minLabelDist ( const QFont & *font* ) const

Determine the minimum distance between two labels, that is necessary that the texts don't overlap.

**Parameters**

| | |
|---|---|
| *font* | Font |

**Returns**

The maximum width of a label

**See Also**

getBorderDistHint()

#### 12.110.4.18 int QwtScaleDraw::minLength ( const QFont & *font* ) const

Calculate the minimum length that is needed to draw the scale

**Parameters**

| | |
|---|---|
| *font* | Font used for painting the labels |

**Returns**

Minimum length that is needed to draw the scale

**See Also**

extent()

#### 12.110.4.19 void QwtScaleDraw::move ( double *x*, double *y* ) `[inline]`

Move the position of the scale

**Parameters**

| | |
|---|---|
| *x* | X coordinate |
| *y* | Y coordinate |

**See Also**

move(const QPointF &)

#### 12.110.4.20 void QwtScaleDraw::move ( const QPointF & *pos* )

Move the position of the scale.

The meaning of the parameter pos depends on the alignment:

**QwtScaleDraw::LeftScale** The origin is the topmost point of the backbone. The backbone is a vertical line. Scale marks and labels are drawn at the left of the backbone.

**QwtScaleDraw::RightScale** The origin is the topmost point of the backbone. The backbone is a vertical line. Scale marks and labels are drawn at the right of the backbone.

**QwtScaleDraw::TopScale** The origin is the leftmost point of the backbone. The backbone is a horizontal line. Scale marks and labels are drawn above the backbone.

**QwtScaleDraw::BottomScale** The origin is the leftmost point of the backbone. The backbone is a horizontal line Scale marks and labels are drawn below the backbone.

**Parameters**

| | |
|---|---|
| *pos* | Origin of the scale |

**See Also**

pos(), setLength()

#### 12.110.4.21 Qt::Orientation QwtScaleDraw::orientation ( ) const

Return the orientation

TopScale, BottomScale are horizontal (Qt::Horizontal) scales, LeftScale, RightScale are vertical (Qt::Vertical) scales.

**Returns**

Orientation of the scale

**See Also**

alignment()

#### 12.110.4.22 QPointF QwtScaleDraw::pos ( ) const

**Returns**

Origin of the scale

**See Also**

move(), length()

#### 12.110.4.23 void QwtScaleDraw::setAlignment ( Alignment *align* )

Set the alignment of the scale

**Parameters**

| | |
|---|---|
| *align* | Alignment of the scale |

The default alignment is QwtScaleDraw::BottomScale

**See Also**

alignment()

#### 12.110.4.24 void QwtScaleDraw::setLabelAlignment ( Qt::Alignment *alignment* )

Change the label flags.

Labels are aligned to the point tick length + spacing away from the backbone.

The alignment is relative to the orientation of the label text. In case of an flags of 0 the label will be aligned depending on the orientation of the scale:

```
QwtScaleDraw::TopScale: Qt::AlignHCenter | Qt::AlignTop\n
QwtScaleDraw::BottomScale: Qt::AlignHCenter | Qt::AlignBottom\n
QwtScaleDraw::LeftScale: Qt::AlignLeft | Qt::AlignVCenter\n
QwtScaleDraw::RightScale: Qt::AlignRight | Qt::AlignVCenter\n
```

Changing the alignment is often necessary for rotated labels.

**Parameters**

| | |
|---|---|
| *alignment* | Or'd Qt::AlignmentFlags see <qnamespace.h> |

**See Also**

setLabelRotation(), labelRotation(), labelAlignment()

**Warning**

The various alignments might be confusing. The alignment of the label is not the alignment of the scale and is not the alignment of the flags ( QwtText::flags() ) returned from QwtAbstractScaleDraw::label().

#### 12.110.4.25 void QwtScaleDraw::setLabelRotation ( double *rotation* )

Rotate all labels.

When changing the rotation, it might be necessary to adjust the label flags too. Finding a useful combination is often the result of try and error.

**Parameters**

| | |
|---|---|
| *rotation* | Angle in degrees. When changing the label rotation, the label flags often needs to be adjusted too. |

**See Also**

setLabelAlignment(), labelRotation(), labelAlignment().

#### 12.110.4.26 void QwtScaleDraw::setLength ( double *length* )

Set the length of the backbone.

The length doesn't include the space needed for overlapping labels.

**Parameters**

| | |
|---|---|
| *length* | Length of the backbone |

**See Also**

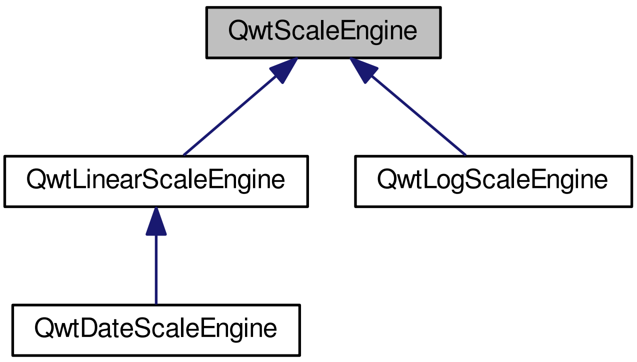
move(), minLabelDist()

## 12.111 QwtScaleEngine Class Reference

Base class for scale engines.

`#include <qwt_scale_engine.h>`

Inheritance diagram for QwtScaleEngine:



**Public Types**

- enum Attribute {
  NoAttribute = 0x00, IncludeReference = 0x01, Symmetric = 0x02, Floating = 0x04,
  Inverted = 0x08 }
- typedef QFlags< Attribute > Attributes

  *Layout attributes.*

**Public Member Functions**

- QwtScaleEngine (uint base=10)
- virtual ∼QwtScaleEngine ()

  *Destructor.*
- void setBase (uint base)
- uint base () const
- void setAttribute (Attribute, bool on=true)
- bool testAttribute (Attribute) const
- void setAttributes (Attributes)
- Attributes attributes () const
- void setReference (double reference)

  *Specify a reference point.*

- double reference () const
- void setMargins (double lower, double upper)

  *Specify margins at the scale's endpoints.*
- double lowerMargin () const
- double upperMargin () const
- virtual void autoScale (int maxNumSteps, double &x1, double &x2, double &stepSize) const =0
- virtual QwtScaleDiv divideScale (double x1, double x2, int maxMajorSteps, int maxMinorSteps, double stepSize=0.0) const =0

  *Calculate a scale division.*
- void setTransformation (QwtTransform ∗)
- QwtTransform ∗ transformation () const

**Protected Member Functions**

- bool contains (const QwtInterval &, double val) const
- QList< double > strip (const QList< double > &, const QwtInterval &) const
- double divideInterval (double interval, int numSteps) const
- QwtInterval buildInterval (double v) const

  *Build an interval around a value.*

### 12.111.1 Detailed Description

Base class for scale engines.

A scale engine tries to find "reasonable" ranges and step sizes for scales.

The layout of the scale can be varied with setAttribute().

Qwt offers implementations for logarithmic and linear scales.

### 12.111.2 Member Enumeration Documentation

#### 12.111.2.1 enum QwtScaleEngine::Attribute

Layout attributes

**See Also**

setAttribute(), testAttribute(), reference(), lowerMargin(), upperMargin()

**Enumerator**

***NoAttribute*** No attributes.

***IncludeReference*** Build a scale which includes the reference() value.

***Symmetric*** Build a scale which is symmetric to the reference() value.

***Floating*** The endpoints of the scale are supposed to be equal the outmost included values plus the specified margins (see setMargins()). If this attribute is *not* set, the endpoints of the scale will be integer multiples of the step size.

***Inverted*** Turn the scale upside down.

### 12.111.3 Constructor & Destructor Documentation

#### 12.111.3.1 QwtScaleEngine::QwtScaleEngine ( uint *base* = `10` ) `[explicit]`

Constructor

**Parameters**

| | |
|---|---|
| *base* | Base of the scale engine |

**See Also**

setBase()

### 12.111.4 Member Function Documentation

#### 12.111.4.1 QwtScaleEngine::Attributes QwtScaleEngine::attributes ( ) const

**Returns**

Scale attributes

**See Also**

Attribute, setAttributes(), testAttribute()

#### 12.111.4.2 virtual void QwtScaleEngine::autoScale ( int *maxNumSteps,* double & *x1,* double & *x2,* double & *stepSize* ) const [pure virtual]

Align and divide an interval

**Parameters**

| | |
|---|---|
| *maxNumSteps* | Max. number of steps |
| *x1* | First limit of the interval (In/Out) |
| *x2* | Second limit of the interval (In/Out) |
| *stepSize* | Step size (Return value) |

Implemented in QwtLogScaleEngine, QwtLinearScaleEngine, and QwtDateScaleEngine.

#### 12.111.4.3 uint QwtScaleEngine::base ( ) const

**Returns**

base Base of the scale engine

**See Also**

setBase()

#### 12.111.4.4 QwtInterval QwtScaleEngine::buildInterval ( double *value* ) const [protected]

Build an interval around a value.

In case of v == 0.0 the interval is [-0.5, 0.5], otherwide it is [0.5 $*$ v, 1.5 $*$ v]

**Parameters**

| | |
|---|---|
| *value* | Initial value |

**Returns**

Calculated interval

#### 12.111.4.5 bool QwtScaleEngine::contains ( const QwtInterval & *interval,* double *value* ) const [protected]

Check if an interval "contains" a value

**Parameters**

| | |
|---:|---|
| *interval* | Interval |
| *value* | Value |

**Returns**

True, when the value is inside the interval

#### 12.111.4.6 double QwtScaleEngine::divideInterval ( double *intervalSize,* int *numSteps* ) const [protected]

Calculate a step size for an interval size

**Parameters**

| | |
|---:|---|
| *intervalSize* | Interval size |
| *numSteps* | Number of steps |

**Returns**

Step size

#### 12.111.4.7 virtual QwtScaleDiv QwtScaleEngine::divideScale ( double *x1,* double *x2,* int *maxMajorSteps,* int *maxMinorSteps,* double *stepSize* = 0.0 ) const [pure virtual]

Calculate a scale division.

**Parameters**

| | |
|---:|---|
| *x1* | First interval limit |
| *x2* | Second interval limit |
| *maxMajorSteps* | Maximum for the number of major steps |
| *maxMinorSteps* | Maximum number of minor steps |
| *stepSize* | Step size. If stepSize == 0.0, the scaleEngine calculates one. |

**Returns**

Calculated scale division

Implemented in QwtLogScaleEngine, QwtLinearScaleEngine, and QwtDateScaleEngine.

#### 12.111.4.8 double QwtScaleEngine::lowerMargin ( ) const

**Returns**

the margin at the lower end of the scale The default margin is 0.

**See Also**

setMargins()

#### 12.111.4.9 double QwtScaleEngine::reference ( ) const

**Returns**

the reference value

**See Also**

setReference(), setAttribute()

#### 12.111.4.10 void QwtScaleEngine::setAttribute ( Attribute *attribute,* bool *on* = true )

Change a scale attribute

**Parameters**

| | |
|---|---|
| *attribute* | Attribute to change |
| *on* | On/Off |

**See Also**

Attribute, testAttribute()

#### 12.111.4.11 void QwtScaleEngine::setAttributes ( Attributes *attributes* )

Change the scale attribute

**Parameters**

| | |
|---|---|
| *attributes* | Set scale attributes |

**See Also**

Attribute, attributes()

#### 12.111.4.12 void QwtScaleEngine::setBase ( uint *base* )

Set the base of the scale engine

While a base of 10 is what 99.9% of all applications need certain scales might need a different base: f.e 2

The default setting is 10

**Parameters**

| | |
|---|---|
| *base* | Base of the engine |

**See Also**

base()

#### 12.111.4.13 void QwtScaleEngine::setMargins ( double *lower,* double *upper* )

Specify margins at the scale's endpoints.

**Parameters**

| | |
|---|---|
| *lower* | minimum distance between the scale's lower boundary and the smallest enclosed value |
| *upper* | minimum distance between the scale's upper boundary and the greatest enclosed value |

Margins can be used to leave a minimum amount of space between the enclosed intervals and the boundaries of the scale.

**Warning**

- QwtLogScaleEngine measures the margins in decades.

**See Also**

upperMargin(), lowerMargin()

#### 12.111.4.14 void QwtScaleEngine::setReference ( double *r* )

Specify a reference point.

**Parameters**

| | |
|---|---|
| *r* | new reference value |

The reference point is needed if options IncludeReference or Symmetric are active. Its default value is 0.0.

**See Also**

Attribute

#### 12.111.4.15 void QwtScaleEngine::setTransformation ( QwtTransform ∗ *transform* )

Assign a transformation

**Parameters**

| | |
|---|---|
| *transform* | Transformation |

The transformation object is used as factory for clones that are returned by transformation()

The scale engine takes ownership of the transformation.

**See Also**

QwtTransform::copy(), transformation()

#### 12.111.4.16 QList< double > QwtScaleEngine::strip ( const QList< double > & *ticks*, const QwtInterval & *interval* ) const [protected]

Remove ticks from a list, that are not inside an interval

**Parameters**

| | |
|---|---|
| *ticks* | Tick list |
| *interval* | Interval |

**Returns**

Stripped tick list

#### 12.111.4.17 bool QwtScaleEngine::testAttribute ( Attribute *attribute* ) const

**Returns**

True, if attribute is enabled.

**Parameters**

| | |
|---|---|
| *attribute* | Attribute to be tested |

**See Also**

Attribute, setAttribute()

#### 12.111.4.18 QwtTransform ∗ QwtScaleEngine::transformation ( ) const

Create and return a clone of the transformation of the engine. When the engine has no special transformation NULL is returned, indicating no transformation.

**Returns**

A clone of the transfomation

**See Also**

setTransformation()

#### 12.111.4.19 double QwtScaleEngine::upperMargin ( ) const

**Returns**

the margin at the upper end of the scale The default margin is 0.

**See Also**

setMargins()

## 12.112 QwtScaleMap Class Reference

A scale map.

```
#include <qwt_scale_map.h>
```

### Public Member Functions

- QwtScaleMap ()

  *Constructor.*
- QwtScaleMap (const QwtScaleMap &)

  *Copy constructor.*
- ∼QwtScaleMap ()
- QwtScaleMap & operator= (const QwtScaleMap &)

  *Assignment operator.*
- void setTransformation (QwtTransform ∗)
- const QwtTransform ∗ transformation () const

  *Get the transformation.*
- void setPaintInterval (double p1, double p2)

  *Specify the borders of the paint device interval.*
- void setScaleInterval (double s1, double s2)

  *Specify the borders of the scale interval.*
- double transform (double s) const
- double invTransform (double p) const
- double p1 () const
- double p2 () const
- double s1 () const
- double s2 () const
- double pDist () const
- double sDist () const
- bool isInverting () const

### Static Public Member Functions

- static QRectF transform (const QwtScaleMap &, const QwtScaleMap &, const QRectF &)
- static QRectF invTransform (const QwtScaleMap &, const QwtScaleMap &, const QRectF &)
- static QPointF transform (const QwtScaleMap &, const QwtScaleMap &, const QPointF &)
- static QPointF invTransform (const QwtScaleMap &, const QwtScaleMap &, const QPointF &)

### 12.112.1 Detailed Description

A scale map.

QwtScaleMap offers transformations from the coordinate system of a scale into the linear coordinate system of a paint device and vice versa.

### 12.112.2 Constructor & Destructor Documentation

#### 12.112.2.1 QwtScaleMap::QwtScaleMap ( )

Constructor.

The scale and paint device intervals are both set to [0,1].

#### 12.112.2.2 QwtScaleMap::∼QwtScaleMap ( )

Destructor

### 12.112.3 Member Function Documentation

#### 12.112.3.1 double QwtScaleMap::invTransform ( double *p* ) const [inline]

Transform an paint device value into a value in the interval of the scale.

**Parameters**

| | |
|---|---|
| *p* | Value relative to the coordinates of the paint device |

**Returns**

Transformed value

**See Also**

transform()

#### 12.112.3.2 QRectF QwtScaleMap::invTransform ( const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *rect* ) [static]

Transform a rectangle from paint to scale coordinates

**Parameters**

| | |
|---|---|
| *xMap* | X map |
| *yMap* | Y map |
| *rect* | Rectangle in paint coordinates |

**Returns**

Rectangle in scale coordinates

**See Also**

transform()

#### 12.112.3.3 QPointF QwtScaleMap::invTransform ( const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QPointF & *pos* ) [static]

Transform a rectangle from paint to scale coordinates

**Parameters**

| | |
|---:|---|
| *xMap* | X map |
| *yMap* | Y map |
| *pos* | Position in paint coordinates |

**Returns**

Position in scale coordinates

**See Also**

transform()

#### 12.112.3.4 bool QwtScaleMap::isInverting ( ) const [inline]

**Returns**

True, when ( p1() < p2() ) != ( s1() < s2() )

#### 12.112.3.5 double QwtScaleMap::p1 ( ) const [inline]

**Returns**

First border of the paint interval

#### 12.112.3.6 double QwtScaleMap::p2 ( ) const [inline]

**Returns**

Second border of the paint interval

#### 12.112.3.7 double QwtScaleMap::pDist ( ) const [inline]

**Returns**

qwtAbs(p2() - p1())

#### 12.112.3.8 double QwtScaleMap::s1 ( ) const [inline]

**Returns**

First border of the scale interval

#### 12.112.3.9 double QwtScaleMap::s2 ( ) const [inline]

**Returns**

Second border of the scale interval

#### 12.112.3.10 double QwtScaleMap::sDist ( ) const [inline]

**Returns**

qwtAbs(s2() - s1())

#### 12.112.3.11 void QwtScaleMap::setPaintInterval ( double *p1*, double *p2* )

Specify the borders of the paint device interval.

**Parameters**

| | |
|---|---|
| *p1* | first border |
| *p2* | second border |

#### 12.112.3.12 void QwtScaleMap::setScaleInterval ( double *s1*, double *s2* )

Specify the borders of the scale interval.

**Parameters**

| | |
|---|---|
| *s1* | first border |
| *s2* | second border |

**Warning**

scales might be aligned to transformation depending boundaries

#### 12.112.3.13 void QwtScaleMap::setTransformation ( QwtTransform ∗ *transform* )

Initialize the map with a transformation

#### 12.112.3.14 double QwtScaleMap::transform ( double *s* ) const [inline]

Transform a point related to the scale interval into an point related to the interval of the paint device

**Parameters**

| | |
|---|---|
| *s* | Value relative to the coordinates of the scale |

**Returns**

Transformed value

**See Also**

invTransform()

#### 12.112.3.15 QRectF QwtScaleMap::transform ( const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QRectF & *rect* ) [static]

Transform a rectangle from scale to paint coordinates

**Parameters**

| | |
|---|---|
| *xMap* | X map |
| *yMap* | Y map |
| *rect* | Rectangle in scale coordinates |

**Returns**

Rectangle in paint coordinates

**See Also**

invTransform()

#### 12.112.3.16 QPointF QwtScaleMap::transform ( const QwtScaleMap & *xMap*, const QwtScaleMap & *yMap*, const QPointF & *pos* ) [static]

Transform a point from scale to paint coordinates

**Parameters**

| | |
|---|---|
| *xMap* | X map |
| *yMap* | Y map |
| *pos* | Position in scale coordinates |

**Returns**

Position in paint coordinates

**See Also**

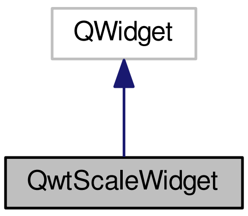
invTransform()

## 12.113 QwtScaleWidget Class Reference

A Widget which contains a scale.

```
#include <qwt_scale_widget.h>
```

Inheritance diagram for QwtScaleWidget:



**Public Types**

- enum LayoutFlag { TitleInverted = 1 }

  *Layout flags of the title.*
- typedef QFlags< LayoutFlag > LayoutFlags

  *Layout flags of the title.*

**Signals**

- void scaleDivChanged ()

  *Signal emitted, whenever the scale division changes.*

**Public Member Functions**

- QwtScaleWidget (QWidget ∗parent=NULL)

  *Create a scale with the position QwtScaleWidget::Left.*
- QwtScaleWidget (QwtScaleDraw::Alignment, QWidget ∗parent=NULL)

  *Constructor.*

- virtual ∼QwtScaleWidget ()

  *Destructor.*
- void setTitle (const QString &title)
- void setTitle (const QwtText &title)
- QwtText title () const
- void setLayoutFlag (LayoutFlag, bool on)
- bool testLayoutFlag (LayoutFlag) const
- void setBorderDist (int start, int end)
- int startBorderDist () const
- int endBorderDist () const
- void getBorderDistHint (int &start, int &end) const

  *Calculate a hint for the border distances.*
- void getMinBorderDist (int &start, int &end) const
- void setMinBorderDist (int start, int end)
- void setMargin (int)

  *Specify the margin to the colorBar/base line.*
- int margin () const
- void setSpacing (int td)

  *Specify the distance between color bar, scale and title.*
- int spacing () const
- void setScaleDiv (const QwtScaleDiv &sd)

  *Assign a scale division.*
- void setTransformation (QwtTransform ∗)
- void setScaleDraw (QwtScaleDraw ∗)
- const QwtScaleDraw ∗ scaleDraw () const
- QwtScaleDraw ∗ scaleDraw ()
- void setLabelAlignment (Qt::Alignment)

  *Change the alignment for the labels.*
- void setLabelRotation (double rotation)

  *Change the rotation for the labels. See QwtScaleDraw::setLabelRotation().*
- void setColorBarEnabled (bool)
- bool isColorBarEnabled () const
- void setColorBarWidth (int)
- int colorBarWidth () const
- void setColorMap (const QwtInterval &, QwtColorMap ∗)
- QwtInterval colorBarInterval () const
- const QwtColorMap ∗ colorMap () const
- virtual QSize sizeHint () const
- virtual QSize minimumSizeHint () const
- int titleHeightForWidth (int width) const

  *Find the height of the title for a given width.*
- int dimForLength (int length, const QFont &scaleFont) const

  *Find the minimum dimension for a given length. dim is the height, length the width seen in direction of the title.*
- void drawColorBar (QPainter ∗painter, const QRectF &) const
- void drawTitle (QPainter ∗painter, QwtScaleDraw::Alignment, const QRectF &rect) const
- void setAlignment (QwtScaleDraw::Alignment)
- QwtScaleDraw::Alignment alignment () const
- QRectF colorBarRect (const QRectF &) const

**Protected Member Functions**

- virtual void paintEvent (QPaintEvent ∗)

  *paintEvent*
- virtual void resizeEvent (QResizeEvent ∗)
- void draw (QPainter ∗p) const

  *draw the scale*
- void scaleChange ()

  *Notify a change of the scale.*
- void layoutScale (bool update=true)

### 12.113.1 Detailed Description

A Widget which contains a scale.

This Widget can be used to decorate composite widgets with a scale.

### 12.113.2 Member Enumeration Documentation

#### 12.113.2.1 enum QwtScaleWidget::LayoutFlag

Layout flags of the title.

**Enumerator**

***TitleInverted*** The title of vertical scales is painted from top to bottom. Otherwise it is painted from bottom to top.

### 12.113.3 Constructor & Destructor Documentation

#### 12.113.3.1 QwtScaleWidget::QwtScaleWidget ( QWidget ∗ *parent* = NULL ) [explicit]

Create a scale with the position QwtScaleWidget::Left.

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

#### 12.113.3.2 QwtScaleWidget::QwtScaleWidget ( QwtScaleDraw::Alignment *align*, QWidget ∗ *parent* = NULL ) [explicit]

Constructor.

**Parameters**

| | |
|---|---|
| *align* | Alignment. |
| *parent* | Parent widget |

### 12.113.4 Member Function Documentation

#### 12.113.4.1 QwtScaleDraw::Alignment QwtScaleWidget::alignment ( ) const

**Returns**

position

**See Also**

setPosition()

#### 12.113.4.2 QwtInterval QwtScaleWidget::colorBarInterval ( ) const

**Returns**

Value interval for the color bar

**See Also**

setColorMap(), colorMap()

#### 12.113.4.3 QRectF QwtScaleWidget::colorBarRect ( const QRectF & *rect* ) const

Calculate the the rectangle for the color bar

**Parameters**

| | |
|---|---|
| *rect* | Bounding rectangle for all components of the scale |

**Returns**

Rectangle for the color bar

#### 12.113.4.4 int QwtScaleWidget::colorBarWidth ( ) const

**Returns**

Width of the color bar

**See Also**

setColorBarEnabled(), setColorBarEnabled()

#### 12.113.4.5 const QwtColorMap ∗ QwtScaleWidget::colorMap ( ) const

**Returns**

Color map

**See Also**

setColorMap(), colorBarInterval()

#### 12.113.4.6 int QwtScaleWidget::dimForLength ( int *length,* const QFont & *scaleFont* ) const

Find the minimum dimension for a given length. dim is the height, length the width seen in direction of the title.

**Parameters**

| | |
|---|---|
| *length* | width for horizontal, height for vertical scales |
| *scaleFont* | Font of the scale |

**Returns**

height for horizontal, width for vertical scales

#### 12.113.4.7 void QwtScaleWidget::drawColorBar ( QPainter ∗ *painter,* const QRectF & *rect* ) const

Draw the color bar of the scale widget

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *rect* | Bounding rectangle for the color bar |

**See Also**

setColorBarEnabled()

#### 12.113.4.8 void QwtScaleWidget::drawTitle ( QPainter ∗ *painter*, QwtScaleDraw::Alignment *align*, const QRectF & *rect* ) const

Rotate and paint a title according to its position into a given rectangle.

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *align* | Alignment |
| *rect* | Bounding rectangle |

#### 12.113.4.9 int QwtScaleWidget::endBorderDist ( ) const

**Returns**

end border distance

**See Also**

setBorderDist()

#### 12.113.4.10 void QwtScaleWidget::getBorderDistHint ( int & *start*, int & *end* ) const

Calculate a hint for the border distances.

This member function calculates the distance of the scale's endpoints from the widget borders which is required for the mark labels to fit into the widget. The maximum of this distance an the minimum border distance is returned.

**Parameters**

| | |
|---:|---|
| *start* | Return parameter for the border width at the beginning of the scale |
| *end* | Return parameter for the border width at the end of the scale |

**Warning**

- The minimum border distance depends on the font.

**See Also**

setMinBorderDist(), getMinBorderDist(), setBorderDist()

#### 12.113.4.11 void QwtScaleWidget::getMinBorderDist ( int & *start*, int & *end* ) const

Get the minimum value for the distances of the scale's endpoints from the widget borders.

**Parameters**

| | |
|---|---|
| *start* | Return parameter for the border width at the beginning of the scale |
| *end* | Return parameter for the border width at the end of the scale |

**See Also**

setMinBorderDist(), getBorderDistHint()

#### 12.113.4.12 bool QwtScaleWidget::isColorBarEnabled ( ) const

**Returns**

true, when the color bar is enabled

**See Also**

setColorBarEnabled(), setColorBarWidth()

#### 12.113.4.13 void QwtScaleWidget::layoutScale ( bool *update_geometry* = `true` ) `[protected]`

Recalculate the scale's geometry and layout based on the current geometry and fonts.

**Parameters**

| | |
|---|---|
| *update_-geometry* | Notify the layout system and call update to redraw the scale |

#### 12.113.4.14 int QwtScaleWidget::margin ( ) const

**Returns**

margin

**See Also**

setMargin()

#### 12.113.4.15 QSize QwtScaleWidget::minimumSizeHint ( ) const `[virtual]`

**Returns**

a minimum size hint

#### 12.113.4.16 void QwtScaleWidget::resizeEvent ( QResizeEvent ∗ *event* ) `[protected]`, `[virtual]`

Event handler for resize events

**Parameters**

| | |
|---|---|
| *event* | Resize event |

#### 12.113.4.17 void QwtScaleWidget::scaleChange ( ) `[protected]`

Notify a change of the scale.

This virtual function can be overloaded by derived classes. The default implementation updates the geometry and repaints the widget.

#### 12.113.4.18 const QwtScaleDraw ∗ QwtScaleWidget::scaleDraw ( ) const

**Returns**

scaleDraw of this scale

**See Also**

setScaleDraw(), QwtScaleDraw::setScaleDraw()

#### 12.113.4.19 QwtScaleDraw ∗ QwtScaleWidget::scaleDraw ( )

**Returns**

scaleDraw of this scale

**See Also**

QwtScaleDraw::setScaleDraw()

#### 12.113.4.20 void QwtScaleWidget::setAlignment ( QwtScaleDraw::Alignment *alignment* )

Change the alignment

**Parameters**

| | |
|---|---|
| *alignment* | New alignment |

**See Also**

alignment()

#### 12.113.4.21 void QwtScaleWidget::setBorderDist ( int *dist1,* int *dist2* )

Specify distances of the scale's endpoints from the widget's borders. The actual borders will never be less than minimum border distance.

**Parameters**

| | |
|---|---|
| *dist1* | Left or top Distance |
| *dist2* | Right or bottom distance |

**See Also**

borderDist()

#### 12.113.4.22 void QwtScaleWidget::setColorBarEnabled ( bool *on* )

En/disable a color bar associated to the scale

**See Also**

isColorBarEnabled(), setColorBarWidth()

#### 12.113.4.23 void QwtScaleWidget::setColorBarWidth ( int *width* )

Set the width of the color bar

**Parameters**

| | |
|---|---|
| *width* | Width |

**See Also**

colorBarWidth(), setColorBarEnabled()

#### 12.113.4.24 void QwtScaleWidget::setColorMap ( const QwtInterval & *interval*, QwtColorMap ∗ *colorMap* )

Set the color map and value interval, that are used for displaying the color bar.

**Parameters**

| | |
|---|---|
| *interval* | Value interval |
| *colorMap* | Color map |

**See Also**

colorMap(), colorBarInterval()

#### 12.113.4.25 void QwtScaleWidget::setLabelAlignment ( Qt::Alignment *alignment* )

Change the alignment for the labels.

**See Also**

QwtScaleDraw::setLabelAlignment(), setLabelRotation()

#### 12.113.4.26 void QwtScaleWidget::setLabelRotation ( double *rotation* )

Change the rotation for the labels. See QwtScaleDraw::setLabelRotation().

**Parameters**

| | |
|---|---|
| *rotation* | Rotation |

**See Also**

QwtScaleDraw::setLabelRotation(), setLabelFlags()

#### 12.113.4.27 void QwtScaleWidget::setLayoutFlag ( LayoutFlag *flag*, bool *on* )

Toggle an layout flag

**Parameters**

| | |
|---|---|
| *flag* | Layout flag |
| *on* | true/false |

**See Also**

testLayoutFlag(), LayoutFlag

#### 12.113.4.28 void QwtScaleWidget::setMargin ( int *margin* )

Specify the margin to the colorBar/base line.

**Parameters**

| | |
|---|---|
| *margin* | Margin |

**See Also**

margin()

#### 12.113.4.29 void QwtScaleWidget::setMinBorderDist ( int *start,* int *end* )

Set a minimum value for the distances of the scale's endpoints from the widget borders. This is useful to avoid that the scales are "jumping", when the tick labels or their positions change often.

**Parameters**

| | |
|---|---|
| *start* | Minimum for the start border |
| *end* | Minimum for the end border |

**See Also**

getMinBorderDist(), getBorderDistHint()

#### 12.113.4.30 void QwtScaleWidget::setScaleDiv ( const QwtScaleDiv & *scaleDiv* )

Assign a scale division.

The scale division determines where to set the tick marks.

**Parameters**

| | |
|---|---|
| *scaleDiv* | Scale Division |

**See Also**

For more information about scale divisions, see QwtScaleDiv.

#### 12.113.4.31 void QwtScaleWidget::setScaleDraw ( QwtScaleDraw ∗ *scaleDraw* )

Set a scale draw

scaleDraw has to be created with new and will be deleted in ∼QwtScaleWidget() or the next call of setScaleDraw(). scaleDraw will be initialized with the attributes of the previous scaleDraw object.

**Parameters**

| | |
|---|---|
| *scaleDraw* | ScaleDraw object |

**See Also**

scaleDraw()

#### 12.113.4.32 void QwtScaleWidget::setSpacing ( int *spacing* )

Specify the distance between color bar, scale and title.

**Parameters**

| | |
|---|---|
| *spacing* | Spacing |

**See Also**

spacing()

#### 12.113.4.33 void QwtScaleWidget::setTitle ( const QString & *title* )

Give title new text contents

**Parameters**

| | |
|---|---|
| *title* | New title |

**See Also**

title(), setTitle(const QwtText &);

#### 12.113.4.34 void QwtScaleWidget::setTitle ( const QwtText & *title* )

Give title new text contents

**Parameters**

| | |
|---|---|
| *title* | New title |

**See Also**

title()

**Warning**

The title flags are interpreted in direction of the label, AlignTop, AlignBottom can't be set as the title will always be aligned to the scale.

#### 12.113.4.35 void QwtScaleWidget::setTransformation ( QwtTransform ∗ *transformation* )

Set the transformation

**Parameters**

| | |
|---|---|
| *transformation* | Transformation |

**See Also**

QwtAbstractScaleDraw::scaleDraw(), QwtScaleMap

#### 12.113.4.36 QSize QwtScaleWidget::sizeHint ( ) const [virtual]

**Returns**

a size hint

#### 12.113.4.37 int QwtScaleWidget::spacing ( ) const

**Returns**

distance between scale and title

**See Also**

setMargin()

#### 12.113.4.38 int QwtScaleWidget::startBorderDist ( ) const

**Returns**

start border distance

**See Also**

setBorderDist()

#### 12.113.4.39 bool QwtScaleWidget::testLayoutFlag ( LayoutFlag *flag* ) const

Test a layout flag

**Parameters**

| | |
|---|---|
| *flag* | Layout flag |

**Returns**

true/false

**See Also**

setLayoutFlag(), LayoutFlag

#### 12.113.4.40 QwtText QwtScaleWidget::title ( ) const

**Returns**

title

**See Also**

setTitle()

#### 12.113.4.41 int QwtScaleWidget::titleHeightForWidth ( int *width* ) const

Find the height of the title for a given width.

**Parameters**

| | |
|---|---|
| *width* | Width |

**Returns**

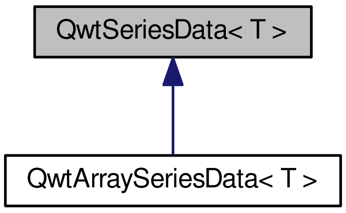
height Height

## 12.114 QwtSeriesData< T > Class Template Reference

Abstract interface for iterating over samples.

```
#include <qwt_series_data.h>
```

Inheritance diagram for QwtSeriesData< T >:



#### Public Member Functions

- QwtSeriesData ()

  *Constructor.*
- virtual ~QwtSeriesData ()

  *Destructor.*
- virtual size_t size () const =0
- virtual T sample (size_t i) const =0
- virtual QRectF boundingRect () const =0
- virtual void setRectOfInterest (const QRectF &rect)

#### Protected Attributes

- QRectF d_boundingRect

  *Can be used to cache a calculated bounding rectangle.*

### 12.114.1 Detailed Description

#### template<typename T>class QwtSeriesData< T >

Abstract interface for iterating over samples.

Qwt offers several implementations of the QwtSeriesData API, but in situations, where data of an application specific format needs to be displayed, without having to copy it, it is recommended to implement an individual data access.

A subclass of QwtSeriesData<QPointF> must implement:

- size()

  Should return number of data points.

- sample()

  Should return values x and y values of the sample at specific position as QPointF object.

- boundingRect()

  Should return the bounding rectangle of the data series. It is used for autoscaling and might help certain algorithms for displaying the data. You can use qwtBoundingRect() for an implementation but often it is possible to implement a more efficient algorithm depending on the characteristics of the series. The member d_boundingRect is intended for caching the calculated rectangle.

#### 12.114.2 Member Function Documentation

##### 12.114.2.1 template<typename T> virtual QRectF **QwtSeriesData**< T >::boundingRect ( ) const [pure virtual]

Calculate the bounding rect of all samples

The bounding rect is necessary for autoscaling and can be used for a couple of painting optimizations.

qwtBoundingRect(...) offers slow implementations iterating over the samples. For large sets it is recommended to implement something faster f.e. by caching the bounding rectangle.

**Returns**

Bounding rectangle

Implemented in QwtTradingChartData, QwtSetSeriesData, QwtIntervalSeriesData, QwtPoint3DSeriesData, QwtPointSeriesData, QwtSyntheticPointData, QwtCPointerData, and QwtPointArrayData.

##### 12.114.2.2 template<typename T> virtual T **QwtSeriesData**< T >::sample ( size_t *i* ) const [pure virtual]

Return a sample

**Parameters**

| | |
|---|---|
| *i* | Index |

**Returns**

Sample at position i

Implemented in QwtArraySeriesData< T >, QwtArraySeriesData< QwtIntervalSample >, QwtArraySeriesData< QwtOHLCSample >, QwtArraySeriesData< QPointF >, QwtArraySeriesData< QwtPoint3D >, QwtArraySeriesData< QwtSetSample >, QwtSyntheticPointData, QwtCPointerData, and QwtPointArrayData.

##### 12.114.2.3 template<typename T > void **QwtSeriesData**< T >::setRectOfInterest ( const QRectF & *rect* ) [virtual]

Set a the "rect of interest"

QwtPlotSeriesItem defines the current area of the plot canvas as "rectangle of interest" ( QwtPlotSeriesItem::updateScaleDiv() ). It can be used to implement different levels of details.

The default implementation does nothing.

**Parameters**

| | |
|---|---|
| *rect* | Rectangle of interest |

Reimplemented in QwtSyntheticPointData.

##### 12.114.2.4 template<typename T> virtual size_t **QwtSeriesData**< T >::size ( ) const [pure virtual]

**Returns**

Number of samples

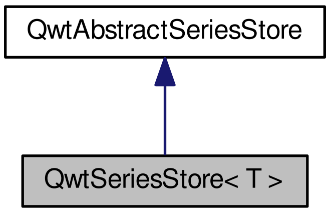
Implemented in QwtArraySeriesData< T >, QwtArraySeriesData< QwtIntervalSample >, QwtArraySeriesData< QwtOHLCSample >, QwtArraySeriesData< QPointF >, QwtArraySeriesData< QwtPoint3D >, QwtArraySeriesData< QwtSetSample >, QwtSyntheticPointData, QwtCPointerData, and QwtPointArrayData.

### 12.115 QwtSeriesStore< T > Class Template Reference

Class storing a QwtSeriesData object.

```
#include <qwt_series_store.h>
```

Inheritance diagram for QwtSeriesStore< T >:



**Public Member Functions**

- QwtSeriesStore ()

  *Constructor The store contains no series.*
- ~QwtSeriesStore ()

  *Destructor.*
- void setData (QwtSeriesData< T > *series)
- QwtSeriesData< T > * data ()
- const QwtSeriesData< T > * data () const
- T sample (int index) const
- virtual size_t dataSize () const
- virtual QRectF dataRect () const
- virtual void setRectOfInterest (const QRectF &rect)
- QwtSeriesData< T > * swapData (QwtSeriesData< T > *series)

**Additional Inherited Members**

### 12.115.1 Detailed Description

**template<typename T>class QwtSeriesStore< T >**

Class storing a QwtSeriesData object.

QwtSeriesStore and QwtPlotSeriesItem are intended as base classes for all plot items iterating over a series of samples. Both classes share a virtual base class ( QwtAbstractSeriesStore ) to bridge between them.

QwtSeriesStore offers the template based part for the plot item API, so that QwtPlotSeriesItem can be derived without any hassle with templates.

### 12.115.2 Member Function Documentation

#### 12.115.2.1 template<typename T > QwtSeriesData< T > * QwtSeriesStore< T >::data ( ) [inline]

**Returns**

the the series data

#### 12.115.2.2 template<typename T > const QwtSeriesData< T > ∗ QwtSeriesStore< T >::data ( ) const [inline]

**Returns**

the the series data

#### 12.115.2.3 template<typename T > QRectF QwtSeriesStore< T >::dataRect ( ) const [virtual]

**Returns**

Bounding rectangle of the series or an invalid rectangle, when no series is stored

**See Also**

QwtSeriesData<T>::boundingRect()

Implements QwtAbstractSeriesStore.

#### 12.115.2.4 template<typename T > size_t QwtSeriesStore< T >::dataSize ( ) const [virtual]

**Returns**

Number of samples of the series

**See Also**

setData(), QwtSeriesData<T>::size()

Implements QwtAbstractSeriesStore.

#### 12.115.2.5 template<typename T > T QwtSeriesStore< T >::sample ( int *index* ) const [inline]

**Parameters**

| | |
|---|---|
| *index* | Index |

**Returns**

Sample at position index

#### 12.115.2.6 template<typename T> void QwtSeriesStore< T >::setData ( QwtSeriesData< T > ∗ *series* )

Assign a series of samples

**Parameters**

| | |
|---|---|
| *series* | Data |

**Warning**

The item takes ownership of the data object, deleting it when its not used anymore.

#### 12.115.2.7 template<typename T > void QwtSeriesStore< T >::setRectOfInterest ( const QRectF & *rect* ) [virtual]

Set a the "rect of interest" for the series

**Parameters**

| | |
|---|---|
| *rect* | Rectangle of interest |

**See Also**

QwtSeriesData< T >::setRectOfInterest()

Implements QwtAbstractSeriesStore.

#### 12.115.2.8 template< typename T > QwtSeriesData< T > ∗ QwtSeriesStore< T >::swapData ( QwtSeriesData< T > ∗ *series* )

Replace a series without deleting the previous one

**Parameters**

| | |
|---|---|
| *series* | New series |

**Returns**

Previously assigned series

## 12.116 QwtSetSample Class Reference

A sample of the types (x1...xn, y) or (x, y1..yn)

```
#include <qwt_samples.h>
```

**Public Member Functions**

- QwtSetSample ()
- QwtSetSample (double, const QVector< double > &=QVector< double >())
- bool operator== (const QwtSetSample &other) const

  *Compare operator.*
- bool operator!= (const QwtSetSample &other) const

  *Compare operator.*
- double added () const

**Public Attributes**

- double value

  *value*
- QVector< double > set

  *Vector of values associated to value.*

### 12.116.1 Detailed Description

A sample of the types (x1...xn, y) or (x, y1..yn)

### 12.116.2 Constructor & Destructor Documentation

#### 12.116.2.1 QwtSetSample::QwtSetSample ( ) [inline]

Constructor The value is set to 0.0

#### 12.116.2.2 QwtSetSample::QwtSetSample ( double *v*, const QVector< double > & *s* = `QVector<double>()` ) `[inline]`

Constructor

**Parameters**

| | |
|---|---|
| *v* | Value |
| *s* | Set of values |

### 12.116.3 Member Function Documentation

#### 12.116.3.1 double QwtSetSample::added ( ) const `[inline]`

**Returns**

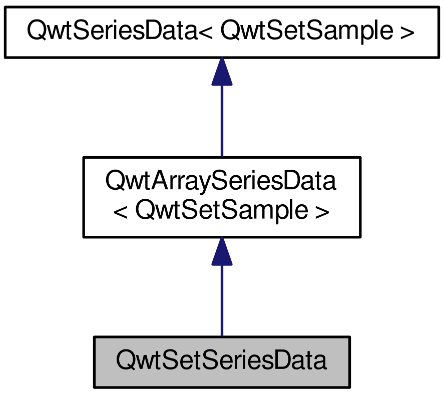
All values of the set added

## 12.117 QwtSetSeriesData Class Reference

Interface for iterating over an array of samples.

`#include <qwt_series_data.h>`

Inheritance diagram for QwtSetSeriesData:


QwtSeriesData< QwtSetSample >
QwtArraySeriesData < QwtSetSample >
QwtSetSeriesData

**Public Member Functions**

- QwtSetSeriesData (const QVector< QwtSetSample > &=QVector< QwtSetSample >())
- virtual QRectF boundingRect () const

  *Calculate the bounding rectangle.*

**Additional Inherited Members**

### 12.117.1 Detailed Description

Interface for iterating over an array of samples.

### 12.117.2 Constructor & Destructor Documentation

#### 12.117.2.1 QwtSetSeriesData::QwtSetSeriesData ( const QVector< **QwtSetSample** > & *samples* = `QVector<`**QwtSetSample**`>()` )

Constructor

**Parameters**

| | |
|---|---|
| *samples* | Samples |

### 12.117.3 Member Function Documentation

#### 12.117.3.1 QRectF QwtSetSeriesData::boundingRect ( ) const [virtual]

Calculate the bounding rectangle.

The bounding rectangle is calculated once by iterating over all points and is stored for all following requests.

**Returns**

Bounding rectangle

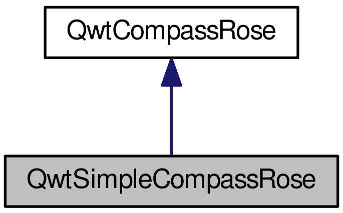
Implements QwtSeriesData< QwtSetSample >.

## 12.118 QwtSimpleCompassRose Class Reference

A simple rose for QwtCompass.

`#include <qwt_compass_rose.h>`

Inheritance diagram for QwtSimpleCompassRose:



**Public Member Functions**

- QwtSimpleCompassRose (int numThorns=8, int numThornLevels=-1)
- virtual ~QwtSimpleCompassRose ()

  *Destructor.*
- void setWidth (double w)
- double width () const
- void setNumThorns (int count)
- int numThorns () const
- void setNumThornLevels (int count)
- int numThornLevels () const
- void setShrinkFactor (double factor)
- double shrinkFactor () const
- virtual void draw (QPainter $*$, const QPointF &center, double radius, double north, QPalette::ColorGroup=Q-Palette::Active) const

#### Static Public Member Functions

- static void drawRose (QPainter ∗, const QPalette &, const QPointF &center, double radius, double origin, double width, int numThorns, int numThornLevels, double shrinkFactor)

### 12.118.1 Detailed Description

A simple rose for QwtCompass.

### 12.118.2 Constructor & Destructor Documentation

#### 12.118.2.1 QwtSimpleCompassRose::QwtSimpleCompassRose ( int *numThorns* = `8`, int *numThornLevels* = `-1` )

Constructor

**Parameters**

| | |
|---|---|
| *numThorns* | Number of thorns |
| *numThornLevels* | Number of thorn levels |

### 12.118.3 Member Function Documentation

#### 12.118.3.1 void QwtSimpleCompassRose::draw ( QPainter ∗ *painter*, const QPointF & *center*, double *radius*, double *north*, QPalette::ColorGroup *cg* = `QPalette::Active` ) const `[virtual]`

Draw the rose

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *center* | Center point |
| *radius* | Radius of the rose |
| *north* | Position |
| *cg* | Color group |

Implements QwtCompassRose.

#### 12.118.3.2 void QwtSimpleCompassRose::drawRose ( QPainter ∗ *painter*, const QPalette & *palette*, const QPointF & *center*, double *radius*, double *north*, double *width*, int *numThorns*, int *numThornLevels*, double *shrinkFactor* ) `[static]`

Draw the rose

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *palette* | Palette |
| *center* | Center of the rose |
| *radius* | Radius of the rose |
| *north* | Position pointing to north |
| *width* | Width of the rose |
| *numThorns* | Number of thorns |
| *numThornLevels* | Number of thorn levels |
| *shrinkFactor* | Factor to shrink the thorns with each level |

#### 12.118.3.3 int QwtSimpleCompassRose::numThornLevels ( ) const

**Returns**

Number of thorn levels

**See Also**

setNumThorns(), setNumThornLevels()

#### 12.118.3.4 int QwtSimpleCompassRose::numThorns ( ) const

**Returns**

Number of thorns

**See Also**

setNumThorns(), setNumThornLevels()

#### 12.118.3.5 void QwtSimpleCompassRose::setNumThornLevels ( int *numThornLevels* )

Set the of thorns levels

**Parameters**

| | |
|---|---|
| *numThornLevels* | Number of thorns levels |

**See Also**

setNumThorns(), numThornLevels()

#### 12.118.3.6 void QwtSimpleCompassRose::setNumThorns ( int *numThorns* )

Set the number of thorns on one level The number is aligned to a multiple of 4, with a minimum of 4

**Parameters**

| | |
|---|---|
| *numThorns* | Number of thorns |

**See Also**

numThorns(), setNumThornLevels()

#### 12.118.3.7 void QwtSimpleCompassRose::setShrinkFactor ( double *factor* )

Set the Factor how to shrink the thorns with each level The default value is 0.9.

**Parameters**

| | |
|---|---|
| *factor* | Shrink factor |

**See Also**

shrinkFactor()

#### 12.118.3.8 void QwtSimpleCompassRose::setWidth ( double *width* )

Set the width of the rose heads. Lower value make thinner heads. The range is limited from 0.03 to 0.4.

**Parameters**

| | |
|---|---|
| *width* | Width |

#### 12.118.3.9 double QwtSimpleCompassRose::shrinkFactor ( ) const

**Returns**

Factor how to shrink the thorns with each level

**See Also**

setShrinkFactor()

#### 12.118.3.10 double QwtSimpleCompassRose::width ( ) const

**Returns**

Width of the rose

**See Also**

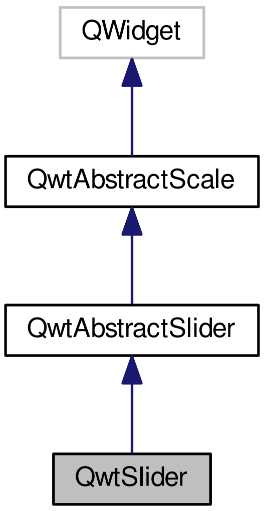
setWidth()

### 12.119 QwtSlider Class Reference

The Slider Widget.

```
#include <qwt_slider.h>
```

Inheritance diagram for QwtSlider:



**Public Types**

- enum ScalePosition { NoScale, LeadingScale, TrailingScale }

### Public Member Functions

- QwtSlider (QWidget ∗parent=NULL)
- QwtSlider (Qt::Orientation, QWidget ∗parent=NULL)
- virtual ∼QwtSlider ()

  *Destructor.*
- void setOrientation (Qt::Orientation)

  *Set the orientation.*
- Qt::Orientation orientation () const
- void setScalePosition (ScalePosition)

  *Change the position of the scale.*
- ScalePosition scalePosition () const
- void setTrough (bool)
- bool hasTrough () const
- void setGroove (bool)
- bool hasGroove () const
- void setHandleSize (const QSize &)

  *Set the slider's handle size.*
- QSize handleSize () const
- void setBorderWidth (int bw)

  *Change the slider's border width.*
- int borderWidth () const
- void setSpacing (int)

  *Change the spacing between trough and scale.*
- int spacing () const
- virtual QSize sizeHint () const
- virtual QSize minimumSizeHint () const
- void setScaleDraw (QwtScaleDraw ∗)

  *Set a scale draw.*
- const QwtScaleDraw ∗ scaleDraw () const
- void setUpdateInterval (int)

  *Specify the update interval for automatic scrolling.*
- int updateInterval () const

### Protected Member Functions

- virtual double scrolledTo (const QPoint &) const

  *Determine the value for a new position of the slider handle.*
- virtual bool isScrollPosition (const QPoint &) const

  *Determine what to do when the user presses a mouse button.*
- virtual void drawSlider (QPainter ∗, const QRect &) const
- virtual void drawHandle (QPainter ∗, const QRect &, int pos) const
- virtual void mousePressEvent (QMouseEvent ∗)
- virtual void mouseReleaseEvent (QMouseEvent ∗)
- virtual void resizeEvent (QResizeEvent ∗)
- virtual void paintEvent (QPaintEvent ∗)
- virtual void changeEvent (QEvent ∗)
- virtual void timerEvent (QTimerEvent ∗)
- virtual void scaleChange ()

  *Notify changed scale.*
- QRect sliderRect () const
- QRect handleRect () const

#### Additional Inherited Members

### 12.119.1 Detailed Description

The Slider Widget.

QwtSlider is a slider widget which operates on an interval of type double. Its position is related to a scale showing the current value.

The slider can be customized by having a through, a groove - or both.

### 12.119.2 Member Enumeration Documentation

#### 12.119.2.1 enum QwtSlider::ScalePosition

Position of the scale

**See Also**

QwtSlider(), setScalePosition(), setOrientation()

**Enumerator**

***NoScale*** The slider has no scale.

***LeadingScale*** The scale is right of a vertical or below a horizontal slider.

***TrailingScale*** The scale is left of a vertical or above a horizontal slider.

### 12.119.3 Constructor & Destructor Documentation

#### 12.119.3.1 QwtSlider::QwtSlider ( QWidget ∗ *parent* = NULL ) [explicit]

Construct vertical slider in QwtSlider::Trough style with a scale to the left.

The scale is initialized to [0.0, 100.0] and the value set to 0.0.

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

**See Also**

setOrientation(), setScalePosition(), setBackgroundStyle()

#### 12.119.3.2 QwtSlider::QwtSlider ( Qt::Orientation *orientation,* QWidget ∗ *parent* = NULL ) [explicit]

Construct a slider in QwtSlider::Trough style

When orientation is Qt::Vertical the scale will be aligned to the left - otherwise at the the top of the slider.

The scale is initialized to [0.0, 100.0] and the value set to 0.0.

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |
| *orientation* | Orientation of the slider. |

### 12.119.4 Member Function Documentation

#### 12.119.4.1 int QwtSlider::borderWidth ( ) const

**Returns**

the border width.

**See Also**

setBorderWidth()

#### 12.119.4.2 void QwtSlider::changeEvent ( QEvent ∗ *event* ) [protected], [virtual]

Handles QEvent::StyleChange and QEvent::FontChange events

**Parameters**

| | |
|---|---|
| *event* | Change event |

#### 12.119.4.3 void QwtSlider::drawHandle ( QPainter ∗ *painter,* const QRect & *handleRect,* int *pos* ) const [protected], [virtual]

Draw the thumb at a position

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *handleRect* | Bounding rectangle of the handle |
| *pos* | Position of the handle marker in widget coordinates |

#### 12.119.4.4 void QwtSlider::drawSlider ( QPainter ∗ *painter,* const QRect & *sliderRect* ) const [protected], [virtual]

Draw the slider into the specified rectangle.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *sliderRect* | Bounding rectangle of the slider |

#### 12.119.4.5 QRect QwtSlider::handleRect ( ) const [protected]

**Returns**

Bounding rectangle of the slider handle

#### 12.119.4.6 QSize QwtSlider::handleSize ( ) const

**Returns**

Size of the handle.

**See Also**

setHandleSize()

#### 12.119.4.7 bool QwtSlider::hasGroove ( ) const

**Returns**

True, when the groove is visisble

**See Also**

setGroove(), hasTrough()

#### 12.119.4.8 bool QwtSlider::hasTrough ( ) const

**Returns**

True, when the trough is visisble

**See Also**

setTrough(), hasGroove()

#### 12.119.4.9 bool QwtSlider::isScrollPosition ( const QPoint & *pos* ) const [protected], [virtual]

Determine what to do when the user presses a mouse button.

**Parameters**

|  |  |
|---|---|
| *pos* | Mouse position |

**Return values**

|  |  |
|---|---|
| *True,when* | handleRect() contains pos |

**See Also**

scrolledTo()

Implements QwtAbstractSlider.

#### 12.119.4.10 QSize QwtSlider::minimumSizeHint ( ) const [virtual]

**Returns**

Minimum size hint

**See Also**

sizeHint()

#### 12.119.4.11 void QwtSlider::mousePressEvent ( QMouseEvent ∗ *event* ) [protected], [virtual]

Mouse press event handler

**Parameters**

|  |  |
|---|---|
| *event* | Mouse event |

Reimplemented from QwtAbstractSlider.

#### 12.119.4.12 void QwtSlider::mouseReleaseEvent ( QMouseEvent ∗ *event* ) [protected], [virtual]

Mouse release event handler

**Parameters**

|  |  |
|---|---|
| *event* | Mouse event |

Reimplemented from QwtAbstractSlider.

#### 12.119.4.13 Qt::Orientation QwtSlider::orientation ( ) const

**Returns**

Orientation

**See Also**

setOrientation()

#### 12.119.4.14 void QwtSlider::paintEvent ( QPaintEvent ∗ *event* ) [protected], [virtual]

Qt paint event handler

**Parameters**

| | |
|---|---|
| *event* | Paint event |

#### 12.119.4.15 void QwtSlider::resizeEvent ( QResizeEvent ∗ *event* ) [protected], [virtual]

Qt resize event handler

**Parameters**

| | |
|---|---|
| *event* | Resize event |

#### 12.119.4.16 const QwtScaleDraw ∗ QwtSlider::scaleDraw ( ) const

**Returns**

the scale draw of the slider

**See Also**

setScaleDraw()

#### 12.119.4.17 QwtSlider::ScalePosition QwtSlider::scalePosition ( ) const

**Returns**

Position of the scale

**See Also**

setScalePosition()

#### 12.119.4.18 double QwtSlider::scrolledTo ( const QPoint & *pos* ) const [protected], [virtual]

Determine the value for a new position of the slider handle.

**Parameters**

| | |
|---|---|
| *pos* | Mouse position |

**Returns**

Value for the mouse position

**See Also**

isScrollPosition()

Implements QwtAbstractSlider.

#### 12.119.4.19 void QwtSlider::setBorderWidth ( int *width* )

Change the slider's border width.

The border width is used for drawing the slider handle and the trough.

**Parameters**

| | |
|---|---|
| *width* | Border width |

**See Also**

borderWidth()

#### 12.119.4.20 void QwtSlider::setGroove ( bool *on* )

En/Disable the groove

The slider can be cutomized by showing a groove for the handle.

**Parameters**

| | |
|---|---|
| *on* | When true, the groove is visible |

**See Also**

hasGroove(), setThrough()

#### 12.119.4.21 void QwtSlider::setHandleSize ( const QSize & *size* )

Set the slider's handle size.

When the size is empty the slider handle will be painted with a default size depending on its orientation() and backgroundStyle().

**Parameters**

| | |
|---|---|
| *size* | New size |

**See Also**

handleSize()

#### 12.119.4.22 void QwtSlider::setOrientation ( Qt::Orientation *orientation* )

Set the orientation.

**Parameters**

| | |
|---|---|
| *orientation* | Allowed values are Qt::Horizontal and Qt::Vertical. |

**See Also**

orientation(), scalePosition()

#### 12.119.4.23 void QwtSlider::setScaleDraw ( QwtScaleDraw $*$ *scaleDraw* )

Set a scale draw.

For changing the labels of the scales, it is necessary to derive from QwtScaleDraw and overload QwtScaleDraw-::label().

**Parameters**

| | |
|---|---|
| *scaleDraw* | ScaleDraw object, that has to be created with new and will be deleted in ~QwtSlider() or the next call of setScaleDraw(). |

**See Also**

scaleDraw()

#### 12.119.4.24 void QwtSlider::setScalePosition ( ScalePosition *scalePosition* )

Change the position of the scale.

**Parameters**

| | |
|---|---|
| *scalePosition* | Position of the scale. |

**See Also**

ScalePosition, scalePosition()

#### 12.119.4.25 void QwtSlider::setSpacing ( int *spacing* )

Change the spacing between trough and scale.

A spacing of 0 means, that the backbone of the scale is covered by the trough.

The default setting is 4 pixels.

**Parameters**

| | |
|---|---|
| *spacing* | Number of pixels |

**See Also**

spacing();

#### 12.119.4.26 void QwtSlider::setTrough ( bool *on* )

En/Disable the trough

The slider can be cutomized by showing a trough for the handle.

**Parameters**

| | |
|---|---|
| *on* | When true, the groove is visible |

**See Also**

hasTrough(), setGroove()

#### 12.119.4.27 void QwtSlider::setUpdateInterval ( int *interval* )

Specify the update interval for automatic scrolling.

The minimal accepted value is 50 ms.

**Parameters**

|  |  |
|---|---|
| *interval* | Update interval in milliseconds |

**See Also**

setUpdateInterval()

#### 12.119.4.28 QSize QwtSlider::sizeHint ( ) const [virtual]

**Returns**

minimumSizeHint()

#### 12.119.4.29 QRect QwtSlider::sliderRect ( ) const [protected]

**Returns**

Bounding rectangle of the slider - without the scale

#### 12.119.4.30 int QwtSlider::spacing ( ) const

**Returns**

Number of pixels between slider and scale

**See Also**

setSpacing()

#### 12.119.4.31 void QwtSlider::timerEvent ( QTimerEvent ∗ *event* ) [protected], [virtual]

Timer event handler

Handles the timer, when the mouse stays pressed inside the sliderRect().

**Parameters**

|  |  |
|---|---|
| *event* | Mouse event |

#### 12.119.4.32 int QwtSlider::updateInterval ( ) const

**Returns**

Update interval in milliseconds for automatic scrolling

**See Also**

setUpdateInterval()

## 12.120 QwtSpline Class Reference

A class for spline interpolation.

```
#include <qwt_spline.h>
```

**Public Types**

- enum SplineType { Natural, Periodic }

  *Spline type.*

### Public Member Functions

- QwtSpline ()

  *Constructor.*
- QwtSpline (const QwtSpline &)
- ~QwtSpline ()

  *Destructor.*
- QwtSpline & operator= (const QwtSpline &)
- void setSplineType (SplineType)
- SplineType splineType () const
- bool setPoints (const QPolygonF &points)

  *Calculate the spline coefficients.*
- QPolygonF points () const
- void reset ()

  *Free allocated memory and set size to 0.*
- bool isValid () const

  *True if valid.*
- double value (double x) const
- const QVector< double > & coefficientsA () const
- const QVector< double > & coefficientsB () const
- const QVector< double > & coefficientsC () const

### Protected Member Functions

- bool buildNaturalSpline (const QPolygonF &)

  *Determines the coefficients for a natural spline.*
- bool buildPeriodicSpline (const QPolygonF &)

  *Determines the coefficients for a periodic spline.*

### 12.120.1 Detailed Description

A class for spline interpolation.

The QwtSpline class is used for cubical spline interpolation. Two types of splines, natural and periodic, are supported.

**Usage:**

1. First call setPoints() to determine the spline coefficients for a tabulated function y(x).
2. After the coefficients have been set up, the interpolated function value for an argument x can be determined by calling QwtSpline::value().

**Example:**

```
#include <qwt_spline.h>

QPolygonF interpolate(const QPolygonF& points, int numValues)
{
    QwtSpline spline;
    if ( !spline.setPoints(points) )
        return points;

    QPolygonF interpolatedPoints(numValues);

    const double delta =
        (points[numPoints - 1].x() - points[0].x()) / (points.size() - 1);
    for(i = 0; i < points.size(); i++)  / interpolate
    {
        const double x = points[0].x() + i * delta;
        interpolatedPoints[i].setX(x);
        interpolatedPoints[i].setY(spline.value(x));
    }
    return interpolatedPoints;
}
```

### 12.120.2 Member Enumeration Documentation

#### 12.120.2.1 enum QwtSpline::SplineType

Spline type.

**Enumerator**

***Natural*** A natural spline.

***Periodic*** A periodic spline.

### 12.120.3 Constructor & Destructor Documentation

#### 12.120.3.1 QwtSpline::QwtSpline ( const QwtSpline & *other* )

Copy constructor

**Parameters**

| | |
|---|---|
| *other* | Spline used for initialization |

### 12.120.4 Member Function Documentation

#### 12.120.4.1 bool QwtSpline::buildNaturalSpline ( const QPolygonF & *points* ) `[protected]`

Determines the coefficients for a natural spline.

**Returns**

true if successful

#### 12.120.4.2 bool QwtSpline::buildPeriodicSpline ( const QPolygonF & *points* ) `[protected]`

Determines the coefficients for a periodic spline.

**Returns**

true if successful

#### 12.120.4.3 const QVector< double > & QwtSpline::coefficientsA ( ) const

**Returns**

A coefficients

#### 12.120.4.4 const QVector< double > & QwtSpline::coefficientsB ( ) const

**Returns**

B coefficients

#### 12.120.4.5 const QVector< double > & QwtSpline::coefficientsC ( ) const

**Returns**

C coefficients

#### 12.120.4.6 QwtSpline & QwtSpline::operator= ( const QwtSpline & *other* )

Assignment operator

**Parameters**

| | |
|---|---|
| *other* | Spline used for initialization |

**Returns**

∗this

#### 12.120.4.7 QPolygonF QwtSpline::points ( ) const

**Returns**

Points, that have been by setPoints()

#### 12.120.4.8 bool QwtSpline::setPoints ( const QPolygonF & *points* )

Calculate the spline coefficients.

Depending on the value of *periodic*, this function will determine the coefficients for a natural or a periodic spline and store them internally.

**Parameters**

| | |
|---|---|
| *points* | Points |

**Returns**

true if successful

**Warning**

The sequence of x (but not y) values has to be strictly monotone increasing, which means `points[i].x()` $<$ `points[i+1].x()`. If this is not the case, the function will return false

#### 12.120.4.9 void QwtSpline::setSplineType ( SplineType *splineType* )

Select the algorithm used for calculating the spline

**Parameters**

| | |
|---|---|
| *splineType* | Spline type |

**See Also**

splineType()

#### 12.120.4.10 QwtSpline::SplineType QwtSpline::splineType ( ) const

**Returns**

the spline type

**See Also**

setSplineType()

#### 12.120.4.11 double QwtSpline::value ( double *x* ) const

Calculate the interpolated function value corresponding to a given argument x.

#### Parameters

| | |
|---|---|
| *x* | Coordinate |

#### Returns

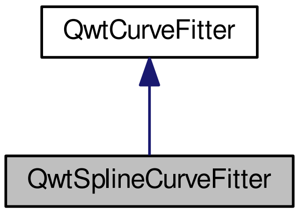
Interpolated coordinate

## 12.121 QwtSplineCurveFitter Class Reference

A curve fitter using cubic splines.

`#include <qwt_curve_fitter.h>`

Inheritance diagram for QwtSplineCurveFitter:



#### Public Types

- enum FitMode { Auto, Spline, ParametricSpline }

#### Public Member Functions

- QwtSplineCurveFitter ()

  *Constructor.*
- virtual ∼QwtSplineCurveFitter ()

  *Destructor.*
- void setFitMode (FitMode)
- FitMode fitMode () const
- void setSpline (const QwtSpline &)
- const QwtSpline & spline () const
- QwtSpline & spline ()
- void setSplineSize (int size)
- int splineSize () const
- virtual QPolygonF fitCurve (const QPolygonF &) const

#### Additional Inherited Members

### 12.121.1 Detailed Description

A curve fitter using cubic splines.

### 12.121.2 Member Enumeration Documentation

#### 12.121.2.1 enum QwtSplineCurveFitter::FitMode

Spline type The default setting is Auto

**See Also**

setFitMode(), FitMode()

**Enumerator**

***Auto*** Use the default spline algorithm for polygons with increasing x values ( p[i-1] < p[i] ), otherwise use a parametric spline algorithm.

***Spline*** Use a default spline algorithm.

***ParametricSpline*** Use a parametric spline algorithm.

### 12.121.3 Member Function Documentation

#### 12.121.3.1 QPolygonF QwtSplineCurveFitter::fitCurve ( const QPolygonF & *points* ) const [virtual]

Find a curve which has the best fit to a series of data points

**Parameters**

| | |
|---|---|
| *points* | Series of data points |

**Returns**

Curve points

Implements QwtCurveFitter.

#### 12.121.3.2 QwtSplineCurveFitter::FitMode QwtSplineCurveFitter::fitMode ( ) const

**Returns**

Mode representing a spline algorithm

**See Also**

setFitMode()

#### 12.121.3.3 void QwtSplineCurveFitter::setFitMode ( FitMode *mode* )

Select the algorithm used for building the spline

**Parameters**

| | |
|---|---|
| *mode* | Mode representing a spline algorithm |

**See Also**

fitMode()

#### 12.121.3.4 void QwtSplineCurveFitter::setSpline ( const QwtSpline & *spline* )

Assign a spline

**Parameters**

| | |
|---|---|
| *spline* | Spline |

**See Also**

spline()

#### 12.121.3.5 void QwtSplineCurveFitter::setSplineSize ( int *splineSize* )

Assign a spline size ( has to be at least 10 points )

**Parameters**

| | |
|---|---|
| *splineSize* | Spline size |

**See Also**

splineSize()

#### 12.121.3.6 const QwtSpline & QwtSplineCurveFitter::spline ( ) const

**Returns**

Spline

**See Also**

setSpline()

#### 12.121.3.7 QwtSpline & QwtSplineCurveFitter::spline ( )

**Returns**

Spline

**See Also**

setSpline()

#### 12.121.3.8 int QwtSplineCurveFitter::splineSize ( ) const

**Returns**

Spline size

**See Also**

setSplineSize()

## 12.122 QwtSymbol Class Reference

A class for drawing symbols.

```
#include <qwt_symbol.h>
```

### Public Types

- enum Style {
  NoSymbol = -1, Ellipse, Rect, Diamond,
  Triangle, DTriangle, UTriangle, LTriangle,
  RTriangle, Cross, XCross, HLine,
  VLine, Star1, Star2, Hexagon,
  Path, Pixmap, Graphic, SvgDocument,
  UserStyle = 1000 }
- enum CachePolicy { NoCache, Cache, AutoCache }

### Public Member Functions

- QwtSymbol (Style=NoSymbol)
- QwtSymbol (Style, const QBrush &, const QPen &, const QSize &)

  *Constructor.*
- QwtSymbol (const QPainterPath &, const QBrush &, const QPen &)

  *Constructor.*
- virtual ∼QwtSymbol ()

  *Destructor.*
- void setCachePolicy (CachePolicy)
- CachePolicy cachePolicy () const
- void setSize (const QSize &)
- void setSize (int width, int height=-1)

  *Specify the symbol's size.*
- const QSize & size () const
- void setPinPoint (const QPointF &pos, bool enable=true)

  *Set and enable a pin point.*
- QPointF pinPoint () const
- void setPinPointEnabled (bool)
- bool isPinPointEnabled () const
- virtual void setColor (const QColor &)

  *Set the color of the symbol.*
- void setBrush (const QBrush &b)

  *Assign a brush.*
- const QBrush & brush () const
- void setPen (const QColor &, qreal width=0.0, Qt::PenStyle=Qt::SolidLine)
- void setPen (const QPen &)
- const QPen & pen () const
- void setStyle (Style)
- Style style () const
- void setPath (const QPainterPath &)

  *Set a painter path as symbol.*
- const QPainterPath & path () const
- void setPixmap (const QPixmap &)
- const QPixmap & pixmap () const
- void setGraphic (const QwtGraphic &)
- const QwtGraphic & graphic () const
- void setSvgDocument (const QByteArray &)
- void drawSymbol (QPainter ∗, const QRectF &) const

  *Draw the symbol into a rectangle.*
- void drawSymbol (QPainter ∗, const QPointF &) const

  *Draw the symbol at a specified position.*

- void drawSymbols (QPainter ∗, const QPolygonF &) const

    *Draw symbols at the specified points.*
- void drawSymbols (QPainter ∗, const QPointF ∗, int numPoints) const
- virtual QRect boundingRect () const
- void invalidateCache ()

#### Protected Member Functions

- virtual void renderSymbols (QPainter ∗, const QPointF ∗, int numPoints) const

### 12.122.1 Detailed Description

A class for drawing symbols.

### 12.122.2 Member Enumeration Documentation

#### 12.122.2.1 enum QwtSymbol::CachePolicy

Depending on the render engine and the complexity of the symbol shape it might be faster to render the symbol to a pixmap and to paint this pixmap.

F.e. the raster paint engine is a pure software renderer where in cache mode a draw operation usually ends in raster operation with the the backing store, that are usually faster, than the algorithms for rendering polygons. But the opposite can be expected for graphic pipelines that can make use of hardware acceleration.

The default setting is AutoCache

**See Also**

setCachePolicy(), cachePolicy()

**Note**

The policy has no effect, when the symbol is painted to a vector graphics format ( PDF, SVG ).

**Warning**

Since Qt 4.8 raster is the default backend on X11

**Enumerator**

***NoCache*** Don't use a pixmap cache.

***Cache*** Always use a pixmap cache.

***AutoCache*** Use a cache when one of the following conditions is true:

- The symbol is rendered with the software renderer ( QPaintEngine::Raster )

#### 12.122.2.2 enum QwtSymbol::Style

Symbol Style

**See Also**

setStyle(), style()

**Enumerator**

***NoSymbol*** No Style. The symbol cannot be drawn.

***Ellipse*** Ellipse or circle.

***Rect*** Rectangle.

***Diamond*** Diamond.

***Triangle*** Triangle pointing upwards.

***DTriangle*** Triangle pointing downwards.

***UTriangle*** Triangle pointing upwards.

***LTriangle*** Triangle pointing left.

***RTriangle*** Triangle pointing right.

***Cross*** Cross (+)

***XCross*** Diagonal cross (X)

***HLine*** Horizontal line.

***VLine*** Vertical line.

***Star1*** X combined with +.

***Star2*** Six-pointed star.

***Hexagon*** Hexagon.

***Path*** The symbol is represented by a painter path, where the origin ( 0, 0 ) of the path coordinate system is mapped to the position of the symbol.

**See Also**

setPath(), path()

***Pixmap*** The symbol is represented by a pixmap. The pixmap is centered or aligned to its pin point.

**See Also**

setPinPoint()

***Graphic*** The symbol is represented by a graphic. The graphic is centered or aligned to its pin point.

**See Also**

setPinPoint()

***SvgDocument*** The symbol is represented by a SVG graphic. The graphic is centered or aligned to its pin point.

**See Also**

setPinPoint()

***UserStyle*** Styles >= QwtSymbol::UserSymbol are reserved for derived classes of QwtSymbol that overload drawSymbols() with additional application specific symbol types.

### 12.122.3 Constructor & Destructor Documentation

#### 12.122.3.1 QwtSymbol::QwtSymbol ( **Style** *style* = **NoSymbol** )

Default Constructor

**Parameters**

| | |
|---|---|
| *style* | Symbol Style |

The symbol is constructed with gray interior, black outline with zero width, no size and style 'NoSymbol'.

#### 12.122.3.2 QwtSymbol::QwtSymbol ( QwtSymbol::Style *style*, const QBrush & *brush*, const QPen & *pen*, const QSize & *size* )

Constructor.

**Parameters**

| | |
|---|---|
| *style* | Symbol Style |
| *brush* | brush to fill the interior |
| *pen* | outline pen |
| *size* | size |

**See Also**

setStyle(), setBrush(), setPen(), setSize()

#### 12.122.3.3 QwtSymbol::QwtSymbol ( const QPainterPath & *path*, const QBrush & *brush*, const QPen & *pen* )

Constructor.

The symbol gets initialized by a painter path. The style is set to QwtSymbol::Path, the size is set to empty ( the path is displayed unscaled ).

**Parameters**

| | |
|---|---|
| *path* | painter path |
| *brush* | brush to fill the interior |
| *pen* | outline pen |

**See Also**

setPath(), setBrush(), setPen(), setSize()

### 12.122.4 Member Function Documentation

#### 12.122.4.1 QRect QwtSymbol::boundingRect ( ) const [virtual]

Calculate the bounding rectangle for a symbol at position (0,0).

**Returns**

Bounding rectangle

#### 12.122.4.2 const QBrush & QwtSymbol::brush ( ) const

**Returns**

Brush

**See Also**

setBrush()

#### 12.122.4.3 QwtSymbol::CachePolicy QwtSymbol::cachePolicy ( ) const

**Returns**

Cache policy

**See Also**

CachePolicy, setCachePolicy()

#### 12.122.4.4 void QwtSymbol::drawSymbol ( QPainter ∗ *painter*, const QRectF & *rect* ) const

Draw the symbol into a rectangle.

The symbol is painted centered and scaled into the target rectangle. It is always painted uncached and the pin point is ignored.

This method is primarily intended for drawing a symbol to the legend.

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *rect* | Target rectangle for the symbol |

#### 12.122.4.5 void QwtSymbol::drawSymbol ( QPainter ∗ *painter*, const QPointF & *pos* ) const [inline]

Draw the symbol at a specified position.

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *pos* | Position of the symbol in screen coordinates |

#### 12.122.4.6 void QwtSymbol::drawSymbols ( QPainter ∗ *painter*, const QPolygonF & *points* ) const [inline]

Draw symbols at the specified points.

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *points* | Positions of the symbols in screen coordinates |

#### 12.122.4.7 void QwtSymbol::drawSymbols ( QPainter ∗ *painter*, const QPointF ∗ *points*, int *numPoints* ) const

Render an array of symbols

Painting several symbols is more effective than drawing symbols one by one, as a couple of layout calculations and setting of pen/brush can be done once for the complete array.

**Parameters**

| | |
|---:|---|
| *painter* | Painter |
| *points* | Array of points |
| *numPoints* | Number of points |

#### 12.122.4.8 const QwtGraphic & QwtSymbol::graphic ( ) const

**Returns**

Assigned graphic

**See Also**

setGraphic()

#### 12.122.4.9 void QwtSymbol::invalidateCache ( )

Invalidate the cached symbol pixmap

The symbol invalidates its cache, whenever an attribute is changed that has an effect ob how to display a symbol. In case of derived classes with individual styles ( >= QwtSymbol::UserStyle ) it might be necessary to call invalidateCache() for attributes that are relevant for this style.

**See Also**

CachePolicy, setCachePolicy(), drawSymbols()

#### 12.122.4.10 bool QwtSymbol::isPinPointEnabled ( ) const

**Returns**

True, when the pin point translation is enabled

**See Also**

setPinPoint(), setPinPointEnabled()

#### 12.122.4.11 const QPainterPath & QwtSymbol::path ( ) const

**Returns**

Painter path for displaying the symbol

**See Also**

setPath()

#### 12.122.4.12 const QPen & QwtSymbol::pen ( ) const

**Returns**

Pen

**See Also**

setPen(), brush()

#### 12.122.4.13 QPointF QwtSymbol::pinPoint ( ) const

**Returns**

Pin point

**See Also**

setPinPoint(), setPinPointEnabled()

#### 12.122.4.14 const QPixmap & QwtSymbol::pixmap ( ) const

**Returns**

Assigned pixmap

**See Also**

setPixmap()

#### 12.122.4.15 void QwtSymbol::renderSymbols ( QPainter ∗ *painter,* const QPointF ∗ *points,* int *numPoints* ) const [protected], [virtual]

Render the symbol to series of points

**Parameters**

| | |
|---|---|
| *painter* | Qt painter |
| *points* | Positions of the symbols |
| *numPoints* | Number of points |

#### 12.122.4.16 void QwtSymbol::setBrush ( const QBrush & *brush* )

Assign a brush.

The brush is used to draw the interior of the symbol.

**Parameters**

| | |
|---|---|
| *brush* | Brush |

**See Also**

brush()

#### 12.122.4.17 void QwtSymbol::setCachePolicy ( QwtSymbol::CachePolicy *policy* )

Change the cache policy

The default policy is AutoCache

**Parameters**

| | |
|---|---|
| *policy* | Cache policy |

**See Also**

CachePolicy, cachePolicy()

#### 12.122.4.18 void QwtSymbol::setColor ( const QColor & *color* ) [virtual]

Set the color of the symbol.

Change the color of the brush for symbol types with a filled area. For all other symbol types the color will be assigned to the pen.

**Parameters**

| | |
|---|---|
| *color* | Color |

**See Also**

setBrush(), setPen(), brush(), pen()

#### 12.122.4.19 void QwtSymbol::setGraphic ( const QwtGraphic & *graphic* )

Set a graphic as symbol

**Parameters**

| | |
|---|---|
| *graphic* | Graphic |

**See Also**

graphic(), setPixmap()

**Note**

the style() is set to QwtSymbol::Graphic
brush() and pen() have no effect

#### 12.122.4.20 void QwtSymbol::setPath ( const QPainterPath & *path* )

Set a painter path as symbol.

The symbol is represented by a painter path, where the origin ( 0, 0 ) of the path coordinate system is mapped to the position of the symbol.

When the symbol has valid size the painter path gets scaled to fit into the size. Otherwise the symbol size depends on the bounding rectangle of the path.

The following code defines a symbol drawing an arrow:

```
#include <qwt_symbol.h>

QwtSymbol *symbol = new QwtSymbol();

QPen pen( Qt::black, 2 );
pen.setJoinStyle( Qt::MiterJoin );

symbol->setPen( pen );
symbol->setBrush( Qt::red );

QPainterPath path;
path.moveTo( 0, 8 );
path.lineTo( 0, 5 );
path.lineTo( -3, 5 );
path.lineTo( 0, 0 );
path.lineTo( 3, 5 );
path.lineTo( 0, 5 );

QTransform transform;
transform.rotate( -30.0 );
path = transform.map( path );

symbol->setPath( path );
symbol->setPinPoint( QPointF( 0.0, 0.0 ) );

setSize( 10, 14 );
```

**Parameters**

| | |
|---|---|
| *path* | Painter path |

**Note**

The style is implicitely set to QwtSymbol::Path.

**See Also**

path(), setSize()

#### 12.122.4.21 void QwtSymbol::setPen ( const QColor & *color*, qreal *width* = `0.0`, Qt::PenStyle *style* = `Qt::SolidLine` )

Build and assign a pen

In Qt5 the default pen width is 1.0 ( 0.0 in Qt4 ) what makes it non cosmetic ( see QPen::isCosmetic() ). This method has been introduced to hide this incompatibility.

**Parameters**

| | |
|---|---|
| *color* | Pen color |
| *width* | Pen width |
| *style* | Pen style |

**See Also**

pen(), brush()

#### 12.122.4.22 void QwtSymbol::setPen ( const QPen & *pen* )

Assign a pen

The pen is used to draw the symbol's outline.

**Parameters**

| | |
|---|---|
| *pen* | Pen |

**See Also**

pen(), setBrush()

#### 12.122.4.23 void QwtSymbol::setPinPoint ( const QPointF & *pos*, bool *enable* = `true` )

Set and enable a pin point.

The position of a complex symbol is not always aligned to its center ( f.e an arrow, where the peak points to a position ). The pin point defines the position inside of a Pixmap, Graphic, SvgDocument or PainterPath symbol where the represented point has to be aligned to.

**Parameters**

| | |
|---|---|
| *pos* | Position |
| *enable* | En/Disable the pin point alignment |

**See Also**

pinPoint(), setPinPointEnabled()

#### 12.122.4.24 void QwtSymbol::setPinPointEnabled ( bool *on* )

En/Disable the pin point alignment

**Parameters**

| | |
|---|---|
| *on* | Enabled, when on is true |

**See Also**

setPinPoint(), isPinPointEnabled()

#### 12.122.4.25 void QwtSymbol::setPixmap ( const QPixmap & *pixmap* )

Set a pixmap as symbol

**Parameters**

| | |
|---|---|
| *pixmap* | Pixmap |

**See Also**

pixmap(), setGraphic()

**Note**

the style() is set to QwtSymbol::Pixmap
brush() and pen() have no effect

#### 12.122.4.26 void QwtSymbol::setSize ( const QSize & *size* )

Set the symbol's size

**Parameters**

| | |
|---|---|
| *size* | Size |

**See Also**

size()

#### 12.122.4.27 void QwtSymbol::setSize ( int *width*, int *height* = `-1` )

Specify the symbol's size.

If the 'h' parameter is left out or less than 0, and the 'w' parameter is greater than or equal to 0, the symbol size will be set to (w,w).

**Parameters**

| | |
|---|---|
| *width* | Width |
| *height* | Height (defaults to -1) |

**See Also**

size()

#### 12.122.4.28 void QwtSymbol::setStyle ( QwtSymbol::Style *style* )

Specify the symbol style

**Parameters**

| | |
|---|---|
| *style* | Style |

**See Also**

style()

#### 12.122.4.29 void QwtSymbol::setSvgDocument ( const QByteArray & *svgDocument* )

Set a SVG icon as symbol

**Parameters**

| | |
|---|---|
| *svgDocument* | SVG icon |

**See Also**

setGraphic(), setPixmap()

**Note**

the style() is set to QwtSymbol::SvgDocument
brush() and pen() have no effect

#### 12.122.4.30 const QSize & QwtSymbol::size ( ) const

**Returns**

Size

**See Also**

setSize()

#### 12.122.4.31 QwtSymbol::Style QwtSymbol::style ( ) const

**Returns**

Current symbol style

**See Also**

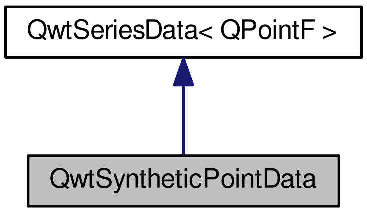
setStyle()

## 12.123 QwtSyntheticPointData Class Reference

Synthetic point data.

```
#include <qwt_point_data.h>
```

Inheritance diagram for QwtSyntheticPointData:



**Public Member Functions**

- QwtSyntheticPointData (size_t size, const QwtInterval &=QwtInterval())
- void setSize (size_t size)
- virtual size_t size () const
- void setInterval (const QwtInterval &)
- QwtInterval interval () const
- virtual QRectF boundingRect () const

    *Calculate the bounding rectangle.*
- virtual QPointF sample (size_t i) const
- virtual double y (double x) const =0
- virtual double x (uint index) const
- virtual void setRectOfInterest (const QRectF &)
- QRectF rectOfInterest () const

**Additional Inherited Members**

### 12.123.1 Detailed Description

Synthetic point data.

QwtSyntheticPointData provides a fixed number of points for an interval. The points are calculated in equidistant steps in x-direction.

If the interval is invalid, the points are calculated for the "rectangle of interest", what normally is the displayed area on the plot canvas. In this mode you get different levels of detail, when zooming in/out.

**Example**

The following example shows how to implement a sinus curve.

```
#include <cmath>
#include <qwt_series_data.h>
#include <qwt_plot_curve.h>
#include <qwt_plot.h>
#include <qapplication.h>

class SinusData: public QwtSyntheticPointData
{
public:
    SinusData():
        QwtSyntheticPointData( 100 )
    {
    }

    virtual double y( double x ) const
    {
        return qSin( x );
    }
};

int main(int argc, char **argv)
{
    QApplication a( argc, argv );

    QwtPlot plot;
    plot.setAxisScale( QwtPlot::xBottom, 0.0, 10.0 );
    plot.setAxisScale( QwtPlot::yLeft, -1.0, 1.0 );

    QwtPlotCurve *curve = new QwtPlotCurve( "y = sin(x)" );
    curve->setData( new SinusData() );
    curve->attach( &plot );

    plot.show();
    return a.exec();
}
```

### 12.123.2 Constructor & Destructor Documentation

#### 12.123.2.1 QwtSyntheticPointData::QwtSyntheticPointData ( size_t *size*, const QwtInterval & *interval* = QwtInterval() )

Constructor

**Parameters**

| | |
|---|---|
| *size* | Number of points |
| *interval* | Bounding interval for the points |

**See Also**

setInterval(), setSize()

### 12.123.3 Member Function Documentation

#### 12.123.3.1 QRectF QwtSyntheticPointData::boundingRect ( ) const [virtual]

Calculate the bounding rectangle.

This implementation iterates over all points, what could often be implemented much faster using the characteristics of the series. When there are many points it is recommended to overload and reimplement this method using the characteristics of the series ( if possible ).

**Returns**

Bounding rectangle

Implements QwtSeriesData< QPointF >.

#### 12.123.3.2 QwtInterval QwtSyntheticPointData::interval ( ) const

**Returns**

Bounding interval

**See Also**

setInterval(), size()

#### 12.123.3.3 QRectF QwtSyntheticPointData::rectOfInterest ( ) const

**Returns**

"rectangle of interest"

**See Also**

setRectOfInterest()

#### 12.123.3.4 QPointF QwtSyntheticPointData::sample ( size_t *index* ) const [virtual]

Calculate the point from an index

**Parameters**

| | |
|---|---|
| *index* | Index |

**Returns**

QPointF(x(index), y(x(index)));

**Warning**

For invalid indices ( index < 0 || index >= size() ) (0, 0) is returned.

Implements QwtSeriesData< QPointF >.

#### 12.123.3.5 void QwtSyntheticPointData::setInterval ( const QwtInterval & *interval* )

Set the bounding interval

**Parameters**

| | |
|---|---|
| *interval* | Interval |

**See Also**

interval(), setSize()

#### 12.123.3.6 void QwtSyntheticPointData::setRectOfInterest ( const QRectF & *rect* ) [virtual]

Set a the "rectangle of interest"

QwtPlotSeriesItem defines the current area of the plot canvas as "rect of interest" ( QwtPlotSeriesItem::update-ScaleDiv() ).

If interval().isValid() == false the x values are calculated in the interval rect.left() -> rect.right().

**See Also**

rectOfInterest()

Reimplemented from QwtSeriesData< QPointF >.

#### 12.123.3.7 void QwtSyntheticPointData::setSize ( size_t *size* )

Change the number of points

**Parameters**

| | |
|---|---|
| *size* | Number of points |

**See Also**

size(), setInterval()

#### 12.123.3.8 size_t QwtSyntheticPointData::size ( ) const [virtual]

**Returns**

Number of points

**See Also**

setSize(), interval()

Implements QwtSeriesData< QPointF >.

#### 12.123.3.9 double QwtSyntheticPointData::x ( uint *index* ) const [virtual]

Calculate a x-value from an index

x values are calculated by dividing an interval into equidistant steps. If !interval().isValid() the interval is calculated from the "rectangle of interest".

**Parameters**

| | |
|---|---|
| *index* | Index of the requested point |

**Returns**

Calculated x coordinate

**See Also**

interval(), rectOfInterest(), y()

#### 12.123.3.10 virtual double QwtSyntheticPointData::y ( double *x* ) const [pure virtual]

Calculate a y value for a x value

**Parameters**

| | |
|---|---|
| *x* | x value |

**Returns**

Corresponding y value

## 12.124 QwtSystemClock Class Reference

QwtSystemClock provides high resolution clock time functions.

```
#include <qwt_system_clock.h>
```

#### Public Member Functions

- QwtSystemClock ()

  *Constructs a null clock object.*
- virtual ∼QwtSystemClock ()

  *Destructor.*
- bool isNull () const
- void start ()
- double restart ()
- double elapsed () const

### 12.124.1 Detailed Description

QwtSystemClock provides high resolution clock time functions.

Sometimes the resolution offered by QTime ( millisecond ) is not accurate enough for implementing time measurements ( f.e. sampling ). QwtSystemClock offers a subset of the QTime functionality using higher resolution timers ( if possible ).

Precision and time intervals are multiples of milliseconds (ms).

**Note**

The implementation uses high-resolution performance counter on Windows, mach_absolute_time() on the Mac or POSIX timers on other systems. If none is available it falls back on QTimer.

### 12.124.2 Member Function Documentation

#### 12.124.2.1 double QwtSystemClock::elapsed ( ) const

**Returns**

Number of milliseconds that have elapsed since the last time start() or restart() was called or 0.0 for null clocks.

#### 12.124.2.2 bool QwtSystemClock::isNull ( ) const

**Returns**

true if the clock has never been started.

#### 12.124.2.3 double QwtSystemClock::restart ( )

Set the start time to the current time

**Returns**

Time, that is elapsed since the previous start time.

#### 12.124.2.4 void QwtSystemClock::start ( )

Sets the start time to the current time.

## 12.125 QwtText Class Reference

A class representing a text.

```
#include <qwt_text.h>
```

### Public Types

- enum TextFormat {
  AutoText = 0, PlainText, RichText, MathMLText,
  TeXText, OtherFormat = 100 }

    *Text format.*
- enum PaintAttribute { PaintUsingTextFont = 0x01, PaintUsingTextColor = 0x02, PaintBackground = 0x04 }

    *Paint Attributes.*
- enum LayoutAttribute { MinimumLayout = 0x01 }

    *Layout Attributes The layout attributes affects some aspects of the layout of the text.*
- typedef QFlags< PaintAttribute > PaintAttributes

    *Paint attributes.*
- typedef QFlags< LayoutAttribute > LayoutAttributes

    *Layout attributes.*

### Public Member Functions

- QwtText (const QString &=QString::null, TextFormat textFormat=AutoText)
- QwtText (const QwtText &)

    *Copy constructor.*
- ∼QwtText ()

    *Destructor.*
- QwtText & operator= (const QwtText &)

    *Assignment operator.*
- bool operator== (const QwtText &) const

    *Relational operator.*
- bool operator!= (const QwtText &) const

    *Relational operator.*
- void setText (const QString &, QwtText::TextFormat textFormat=AutoText)
- QString text () const
- bool isNull () const
- bool isEmpty () const
- void setFont (const QFont &)
- QFont font () const

    *Return the font.*
- QFont usedFont (const QFont &) const
- void setRenderFlags (int flags)

    *Change the render flags.*
- int renderFlags () const
- void setColor (const QColor &)
- QColor color () const

    *Return the pen color, used for painting the text.*
- QColor usedColor (const QColor &) const
- void setBorderRadius (double)
- double borderRadius () const
- void setBorderPen (const QPen &)
- QPen borderPen () const
- void setBackgroundBrush (const QBrush &)
- QBrush backgroundBrush () const
- void setPaintAttribute (PaintAttribute, bool on=true)
- bool testPaintAttribute (PaintAttribute) const
- void setLayoutAttribute (LayoutAttribute, bool on=true)
- bool testLayoutAttribute (LayoutAttribute) const
- double heightForWidth (double width, const QFont &=QFont()) const
- QSizeF textSize (const QFont &=QFont()) const
- void draw (QPainter ∗painter, const QRectF &rect) const

#### Static Public Member Functions

- static const QwtTextEngine ∗ textEngine (const QString &text, QwtText::TextFormat=AutoText)
- static const QwtTextEngine ∗ textEngine (QwtText::TextFormat)

    *Find the text engine for a text format.*
- static void setTextEngine (QwtText::TextFormat, QwtTextEngine ∗)

### 12.125.1 Detailed Description

A class representing a text.

A QwtText is a text including a set of attributes how to render it.

- Format

  A text might include control sequences (f.e tags) describing how to render it. Each format (f.e MathML, TeX, Qt Rich Text) has its own set of control sequences, that can be handles by a special QwtTextEngine for this format.
- Background

  A text might have a background, defined by a QPen and QBrush to improve its visibility. The corners of the background might be rounded.
- Font

  A text might have an individual font.
- Color

  A text might have an individual color.
- Render Flags

  Flags from Qt::AlignmentFlag and Qt::TextFlag used like in QPainter::drawText().

#### See Also

QwtTextEngine, QwtTextLabel

### 12.125.2 Member Enumeration Documentation

#### 12.125.2.1 enum **QwtText::LayoutAttribute**

Layout Attributes The layout attributes affects some aspects of the layout of the text.

#### Enumerator

***MinimumLayout*** Layout the text without its margins. This mode is useful if a text needs to be aligned accurately, like the tick labels of a scale. If QwtTextEngine::textMargins is not implemented for the format of the text, MinimumLayout has no effect.

#### 12.125.2.2 enum **QwtText::PaintAttribute**

Paint Attributes.

Font and color and background are optional attributes of a QwtText. The paint attributes hold the information, if they are set.

#### Enumerator

***PaintUsingTextFont*** The text has an individual font.

***PaintUsingTextColor*** The text has an individual color.

***PaintBackground*** The text has an individual background.

#### 12.125.2.3 enum QwtText::TextFormat

Text format.

The text format defines the QwtTextEngine, that is used to render the text.

**See Also**

QwtTextEngine, setTextEngine()

**Enumerator**

***AutoText*** The text format is determined using QwtTextEngine::mightRender() for all available text engines in increasing order > PlainText. If none of the text engines can render the text is rendered like QwtText::PlainText.

***PlainText*** Draw the text as it is, using a QwtPlainTextEngine.

***RichText*** Use the Scribe framework (Qt Rich Text) to render the text.

***MathMLText***
```
        Use a MathML (http://en.wikipedia.org/wiki/MathML) render engine
to display the text. The Qwt MathML extension offers such an engine
based on the MathML renderer of the Qt solutions package.
To enable MathML support the following code needs to be added to the
application:
```

```
QwtText::setTextEngine(QwtText::MathMLText, new QwtMathMLTextEngine());
```

***TeXText*** Use a TeX (`http://en.wikipedia.org/wiki/TeX`) render engine to display the text ( not implemented yet ).

***OtherFormat*** The number of text formats can be extended using setTextEngine. Formats >= QwtText::OtherFormat are not used by Qwt.

### 12.125.3 Constructor & Destructor Documentation

#### 12.125.3.1 QwtText::QwtText ( const QString & *text* = `QString::null`, QwtText::TextFormat *textFormat* = AutoText )

Constructor

**Parameters**

| | |
|---|---|
| *text* | Text content |
| *textFormat* | Text format |

### 12.125.4 Member Function Documentation

#### 12.125.4.1 QBrush QwtText::backgroundBrush ( ) const

**Returns**

Background brush

**See Also**

setBackgroundBrush(), borderPen()

#### 12.125.4.2 QPen QwtText::borderPen ( ) const

**Returns**

Background pen

**See Also**

setBorderPen(), backgroundBrush()

#### 12.125.4.3 double QwtText::borderRadius ( ) const

**Returns**

Radius for the corners of the border frame

**See Also**

setBorderRadius(), borderPen(), backgroundBrush()

#### 12.125.4.4 void QwtText::draw ( QPainter * *painter,* const QRectF & *rect* ) const

Draw a text into a rectangle

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Rectangle |

#### 12.125.4.5 double QwtText::heightForWidth ( double *width,* const QFont & *defaultFont* = `QFont()` ) const

Find the height for a given width

**Parameters**

| | |
|---|---|
| *defaultFont* | Font, used for the calculation if the text has no font |
| *width* | Width |

**Returns**

Calculated height

#### 12.125.4.6 bool QwtText::isEmpty ( ) const `[inline]`

**Returns**

text().isEmpty()

#### 12.125.4.7 bool QwtText::isNull ( ) const `[inline]`

**Returns**

text().isNull()

#### 12.125.4.8 int QwtText::renderFlags ( ) const

**Returns**

Render flags

**See Also**

setRenderFlags()

#### 12.125.4.9 void QwtText::setBackgroundBrush ( const QBrush & *brush* )

Set the background brush

**Parameters**

| | |
|---|---|
| *brush* | Background brush |

**See Also**

backgroundBrush(), setBorderPen()

#### 12.125.4.10 void QwtText::setBorderPen ( const QPen & *pen* )

Set the background pen

**Parameters**

| | |
|---|---|
| *pen* | Background pen |

**See Also**

borderPen(), setBackgroundBrush()

#### 12.125.4.11 void QwtText::setBorderRadius ( double *radius* )

Set the radius for the corners of the border frame

**Parameters**

| | |
|---|---|
| *radius* | Radius of a rounded corner |

**See Also**

borderRadius(), setBorderPen(), setBackgroundBrush()

#### 12.125.4.12 void QwtText::setColor ( const QColor & *color* )

Set the pen color used for drawing the text.

**Parameters**

| | |
|---|---|
| *color* | Color |

**Note**

Setting the color might have no effect, when the text contains control sequences for setting colors.

#### 12.125.4.13 void QwtText::setFont ( const QFont & *font* )

Set the font.

**Parameters**

| | |
|---|---|
| *font* | Font |

**Note**

Setting the font might have no effect, when the text contains control sequences for setting fonts.

#### 12.125.4.14 void QwtText::setLayoutAttribute ( LayoutAttribute *attribute,* bool *on* = `true` )

Change a layout attribute

**Parameters**

| | |
|---|---|
| *attribute* | Layout attribute |
| *on* | On/Off |

**See Also**

testLayoutAttribute()

#### 12.125.4.15 void QwtText::setPaintAttribute ( PaintAttribute *attribute,* bool *on* = `true` )

Change a paint attribute

**Parameters**

| | |
|---|---|
| *attribute* | Paint attribute |
| *on* | On/Off |

**Note**

Used by setFont(), setColor(), setBorderPen() and setBackgroundBrush()

**See Also**

testPaintAttribute()

#### 12.125.4.16 void QwtText::setRenderFlags ( int *renderFlags* )

Change the render flags.

The default setting is Qt::AlignCenter

**Parameters**

| | |
|---|---|
| *renderFlags* | Bitwise OR of the flags used like in QPainter::drawText() |

**See Also**

renderFlags(), QwtTextEngine::draw()

**Note**

Some renderFlags might have no effect, depending on the text format.

#### 12.125.4.17 void QwtText::setText ( const QString & *text,* QwtText::TextFormat *textFormat* = AutoText )

Assign a new text content

**Parameters**

| | |
|---|---|
| *text* | Text content |
| *textFormat* | Text format |

**See Also**

text()

#### 12.125.4.18 void QwtText::setTextEngine ( QwtText::TextFormat *format,* QwtTextEngine ∗ *engine* ) `[static]`

Assign/Replace a text engine for a text format

With setTextEngine it is possible to extend Qwt with other types of text formats.

For QwtText::PlainText it is not allowed to assign a engine == NULL.

**Parameters**

| | |
|---|---|
| *format* | Text format |
| *engine* | Text engine |

**See Also**

QwtMathMLTextEngine

**Warning**

Using QwtText::AutoText does nothing.

#### 12.125.4.19 bool QwtText::testLayoutAttribute ( **LayoutAttribute** *attribute* ) const

Test a layout attribute

**Parameters**

| | |
|---|---|
| *attribute* | Layout attribute |

**Returns**

true, if attribute is enabled

**See Also**

setLayoutAttribute()

#### 12.125.4.20 bool QwtText::testPaintAttribute ( **PaintAttribute** *attribute* ) const

Test a paint attribute

**Parameters**

| | |
|---|---|
| *attribute* | Paint attribute |

**Returns**

true, if attribute is enabled

**See Also**

setPaintAttribute()

#### 12.125.4.21 QString QwtText::text ( ) const

**Returns**

Text as QString.

**See Also**

setText()

#### 12.125.4.22 const **QwtTextEngine** ∗ QwtText::textEngine ( const QString & *text*, **QwtText::TextFormat** *format* = **AutoText** ) `[static]`

Find the text engine for a text format

In case of QwtText::AutoText the first text engine (beside QwtPlainTextEngine) is returned, where QwtTextEngine::mightRender returns true. If there is none QwtPlainTextEngine is returned.

If no text engine is registered for the format QwtPlainTextEngine is returnd.

**Parameters**

| | |
|---:|---|
| *text* | Text, needed in case of AutoText |
| *format* | Text format |

**Returns**

Corresponding text engine

#### 12.125.4.23 const QwtTextEngine ∗ QwtText::textEngine ( QwtText::TextFormat *format* ) [static]

Find the text engine for a text format.

textEngine can be used to find out if a text format is supported.

**Parameters**

| | |
|---:|---|
| *format* | Text format |

**Returns**

The text engine, or NULL if no engine is available.

#### 12.125.4.24 QSizeF QwtText::textSize ( const QFont & *defaultFont* = QFont() ) const

Find the height for a given width

**Parameters**

| | |
|---:|---|
| *defaultFont* | Font, used for the calculation if the text has no font |

**Returns**

Calculated height

Returns the size, that is needed to render text

**Parameters**

| | |
|---:|---|
| *defaultFont* | Font of the text |

**Returns**

Caluclated size

#### 12.125.4.25 QColor QwtText::usedColor ( const QColor & *defaultColor* ) const

Return the color of the text, if it has one. Otherwise return defaultColor.

**Parameters**

| | |
|---:|---|
| *defaultColor* | Default color |

**Returns**

Color used for drawing the text

**See Also**

setColor(), color(), PaintAttributes

#### 12.125.4.26 QFont QwtText::usedFont ( const QFont & *defaultFont* ) const

Return the font of the text, if it has one. Otherwise return defaultFont.

**Parameters**

| | |
|---|---|
| *defaultFont* | Default font |

**Returns**

Font used for drawing the text

**See Also**

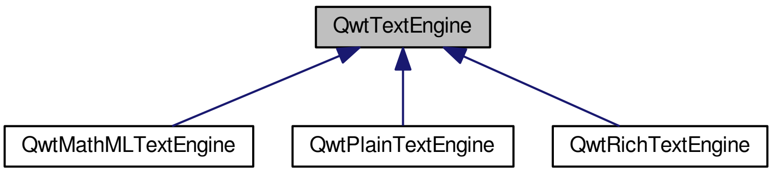
setFont(), font(), PaintAttributes

## 12.126 QwtTextEngine Class Reference

Abstract base class for rendering text strings.

`#include <qwt_text_engine.h>`

Inheritance diagram for QwtTextEngine:



**Public Member Functions**

- virtual ~QwtTextEngine ()

  *Destructor.*
- virtual double heightForWidth (const QFont &font, int flags, const QString &text, double width) const =0
- virtual QSizeF textSize (const QFont &font, int flags, const QString &text) const =0
- virtual bool mightRender (const QString &text) const =0
- virtual void textMargins (const QFont &font, const QString &text, double &left, double &right, double &top, double &bottom) const =0
- virtual void draw (QPainter ∗painter, const QRectF &rect, int flags, const QString &text) const =0

**Protected Member Functions**

- QwtTextEngine ()

  *Constructor.*

### 12.126.1 Detailed Description

Abstract base class for rendering text strings.

A text engine is responsible for rendering texts for a specific text format. They are used by QwtText to render a text.

QwtPlainTextEngine and QwtRichTextEngine are part of the Qwt library. The implementation of QwtMathMLText-Engine uses code from the Qt solution package. Because of license implications it is built into a separate library.

**See Also**

QwtText::setTextEngine()

### 12.126.2 Member Function Documentation

#### 12.126.2.1 virtual void QwtTextEngine::draw ( QPainter ∗ *painter,* const QRectF & *rect,* int *flags,* const QString & *text* ) const `[pure virtual]`

Draw the text in a clipping rectangle

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Clipping rectangle |
| *flags* | Bitwise OR of the flags like in for QPainter::drawText() |
| *text* | Text to be rendered |

Implemented in QwtRichTextEngine, QwtPlainTextEngine, and QwtMathMLTextEngine.

#### 12.126.2.2 virtual double QwtTextEngine::heightForWidth ( const QFont & *font,* int *flags,* const QString & *text,* double *width* ) const `[pure virtual]`

Find the height for a given width

**Parameters**

| | |
|---|---|
| *font* | Font of the text |
| *flags* | Bitwise OR of the flags used like in QPainter::drawText |
| *text* | Text to be rendered |
| *width* | Width |

**Returns**

Calculated height

Implemented in QwtRichTextEngine, QwtPlainTextEngine, and QwtMathMLTextEngine.

#### 12.126.2.3 virtual bool QwtTextEngine::mightRender ( const QString & *text* ) const `[pure virtual]`

Test if a string can be rendered by this text engine

**Parameters**

| | |
|---|---|
| *text* | Text to be tested |

**Returns**

true, if it can be rendered

Implemented in QwtRichTextEngine, QwtPlainTextEngine, and QwtMathMLTextEngine.

#### 12.126.2.4 virtual void QwtTextEngine::textMargins ( const QFont & *font,* const QString & *text,* double & *left,* double & *right,* double & *top,* double & *bottom* ) const `[pure virtual]`

Return margins around the texts

The textSize might include margins around the text, like QFontMetrics::descent(). In situations where texts need to be aligned in detail, knowing these margins might improve the layout calculations.

**Parameters**

| | |
|---|---|
| *font* | Font of the text |
| *text* | Text to be rendered |
| *left* | Return value for the left margin |
| *right* | Return value for the right margin |
| *top* | Return value for the top margin |
| *bottom* | Return value for the bottom margin |

Implemented in QwtRichTextEngine, QwtPlainTextEngine, and QwtMathMLTextEngine.

#### 12.126.2.5 virtual QSizeF QwtTextEngine::textSize ( const QFont & *font*, int *flags*, const QString & *text* ) const [pure virtual]

Returns the size, that is needed to render text

**Parameters**

| | |
|---|---|
| *font* | Font of the text |
| *flags* | Bitwise OR of the flags like in for QPainter::drawText |
| *text* | Text to be rendered |

**Returns**

Calculated size

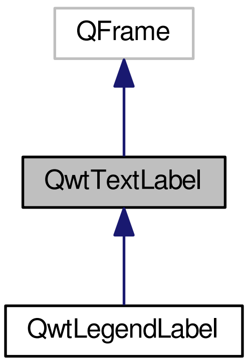
Implemented in QwtRichTextEngine, QwtPlainTextEngine, and QwtMathMLTextEngine.

## 12.127 QwtTextLabel Class Reference

A Widget which displays a QwtText.

`#include <qwt_text_label.h>`

Inheritance diagram for QwtTextLabel:



**Public Slots**

- void setText (const QString &, QwtText::TextFormat textFormat=QwtText::AutoText)
- virtual void setText (const QwtText &)

- void clear ()

  *Clear the text and all QwtText attributes.*

### Public Member Functions

- QwtTextLabel (QWidget ∗parent=NULL)
- QwtTextLabel (const QwtText &, QWidget ∗parent=NULL)
- virtual ∼QwtTextLabel ()

  *Destructor.*
- void setPlainText (const QString &)
- QString plainText () const
- const QwtText & text () const

  *Return the text.*
- int indent () const

  *Return label's text indent in pixels.*
- void setIndent (int)
- int margin () const

  *Return label's text indent in pixels.*
- void setMargin (int)
- virtual QSize sizeHint () const

  *Return label's margin in pixels.*
- virtual QSize minimumSizeHint () const

  *Return a minimum size hint.*
- virtual int heightForWidth (int) const
- QRect textRect () const
- virtual void drawText (QPainter ∗, const QRectF &)

  *Redraw the text.*

### Protected Member Functions

- virtual void paintEvent (QPaintEvent ∗e)
- virtual void drawContents (QPainter ∗)

  *Redraw the text and focus indicator.*

### 12.127.1 Detailed Description

A Widget which displays a QwtText.

### 12.127.2 Constructor & Destructor Documentation

#### 12.127.2.1 QwtTextLabel::QwtTextLabel ( QWidget ∗ *parent* = NULL ) [explicit]

Constructs an empty label.

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

#### 12.127.2.2 QwtTextLabel::QwtTextLabel ( const QwtText & *text,* QWidget ∗ *parent* = NULL ) [explicit]

Constructs a label that displays the text, text

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |
| *text* | Text |

### 12.127.3 Member Function Documentation

#### 12.127.3.1 int QwtTextLabel::heightForWidth ( int *width* ) const [virtual]

**Parameters**

| | |
|---|---|
| *width* | Width |

**Returns**

Preferred height for this widget, given the width.

#### 12.127.3.2 void QwtTextLabel::paintEvent ( QPaintEvent ∗ *event* ) [protected], [virtual]

Qt paint event

**Parameters**

| | |
|---|---|
| *event* | Paint event |

Reimplemented in QwtLegendLabel.

#### 12.127.3.3 QString QwtTextLabel::plainText ( ) const

Interface for the designer plugin

**Returns**

Text as plain text

**See Also**

setPlainText(), text()

#### 12.127.3.4 void QwtTextLabel::setIndent ( int *indent* )

Set label's text indent in pixels

**Parameters**

| | |
|---|---|
| *indent* | Indentation in pixels |

#### 12.127.3.5 void QwtTextLabel::setMargin ( int *margin* )

Set label's margin in pixels

**Parameters**

| | |
|---|---|
| *margin* | Margin in pixels |

#### 12.127.3.6 void QwtTextLabel::setPlainText ( const QString & *text* )

Interface for the designer plugin - does the same as setText()

**See Also**

plainText()

#### 12.127.3.7 void QwtTextLabel::setText ( const QString & *text*, QwtText::TextFormat *textFormat* = QwtText::AutoText ) [slot]

Change the label's text, keeping all other QwtText attributes

**Parameters**

| | |
|---|---|
| *text* | New text |
| *textFormat* | Format of text |

**See Also**

QwtText

#### 12.127.3.8 void QwtTextLabel::setText ( const QwtText & *text* ) [virtual], [slot]

Change the label's text

**Parameters**

| | |
|---|---|
| *text* | New text |

Reimplemented in QwtLegendLabel.

#### 12.127.3.9 QRect QwtTextLabel::textRect ( ) const

Calculate geometry for the text in widget coordinates

**Returns**

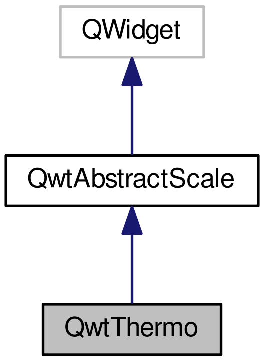
Geometry for the text

## 12.128 QwtThermo Class Reference

The Thermometer Widget.

`#include <qwt_thermo.h>`

Inheritance diagram for QwtThermo:



**Public Types**

- enum ScalePosition { NoScale, LeadingScale, TrailingScale }
- enum OriginMode { OriginMinimum, OriginMaximum, OriginCustom }

### Public Slots

- virtual void setValue (double val)

### Public Member Functions

- QwtThermo (QWidget ∗parent=NULL)
- virtual ∼QwtThermo ()

  *Destructor.*
- void setOrientation (Qt::Orientation)

  *Set the orientation.*
- Qt::Orientation orientation () const
- void setScalePosition (ScalePosition)

  *Change the position of the scale.*
- ScalePosition scalePosition () const
- void setSpacing (int)

  *Change the spacing between pipe and scale.*
- int spacing () const
- void setBorderWidth (int w)
- int borderWidth () const
- void setOriginMode (OriginMode)

  *Change how the origin is determined.*
- OriginMode originMode () const
- void setOrigin (double)

  *Specifies the custom origin.*
- double origin () const
- void setFillBrush (const QBrush &b)

  *Change the brush of the liquid.*
- QBrush fillBrush () const
- void setAlarmBrush (const QBrush &b)

  *Specify the liquid brush above the alarm threshold.*
- QBrush alarmBrush () const
- void setAlarmLevel (double v)
- double alarmLevel () const
- void setAlarmEnabled (bool tf)

  *Enable or disable the alarm threshold.*
- bool alarmEnabled () const
- void setColorMap (QwtColorMap ∗)

  *Assign a color map for the fill color.*
- QwtColorMap ∗ colorMap ()
- const QwtColorMap ∗ colorMap () const
- void setPipeWidth (int w)
- int pipeWidth () const
- void setRangeFlags (QwtInterval::BorderFlags)

  *Exclude/Include min/max values.*
- QwtInterval::BorderFlags rangeFlags () const
- double value () const

  *Return the value.*
- virtual QSize sizeHint () const
- virtual QSize minimumSizeHint () const
- void setScaleDraw (QwtScaleDraw ∗)

  *Set a scale draw.*
- const QwtScaleDraw ∗ scaleDraw () const

#### Protected Member Functions

- virtual void drawLiquid (QPainter ∗, const QRect &) const
- virtual void scaleChange ()

    *Notify a scale change.*
- virtual void paintEvent (QPaintEvent ∗)
- virtual void resizeEvent (QResizeEvent ∗)
- virtual void changeEvent (QEvent ∗)
- QwtScaleDraw ∗ scaleDraw ()
- QRect pipeRect () const
- QRect fillRect (const QRect &) const

    *Calculate the filled rectangle of the pipe.*
- QRect alarmRect (const QRect &) const

    *Calculate the alarm rectangle of the pipe.*

### 12.128.1 Detailed Description

The Thermometer Widget.

QwtThermo is a widget which displays a value in an interval. It supports:

- a horizontal or vertical layout;
- a range;
- a scale;
- an alarm level.

The fill colors might be calculated from an optional color map If no color map has been assigned QwtThermo uses the following colors/brushes from the widget palette:

- QPalette::Base Background of the pipe
- QPalette::ButtonText Fill brush below the alarm level
- QPalette::Highlight Fill brush for the values above the alarm level
- QPalette::WindowText For the axis of the scale
- QPalette::Text For the labels of the scale

### 12.128.2 Member Enumeration Documentation

#### 12.128.2.1 enum **QwtThermo::OriginMode**

Origin mode. This property specifies where the beginning of the liquid is placed.

**See Also**

setOriginMode(), setOrigin()

**Enumerator**

***OriginMinimum*** The origin is the minimum of the scale.

***OriginMaximum*** The origin is the maximum of the scale.

***OriginCustom*** The origin is specified using the origin() property.

#### 12.128.2.2 enum QwtThermo::ScalePosition

Position of the scale

**See Also**

setScalePosition(), setOrientation()

**Enumerator**

***NoScale*** The slider has no scale.

***LeadingScale*** The scale is right of a vertical or below of a horizontal slider.

***TrailingScale*** The scale is left of a vertical or above of a horizontal slider.

### 12.128.3 Constructor & Destructor Documentation

#### 12.128.3.1 QwtThermo::QwtThermo ( QWidget ∗ *parent* = NULL ) [explicit]

Constructor

**Parameters**

| | |
|---|---|
| *parent* | Parent widget |

### 12.128.4 Member Function Documentation

#### 12.128.4.1 QBrush QwtThermo::alarmBrush ( ) const

**Returns**

Liquid brush ( QPalette::Highlight ) above the alarm threshold.

**See Also**

setAlarmBrush(), QWidget::palette()

**Warning**

The alarm threshold has no effect, when a color map has been assigned

#### 12.128.4.2 bool QwtThermo::alarmEnabled ( ) const

**Returns**

True, when the alarm threshold is enabled.

**Warning**

The alarm threshold has no effect, when a color map has been assigned

#### 12.128.4.3 double QwtThermo::alarmLevel ( ) const

**Returns**

Alarm threshold.

**See Also**

setAlarmLevel()

**Warning**

The alarm threshold has no effect, when a color map has been assigned

#### 12.128.4.4 QRect QwtThermo::alarmRect ( const QRect & *fillRect* ) const [protected]

Calculate the alarm rectangle of the pipe.

**Parameters**

| | |
|---|---|
| *fillRect* | Filled rectangle in the pipe |

**Returns**

Rectangle to be filled with the alarm brush

**See Also**

pipeRect(), fillRect(), alarmLevel(), alarmBrush()

#### 12.128.4.5 int QwtThermo::borderWidth ( ) const

**Returns**

Border width of the thermometer pipe.

**See Also**

setBorderWidth()

#### 12.128.4.6 void QwtThermo::changeEvent ( QEvent ∗ *event* ) [protected], [virtual]

Qt change event handler

**Parameters**

| | |
|---|---|
| *event* | Event |

#### 12.128.4.7 QwtColorMap ∗ QwtThermo::colorMap ( )

**Returns**

Color map for the fill color

**Warning**

The alarm threshold has no effect, when a color map has been assigned

#### 12.128.4.8 const QwtColorMap ∗ QwtThermo::colorMap ( ) const

**Returns**

Color map for the fill color

**Warning**

The alarm threshold has no effect, when a color map has been assigned

#### 12.128.4.9 void QwtThermo::drawLiquid ( QPainter ∗ *painter,* const QRect & *pipeRect* ) const [protected], [virtual]

Redraw the liquid in thermometer pipe.

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *pipeRect* | Bounding rectangle of the pipe without borders |

#### 12.128.4.10 QBrush QwtThermo::fillBrush ( ) const

**Returns**

Liquid ( QPalette::ButtonText ) brush.

**See Also**

setFillBrush(), QWidget::palette()

#### 12.128.4.11 QRect QwtThermo::fillRect ( const QRect & *pipeRect* ) const [protected]

Calculate the filled rectangle of the pipe.

**Parameters**

| | |
|---|---|
| *pipeRect* | Rectangle of the pipe |

**Returns**

Rectangle to be filled ( fill and alarm brush )

**See Also**

pipeRect(), alarmRect()

#### 12.128.4.12 QSize QwtThermo::minimumSizeHint ( ) const [virtual]

**Returns**

Minimum size hint

**Warning**

The return value depends on the font and the scale.

**See Also**

sizeHint()

#### 12.128.4.13 Qt::Orientation QwtThermo::orientation ( ) const

**Returns**

Orientation

**See Also**

setOrientation()

#### 12.128.4.14 double QwtThermo::origin ( ) const

**Returns**

Origin of the thermo, when OriginCustom is enabled

**See Also**

setOrigin(), setOriginMode(), originMode()

#### 12.128.4.15 QwtThermo::OriginMode QwtThermo::originMode ( ) const

**Returns**

Mode, how the origin is determined.

**See Also**

setOriginMode(), serOrigin(), origin()

#### 12.128.4.16 void QwtThermo::paintEvent ( QPaintEvent * *event* ) [protected], [virtual]

Paint event handler

**Parameters**

| | |
|---|---|
| *event* | Paint event |

#### 12.128.4.17 QRect QwtThermo::pipeRect ( ) const [protected]

**Returns**

Bounding rectangle of the pipe ( without borders ) in widget coordinates

#### 12.128.4.18 int QwtThermo::pipeWidth ( ) const

**Returns**

Width of the pipe.

**See Also**

setPipeWidth()

#### 12.128.4.19 QwtInterval::BorderFlags QwtThermo::rangeFlags ( ) const

**Returns**

Range flags

**See Also**

setRangeFlags()

#### 12.128.4.20 void QwtThermo::resizeEvent ( QResizeEvent * *event* ) [protected], [virtual]

Resize event handler

**Parameters**

| | |
|---|---|
| *event* | Resize event |

#### 12.128.4.21 const QwtScaleDraw ∗ QwtThermo::scaleDraw ( ) const

**Returns**

the scale draw of the thermo

**See Also**

setScaleDraw()

#### 12.128.4.22 QwtScaleDraw ∗ QwtThermo::scaleDraw ( ) [protected]

**Returns**

the scale draw of the thermo

**See Also**

setScaleDraw()

#### 12.128.4.23 QwtThermo::ScalePosition QwtThermo::scalePosition ( ) const

**Returns**

Scale position.

**See Also**

setScalePosition()

#### 12.128.4.24 void QwtThermo::setAlarmBrush ( const QBrush & *brush* )

Specify the liquid brush above the alarm threshold.

Changes the QPalette::Highlight brush of the palette.

**Parameters**

| | |
|---|---|
| *brush* | New brush. |

**See Also**

alarmBrush(), QWidget::setPalette()

**Warning**

The alarm threshold has no effect, when a color map has been assigned

#### 12.128.4.25 void QwtThermo::setAlarmEnabled ( bool *on* )

Enable or disable the alarm threshold.

**Parameters**

| | |
|---|---|
| *on* | true (disabled) or false (enabled) |

**Warning**

The alarm threshold has no effect, when a color map has been assigned

### 12.128.4.26 void QwtThermo::setAlarmLevel ( double *level* )

Specify the alarm threshold.

**Parameters**

| | |
|---|---|
| *level* | Alarm threshold |

**See Also**

alarmLevel()

**Warning**

The alarm threshold has no effect, when a color map has been assigned

### 12.128.4.27 void QwtThermo::setBorderWidth ( int *width* )

Set the border width of the pipe.

**Parameters**

| | |
|---|---|
| *width* | Border width |

**See Also**

borderWidth()

### 12.128.4.28 void QwtThermo::setColorMap ( QwtColorMap ∗ *colorMap* )

Assign a color map for the fill color.

**Parameters**

| | |
|---|---|
| *colorMap* | Color map |

**Warning**

The alarm threshold has no effect, when a color map has been assigned

### 12.128.4.29 void QwtThermo::setFillBrush ( const QBrush & *brush* )

Change the brush of the liquid.

Changes the QPalette::ButtonText brush of the palette.

**Parameters**

|  |  |
|---|---|
| *brush* | New brush. |

**See Also**

fillBrush(), QWidget::setPalette()

#### 12.128.4.30 void QwtThermo::setOrientation ( Qt::Orientation *orientation* )

Set the orientation.

**Parameters**

|  |  |
|---|---|
| *orientation* | Allowed values are Qt::Horizontal and Qt::Vertical. |

**See Also**

orientation(), scalePosition()

#### 12.128.4.31 void QwtThermo::setOrigin ( double *origin* )

Specifies the custom origin.

If originMode is set to OriginCustom this property controls where the liquid starts.

**Parameters**

|  |  |
|---|---|
| *origin* | New origin level |

**See Also**

setOriginMode(), originMode(), origin()

#### 12.128.4.32 void QwtThermo::setOriginMode ( OriginMode *m* )

Change how the origin is determined.

**See Also**

originMode(), serOrigin(), origin()

#### 12.128.4.33 void QwtThermo::setPipeWidth ( int *width* )

Change the width of the pipe.

**Parameters**

|  |  |
|---|---|
| *width* | Width of the pipe |

**See Also**

pipeWidth()

#### 12.128.4.34 void QwtThermo::setRangeFlags ( QwtInterval::BorderFlags *flags* )

Exclude/Include min/max values.

According to the flags minValue() and maxValue() are included/excluded from the pipe. In case of an excluded value the corresponding tick is painted 1 pixel off of the pipeRect().

F.e. when a minimum of 0.0 has to be displayed as an empty pipe the minValue() needs to be excluded.

**Parameters**

| | |
|---|---|
| *flags* | Range flags |

**See Also**

rangeFlags()

#### 12.128.4.35 void QwtThermo::setScaleDraw ( QwtScaleDraw * *scaleDraw* )

Set a scale draw.

For changing the labels of the scales, it is necessary to derive from QwtScaleDraw and overload QwtScaleDraw::label().

**Parameters**

| | |
|---|---|
| *scaleDraw* | ScaleDraw object, that has to be created with new and will be deleted in ~QwtThermo() or the next call of setScaleDraw(). |

#### 12.128.4.36 void QwtThermo::setScalePosition ( ScalePosition *scalePosition* )

Change the position of the scale.

**Parameters**

| | |
|---|---|
| *scalePosition* | Position of the scale. |

**See Also**

ScalePosition, scalePosition()

#### 12.128.4.37 void QwtThermo::setSpacing ( int *spacing* )

Change the spacing between pipe and scale.

A spacing of 0 means, that the backbone of the scale is below the pipe.

The default setting is 3 pixels.

**Parameters**

| | |
|---|---|
| *spacing* | Number of pixels |

**See Also**

spacing();

#### 12.128.4.38 void QwtThermo::setValue ( double *value* ) `[virtual]`, `[slot]`

Set the current value.

**Parameters**

| | |
|---|---|
| *value* | New Value |

**See Also**

value()

#### 12.128.4.39 QSize QwtThermo::sizeHint ( ) const [virtual]

**Returns**

the minimum size hint

**See Also**

minimumSizeHint()

#### 12.128.4.40 int QwtThermo::spacing ( ) const

**Returns**

Number of pixels between pipe and scale

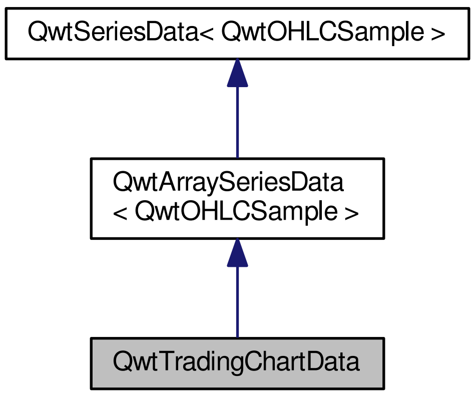
**See Also**

setSpacing()

## 12.129 QwtTradingChartData Class Reference

```
#include <qwt_series_data.h>
```

Inheritance diagram for QwtTradingChartData:


QwtSeriesData< QwtOHLCSample >
QwtArraySeriesData < QwtOHLCSample >
QwtTradingChartData

**Public Member Functions**

- QwtTradingChartData (const QVector< QwtOHLCSample > &=QVector< QwtOHLCSample >())
- virtual QRectF boundingRect () const

  *Calculate the bounding rectangle.*

**Additional Inherited Members**

### 12.129.1 Detailed Description

Interface for iterating over an array of OHLC samples

#### 12.129.2 Constructor & Destructor Documentation

##### 12.129.2.1 QwtTradingChartData::QwtTradingChartData ( const QVector< QwtOHLCSample > & *samples* = `QVector<`**QwtOHLCSample**`>()` )

Constructor

**Parameters**

| | |
|---|---|
| *samples* | Samples |

#### 12.129.3 Member Function Documentation

##### 12.129.3.1 QRectF QwtTradingChartData::boundingRect ( ) const `[virtual]`

Calculate the bounding rectangle.

The bounding rectangle is calculated once by iterating over all points and is stored for all following requests.

**Returns**

Bounding rectangle

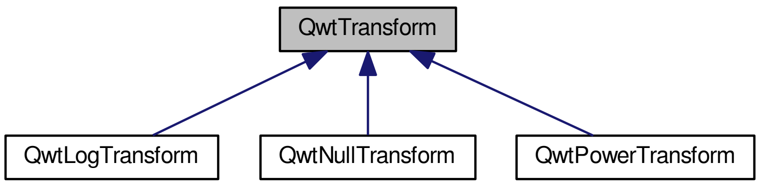
Implements QwtSeriesData< QwtOHLCSample >.

## 12.130 QwtTransform Class Reference

A transformation between coordinate systems.

`#include <qwt_transform.h>`

Inheritance diagram for QwtTransform:



**Public Member Functions**

- QwtTransform ()

  *Constructor.*
- virtual ~QwtTransform ()

  *Destructor.*
- virtual double bounded (double value) const
- virtual double transform (double value) const =0
- virtual double invTransform (double value) const =0
- virtual QwtTransform ∗ copy () const =0

  *Virtualized copy operation.*

### 12.130.1 Detailed Description

A transformation between coordinate systems.

QwtTransform manipulates values, when being mapped between the scale and the paint device coordinate system.

A transformation consists of 2 methods:

- transform
- invTransform

where one is is the inverse function of the other.

When p1, p2 are the boundaries of the paint device coordinates and s1, s2 the boundaries of the scale, QwtScale-Map uses the following calculations:

- p = p1 + ( p2 - p1 ) ∗ ( T( s ) - T( s1 ) / ( T( s2 ) - T( s1 ) );
- s = invT ( T( s1 ) + ( T( s2 ) - T( s1 ) ) ∗ ( p - p1 ) / ( p2 - p1 ) );

### 12.130.2 Member Function Documentation

#### 12.130.2.1 double QwtTransform::bounded ( double *value* ) const `[virtual]`

Modify value to be a valid value for the transformation. The default implementation does nothing.

**Parameters**

| | |
|---|---|
| *value* | Value to be bounded |

**Returns**

value unmodified

Reimplemented in QwtLogTransform.

#### 12.130.2.2 virtual double QwtTransform::invTransform ( double *value* ) const `[pure virtual]`

Inverse transformation function

**Parameters**

| | |
|---|---|
| *value* | Value |

**Returns**

Modified value

**See Also**

transform()

Implemented in QwtPowerTransform, QwtLogTransform, and QwtNullTransform.

#### 12.130.2.3 virtual double QwtTransform::transform ( double *value* ) const `[pure virtual]`

Transformation function

**Parameters**

| | |
|---|---|
| *value* | Value |

**Returns**

Modified value

**See Also**

invTransform()

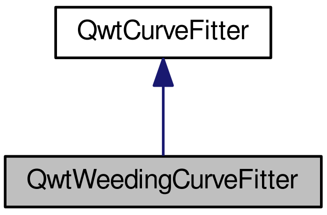
Implemented in QwtPowerTransform, QwtLogTransform, and QwtNullTransform.

## 12.131 QwtWeedingCurveFitter Class Reference

A curve fitter implementing Douglas and Peucker algorithm.

`#include <qwt_curve_fitter.h>`

Inheritance diagram for QwtWeedingCurveFitter:



**Public Member Functions**

- QwtWeedingCurveFitter (double tolerance=1.0)
- virtual ∼QwtWeedingCurveFitter ()

  *Destructor.*
- void setTolerance (double)
- double tolerance () const
- void setChunkSize (uint)
- uint chunkSize () const
- virtual QPolygonF fitCurve (const QPolygonF &) const

**Additional Inherited Members**

### 12.131.1 Detailed Description

A curve fitter implementing Douglas and Peucker algorithm.

The purpose of the Douglas and Peucker algorithm is that given a 'curve' composed of line segments to find a curve not too dissimilar but that has fewer points. The algorithm defines 'too dissimilar' based on the maximum distance (tolerance) between the original curve and the smoothed curve.

The runtime of the algorithm increases non linear ( worst case O( n*n ) ) and might be very slow for huge polygons. To avoid performance issues it might be useful to split the polygon ( setChunkSize() ) and to run the algorithm for these smaller parts. The disadvantage of having no interpolation at the borders is for most use cases irrelevant.

The smoothed curve consists of a subset of the points that defined the original curve.

In opposite to QwtSplineCurveFitter the Douglas and Peucker algorithm reduces the number of points. By adjusting the tolerance parameter according to the axis scales QwtSplineCurveFitter can be used to implement different level of details to speed up painting of curves of many points.

### 12.131.2 Constructor & Destructor Documentation

#### 12.131.2.1 QwtWeedingCurveFitter::QwtWeedingCurveFitter ( double *tolerance* = `1.0` )

Constructor

**Parameters**

| | |
|---|---|
| *tolerance* | Tolerance |

**See Also**

setTolerance(), tolerance()

### 12.131.3 Member Function Documentation

#### 12.131.3.1 uint QwtWeedingCurveFitter::chunkSize ( ) const

**Returns**

Maximum for the number of points passed to a run of the algorithm - or 0, when unlimited

**See Also**

setChunkSize()

#### 12.131.3.2 QPolygonF QwtWeedingCurveFitter::fitCurve ( const QPolygonF & *points* ) const `[virtual]`

**Parameters**

| | |
|---|---|
| *points* | Series of data points |

**Returns**

Curve points

Implements QwtCurveFitter.

#### 12.131.3.3 void QwtWeedingCurveFitter::setChunkSize ( uint *numPoints* )

Limit the number of points passed to a run of the algorithm

The runtime of the Douglas Peucker algorithm increases non linear with the number of points. For a chunk size $>$ 0 the polygon is split into pieces passed to the algorithm one by one.

**Parameters**

| | |
|---|---|
| *numPoints* | Maximum for the number of points passed to the algorithm |

**See Also**

chunkSize()

#### 12.131.3.4 void QwtWeedingCurveFitter::setTolerance ( double *tolerance* )

Assign the tolerance

The tolerance is the maximum distance, that is acceptable between the original curve and the smoothed curve.

Increasing the tolerance will reduce the number of the resulting points.

**Parameters**

| | |
|---|---|
| *tolerance* | Tolerance |

**See Also**

tolerance()

#### 12.131.3.5 double QwtWeedingCurveFitter::tolerance ( ) const

**Returns**

Tolerance

**See Also**

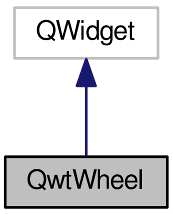
setTolerance()

## 12.132 QwtWheel Class Reference

The Wheel Widget.

`#include <qwt_wheel.h>`

Inheritance diagram for QwtWheel:



**Public Slots**

- void setValue (double)

  *Set a new value without adjusting to the step raster.*

- void setTotalAngle (double)

  *Set the total angle which the wheel can be turned.*
- void setViewAngle (double)

  *Specify the visible portion of the wheel.*
- void setMass (double)

  *Set the slider's mass for flywheel effect.*

### Signals

- void valueChanged (double value)

  *Notify a change of value.*
- void wheelPressed ()
- void wheelReleased ()
- void wheelMoved (double value)

### Public Member Functions

- QwtWheel (QWidget ∗parent=NULL)

  *Constructor.*
- virtual ∼QwtWheel ()

  *Destructor.*
- double value () const
- void setOrientation (Qt::Orientation)

  *Set the wheel's orientation.*
- Qt::Orientation orientation () const
- double totalAngle () const
- double viewAngle () const
- void setTickCount (int)

  *Adjust the number of grooves in the wheel's surface.*
- int tickCount () const
- void setWheelWidth (int)

  *Set the width of the wheel.*
- int wheelWidth () const
- void setWheelBorderWidth (int)

  *Set the wheel border width of the wheel.*
- int wheelBorderWidth () const
- void setBorderWidth (int)

  *Set the border width.*
- int borderWidth () const
- void setInverted (bool tf)

  *En/Disable inverted appearance.*
- bool isInverted () const
- void setWrapping (bool tf)

  *En/Disable wrapping.*
- bool wrapping () const
- void setSingleStep (double)

  *Set the step size of the counter.*
- double singleStep () const
- void setPageStepCount (int)

  *Set the page step count.*
- int pageStepCount () const

- void setStepAlignment (bool on)

  *En/Disable step alignment.*
- bool stepAlignment () const
- void setRange (double vmin, double vmax)

  *Set the minimum and maximum values.*
- void setMinimum (double min)
- double minimum () const
- void setMaximum (double max)
- double maximum () const
- void setUpdateInterval (int)

  *Specify the update interval when the wheel is flying.*
- int updateInterval () const
- void setTracking (bool enable)

  *En/Disable tracking.*
- bool isTracking () const
- double mass () const

#### Protected Member Functions

- virtual void paintEvent (QPaintEvent ∗)

  *Qt Paint Event.*
- virtual void mousePressEvent (QMouseEvent ∗)

  *Mouse press event handler.*
- virtual void mouseReleaseEvent (QMouseEvent ∗)

  *Mouse Release Event handler.*
- virtual void mouseMoveEvent (QMouseEvent ∗)

  *Mouse Move Event handler.*
- virtual void keyPressEvent (QKeyEvent ∗)
- virtual void wheelEvent (QWheelEvent ∗)

  *Handle wheel events.*
- virtual void timerEvent (QTimerEvent ∗)

  *Qt timer event.*
- void stopFlying ()

  *Stop the flying movement of the wheel.*
- QRect wheelRect () const
- virtual QSize sizeHint () const
- virtual QSize minimumSizeHint () const
- virtual void drawTicks (QPainter ∗, const QRectF &)
- virtual void drawWheelBackground (QPainter ∗, const QRectF &)
- virtual double valueAt (const QPoint &) const

### 12.132.1 Detailed Description

The Wheel Widget.

The wheel widget can be used to change values over a very large range in very small steps. Using the setMass() member, it can be configured as a flying wheel.

The default range of the wheel is [0.0, 100.0]

#### See Also

The radio example.

### 12.132.2 Member Function Documentation

#### 12.132.2.1 int QwtWheel::borderWidth ( ) const

**Returns**

Border width

**See Also**

setBorderWidth()

#### 12.132.2.2 void QwtWheel::drawTicks ( QPainter ∗ *painter*, const QRectF & *rect* ) [protected], [virtual]

Draw the Wheel's ticks

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Geometry for the wheel |

#### 12.132.2.3 void QwtWheel::drawWheelBackground ( QPainter ∗ *painter*, const QRectF & *rect* ) [protected], [virtual]

Draw the Wheel's background gradient

**Parameters**

| | |
|---|---|
| *painter* | Painter |
| *rect* | Geometry for the wheel |

#### 12.132.2.4 bool QwtWheel::isInverted ( ) const

**Returns**

True, when the wheel is inverted

**See Also**

setInverted()

#### 12.132.2.5 bool QwtWheel::isTracking ( ) const

**Returns**

True, when tracking is enabled

**See Also**

setTracking(), valueChanged(), wheelMoved()

#### 12.132.2.6 void QwtWheel::keyPressEvent ( QKeyEvent ∗ *event* ) [protected], [virtual]

Handle key events

- Qt::Key_Home
  Step to minimum()
- Qt::Key_End
  Step to maximum()

- Qt::Key_Up

  In case of a horizontal or not inverted vertical wheel the value will be incremented by the step size. For an inverted vertical wheel the value will be decremented by the step size.
- Qt::Key_Down

  In case of a horizontal or not inverted vertical wheel the value will be decremented by the step size. For an inverted vertical wheel the value will be incremented by the step size.
- Qt::Key_PageUp

  The value will be incremented by pageStepSize() ∗ singleStepSize().
- Qt::Key_PageDown

  The value will be decremented by pageStepSize() ∗ singleStepSize().

**Parameters**

| | |
|---|---|
| *event* | Key event |

#### 12.132.2.7 double QwtWheel::mass ( ) const

**Returns**

mass

**See Also**

setMass()

#### 12.132.2.8 double QwtWheel::maximum ( ) const

**Returns**

The maximum of the range

**See Also**

setRange(), setMaximum(), minimum()

#### 12.132.2.9 double QwtWheel::minimum ( ) const

**Returns**

The minimum of the range

**See Also**

setRange(), setMinimum(), maximum()

#### 12.132.2.10 QSize QwtWheel::minimumSizeHint ( ) const `[protected], [virtual]`

**Returns**

Minimum size hint

**Warning**

The return value is based on the wheel width.

#### 12.132.2.11 void QwtWheel::mouseMoveEvent ( QMouseEvent ∗ *event* ) `[protected], [virtual]`

Mouse Move Event handler.

Turn the wheel according to the mouse position

**Parameters**

| | |
|---|---|
| *event* | Mouse event |

#### 12.132.2.12 void QwtWheel::mousePressEvent ( QMouseEvent ∗ *event* ) [protected], [virtual]

Mouse press event handler.

Start movement of the wheel.

**Parameters**

| | |
|---|---|
| *event* | Mouse event |

#### 12.132.2.13 void QwtWheel::mouseReleaseEvent ( QMouseEvent ∗ *event* ) [protected], [virtual]

Mouse Release Event handler.

When the wheel has no mass the movement of the wheel stops, otherwise it starts flying.

**Parameters**

| | |
|---|---|
| *event* | Mouse event |

#### 12.132.2.14 Qt::Orientation QwtWheel::orientation ( ) const

**Returns**

Orientation

**See Also**

setOrientation()

#### 12.132.2.15 int QwtWheel::pageStepCount ( ) const

**Returns**

Page step count

**See Also**

setPageStepCount(), singleStep()

#### 12.132.2.16 void QwtWheel::paintEvent ( QPaintEvent ∗ *event* ) [protected], [virtual]

Qt Paint Event.

**Parameters**

| | |
|---|---|
| *event* | Paint event |

#### 12.132.2.17 void QwtWheel::setBorderWidth ( int *width* )

Set the border width.

The border defaults to 2.

**Parameters**

| | |
|---|---|
| *width* | Border width |

**See Also**

borderWidth()

#### 12.132.2.18 void QwtWheel::setInverted ( bool *on* )

En/Disable inverted appearance.

An inverted wheel increases its values in the opposite direction. The direction of an inverted horizontal wheel will be from right to left an inverted vertical wheel will increase from bottom to top.

**Parameters**

| | |
|---|---|
| *on* | En/Disable inverted appearance |

**See Also**

isInverted()

#### 12.132.2.19 void QwtWheel::setMass ( double *mass* ) [slot]

Set the slider's mass for flywheel effect.

If the slider's mass is greater then 0, it will continue to move after the mouse button has been released. Its speed decreases with time at a rate depending on the slider's mass. A large mass means that it will continue to move for a long time.

Derived widgets may overload this function to make it public.

**Parameters**

| | |
|---|---|
| *mass* | New mass in kg |

**See Also**

mass()

#### 12.132.2.20 void QwtWheel::setMaximum ( double *value* )

Set the maximum value of the range

**Parameters**

| | |
|---|---|
| *value* | Maximum value |

**See Also**

setRange(), setMinimum(), maximum()

#### 12.132.2.21 void QwtWheel::setMinimum ( double *value* )

Set the minimum value of the range

**Parameters**

| | |
|---|---|
| *value* | Minimum value |

**See Also**

setRange(), setMaximum(), minimum()

**Note**

The maximum is adjusted if necessary to ensure that the range remains valid.

#### 12.132.2.22 void QwtWheel::setOrientation ( Qt::Orientation *orientation* )

Set the wheel's orientation.

The default orientation is Qt::Horizontal.

**Parameters**

| | |
|---|---|
| *orientation* | Qt::Horizontal or Qt::Vertical. |

**See Also**

orientation()

#### 12.132.2.23 void QwtWheel::setPageStepCount ( int *count* )

Set the page step count.

pageStepCount is a multiplicator for the single step size that typically corresponds to the user pressing PageUp or PageDown.

A value of 0 disables page stepping.

The default value is 1.

**Parameters**

| | |
|---|---|
| *count* | Multiplicator for the single step size |

**See Also**

pageStepCount(), setSingleStep()

#### 12.132.2.24 void QwtWheel::setRange ( double *min,* double *max* )

Set the minimum and maximum values.

The maximum is adjusted if necessary to ensure that the range remains valid. The value might be modified to be inside of the range.

**Parameters**

| | |
|---|---|
| *min* | Minimum value |
| *max* | Maximum value |

**See Also**

minimum(), maximum()

#### 12.132.2.25 void QwtWheel::setSingleStep ( double *stepSize* )

Set the step size of the counter.

A value <= 0.0 disables stepping

**Parameters**

| | |
|---|---|
| *stepSize* | Single step size |

**See Also**

singleStep(), setPageStepCount()

#### 12.132.2.26 void QwtWheel::setStepAlignment ( bool *on* )

En/Disable step alignment.

When step alignment is enabled value changes initiated by user input ( mouse, keyboard, wheel ) are aligned to the multiples of the single step.

**Parameters**

| | |
|---|---|
| *on* | On/Off |

**See Also**

stepAlignment(), setSingleStep()

#### 12.132.2.27 void QwtWheel::setTickCount ( int *count* )

Adjust the number of grooves in the wheel's surface.

The number of grooves is limited to 6 <= count <= 50. Values outside this range will be clipped. The default value is 10.

**Parameters**

| | |
|---|---|
| *count* | Number of grooves per 360 degrees |

**See Also**

tickCount()

#### 12.132.2.28 void QwtWheel::setTotalAngle ( double *angle* ) [slot]

Set the total angle which the wheel can be turned.

One full turn of the wheel corresponds to an angle of 360 degrees. A total angle of n∗360 degrees means that the wheel has to be turned n times around its axis to get from the minimum value to the maximum value.

The default setting of the total angle is 360 degrees.

**Parameters**

| | |
|---|---|
| *angle* | total angle in degrees |

**See Also**

totalAngle()

#### 12.132.2.29 void QwtWheel::setTracking ( bool *enable* )

En/Disable tracking.

If tracking is enabled (the default), the wheel emits the valueChanged() signal while the wheel is moving. If tracking is disabled, the wheel emits the valueChanged() signal only when the wheel movement is terminated.

The wheelMoved() signal is emitted regardless id tracking is enabled or not.

**Parameters**

| | |
|---|---|
| *enable* | On/Off |

**See Also**

isTracking()

#### 12.132.2.30 void QwtWheel::setUpdateInterval ( int *interval* )

Specify the update interval when the wheel is flying.

Default and minimum value is 50 ms.

**Parameters**

| | |
|---|---|
| *interval* | Interval in milliseconds |

**See Also**

updateInterval(), setMass(), setTracking()

#### 12.132.2.31 void QwtWheel::setValue ( double *value* ) [slot]

Set a new value without adjusting to the step raster.

**Parameters**

| | |
|---|---|
| *value* | New value |

**See Also**

value(), valueChanged()

**Warning**

The value is clipped when it lies outside the range.

#### 12.132.2.32 void QwtWheel::setViewAngle ( double *angle* ) [slot]

Specify the visible portion of the wheel.

You may use this function for fine-tuning the appearance of the wheel. The default value is 175 degrees. The value is limited from 10 to 175 degrees.

**Parameters**

| | |
|---|---|
| *angle* | Visible angle in degrees |

**See Also**

viewAngle(), setTotalAngle()

#### 12.132.2.33 void QwtWheel::setWheelBorderWidth ( int *borderWidth* )

Set the wheel border width of the wheel.

The wheel border must not be smaller than 1 and is limited in dependence on the wheel's size. Values outside the allowed range will be clipped.

The wheel border defaults to 2.

**Parameters**

| | |
|---|---|
| *borderWidth* | Border width |

**See Also**

internalBorder()

#### 12.132.2.34 void QwtWheel::setWheelWidth ( int *width* )

Set the width of the wheel.

Corresponds to the wheel height for horizontal orientation, and the wheel width for vertical orientation.

**Parameters**

| | |
|---|---|
| *width* | the wheel's width |

**See Also**

wheelWidth()

#### 12.132.2.35 void QwtWheel::setWrapping ( bool *on* )

En/Disable wrapping.

If wrapping is true stepping up from maximum() value will take you to the minimum() value and vice versa.

**Parameters**

| | |
|---|---|
| *on* | En/Disable wrapping |

**See Also**

wrapping()

#### 12.132.2.36 double QwtWheel::singleStep ( ) const

**Returns**

Single step size

**See Also**

setSingleStep()

#### 12.132.2.37 QSize QwtWheel::sizeHint ( ) const `[protected]`, `[virtual]`

**Returns**

a size hint

#### 12.132.2.38 bool QwtWheel::stepAlignment ( ) const

**Returns**

True, when the step alignment is enabled

**See Also**

setStepAlignment(), singleStep()

#### 12.132.2.39 int QwtWheel::tickCount ( ) const

**Returns**

Number of grooves in the wheel's surface.

**See Also**

setTickCnt()

#### 12.132.2.40 void QwtWheel::timerEvent ( QTimerEvent ∗ *event* ) [protected], [virtual]

Qt timer event.

The flying wheel effect is implemented using a timer

**Parameters**

| | |
|---|---|
| *event* | Timer event |

**See Also**

updateInterval()

#### 12.132.2.41 double QwtWheel::totalAngle ( ) const

**Returns**

Total angle which the wheel can be turned.

**See Also**

setTotalAngle()

#### 12.132.2.42 int QwtWheel::updateInterval ( ) const

**Returns**

Update interval when the wheel is flying

**See Also**

setUpdateInterval(), mass(), isTracking()

#### 12.132.2.43 double QwtWheel::value ( ) const

**Returns**

Current value of the wheel

**See Also**

setValue(), valueChanged()

#### 12.132.2.44 double QwtWheel::valueAt ( const QPoint & *pos* ) const [protected], [virtual]

Determine the value corresponding to a specified point

**Parameters**

| | |
|---|---|
| *pos* | Position |

**Returns**

Value corresponding to pos

#### 12.132.2.45 void QwtWheel::valueChanged ( double *value* ) [signal]

Notify a change of value.

When tracking is enabled this signal will be emitted every time the value changes.

**Parameters**

| | |
|---|---|
| *value* | new value |

**See Also**

setTracking()

#### 12.132.2.46 double QwtWheel::viewAngle ( ) const

**Returns**

Visible portion of the wheel

**See Also**

setViewAngle(), totalAngle()

#### 12.132.2.47 int QwtWheel::wheelBorderWidth ( ) const

**Returns**

Wheel border width

**See Also**

setWheelBorderWidth()

#### 12.132.2.48 void QwtWheel::wheelEvent ( QWheelEvent * *event* ) [protected], [virtual]

Handle wheel events.

In/Decrement the value

**Parameters**

| | |
|---|---|
| *event* | Wheel event |

#### 12.132.2.49 void QwtWheel::wheelMoved ( double *value* ) [signal]

This signal is emitted when the user moves the wheel with the mouse.

**Parameters**

| | |
|---|---|
| *value* | new value |

#### 12.132.2.50 void QwtWheel::wheelPressed ( ) [signal]

This signal is emitted when the user presses the the wheel with the mouse

#### 12.132.2.51 QRect QwtWheel::wheelRect ( ) const [protected]

**Returns**

Rectangle of the wheel without the outer border

#### 12.132.2.52 void QwtWheel::wheelReleased ( ) [signal]

This signal is emitted when the user releases the mouse

#### 12.132.2.53 int QwtWheel::wheelWidth ( ) const

**Returns**

Width of the wheel

**See Also**

setWheelWidth()

#### 12.132.2.54 bool QwtWheel::wrapping ( ) const

**Returns**

True, when wrapping is set

**See Also**

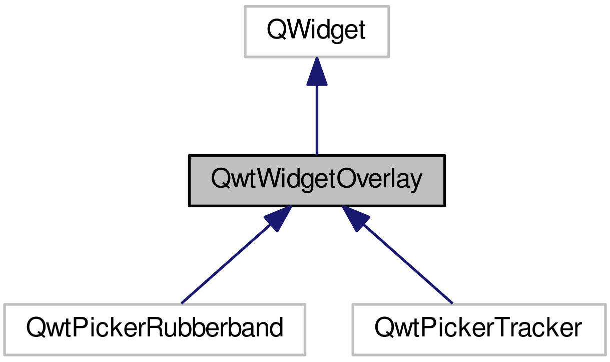
setWrapping()

## 12.133 QwtWidgetOverlay Class Reference

An overlay for a widget.

```
#include <qwt_widget_overlay.h>
```

Inheritance diagram for QwtWidgetOverlay:



**Public Types**

- enum MaskMode { NoMask, MaskHint, AlphaMask }

    *Mask mode.*
- enum RenderMode { AutoRenderMode, CopyAlphaMask, DrawOverlay }

    *Render mode.*

**Public Member Functions**

- QwtWidgetOverlay (QWidget ∗)

    *Constructor.*
- virtual ∼QwtWidgetOverlay ()

    *Destructor.*
- void setMaskMode (MaskMode)

    *Specify how to find the mask for the overlay.*
- MaskMode maskMode () const
- void setRenderMode (RenderMode)
- RenderMode renderMode () const
- void updateOverlay ()
- virtual bool eventFilter (QObject ∗, QEvent ∗)

    *Event filter.*

**Protected Member Functions**

- virtual void paintEvent (QPaintEvent ∗event)
- virtual void resizeEvent (QResizeEvent ∗event)
- virtual QRegion maskHint () const

    *Calculate an approximation for the mask.*
- virtual void drawOverlay (QPainter ∗painter) const =0

### 12.133.1 Detailed Description

An overlay for a widget.

The main use case of an widget overlay is to avoid heavy repaint operation of the widget below.

F.e. in combination with the plot canvas an overlay avoid replots as the content of the canvas can be restored from its backing store.

QwtWidgetOverlay is an abstract base class. Deriving classes are supposed to reimplement the following methods:

- drawOverlay()
- maskHint()

Internally QwtPlotPicker uses overlays for displaying the rubber band and the tracker text.

**See Also**

QwtPlotCanvas::BackingStore

### 12.133.2 Member Enumeration Documentation

#### 12.133.2.1 enum QwtWidgetOverlay::MaskMode

Mask mode.

When using masks the widget below gets paint events for the masked regions of the overlay only. Otherwise Qt triggers full repaints. On less powerful hardware ( f.e embedded systems ) - or when using the raster paint engine on a remote desktop - bit blitting is a noticeable operation, that needs to be avoided.

If and how to mask depends on how expensive the calculation of the mask is and how many pixels can be excluded by the mask.

The default setting is MaskHint.

**See Also**

setMaskMode(), maskMode()

**Enumerator**

***NoMask*** Don't use a mask.

***MaskHint*** Use maskHint() as mask. For many situations a fast approximation is good enough and it is not necessary to build a more detailed mask ( f.e the bounding rectangle of a text ).

***AlphaMask*** Calculate a mask by checking the alpha values. Sometimes it is not possible to give a fast approximation and the mask needs to be calculated by drawing the overlay and testing the result.

When a valid maskHint() is available only pixels inside this approximation are checked.

#### 12.133.2.2 enum QwtWidgetOverlay::RenderMode

Render mode.

For calculating the alpha mask the overlay has already been painted to a temporary QImage. Instead of rendering the overlay twice this buffer can be copied for drawing the overlay.

On graphic systems using the raster paint engine ( QWS, Windows ) it means usually copying some memory only. On X11 it results in an expensive operation building a pixmap and for simple overlays it might not be recommended.

**Note**

The render mode has no effect, when maskMode() != AlphaMask.

**Enumerator**

***AutoRenderMode*** Copy the buffer, when using the raster paint engine.

***CopyAlphaMask*** Always copy the buffer.

***DrawOverlay*** Never copy the buffer.

### 12.133.3 Constructor & Destructor Documentation

#### 12.133.3.1 QwtWidgetOverlay::QwtWidgetOverlay ( QWidget ∗ *widget* )

Constructor.

**Parameters**

| | |
|---|---|
| *widget* | Parent widget, where the overlay is aligned to |

### 12.133.4 Member Function Documentation

#### 12.133.4.1 virtual void QwtWidgetOverlay::drawOverlay ( QPainter ∗ *painter* ) const `[protected], [pure virtual]`

Draw the widget overlay

**Parameters**

| | |
|---|---|
| *painter* | Painter |

#### 12.133.4.2 bool QwtWidgetOverlay::eventFilter ( QObject ∗ *object,* QEvent ∗ *event* ) `[virtual]`

Event filter.

Resize the overlay according to the size of the parent widget.

**Parameters**

| | |
|---|---|
| *object* | Object to be filtered |
| *event* | Event |

**Returns**

See QObject::eventFilter()

#### 12.133.4.3 QRegion QwtWidgetOverlay::maskHint ( ) const `[protected], [virtual]`

Calculate an approximation for the mask.

- MaskHint The hint is used as mask.
- AlphaMask The hint is used to speed up the algorithm for calculating a mask from non transparent pixels
- NoMask The hint is unused.

The default implementation returns an invalid region indicating no hint.

**Returns**

Hint for the mask

#### 12.133.4.4 QwtWidgetOverlay::MaskMode QwtWidgetOverlay::maskMode ( ) const

**Returns**

Mode how to find the mask for the overlay

**See Also**

setMaskMode()

#### 12.133.4.5 void QwtWidgetOverlay::paintEvent ( QPaintEvent ∗ *event* ) [protected], [virtual]

Paint event

**Parameters**

| | |
|---|---|
| *event* | Paint event |

**See Also**

drawOverlay()

#### 12.133.4.6 QwtWidgetOverlay::RenderMode QwtWidgetOverlay::renderMode ( ) const

**Returns**

Render mode

**See Also**

RenderMode, setRenderMode()

#### 12.133.4.7 void QwtWidgetOverlay::resizeEvent ( QResizeEvent ∗ *event* ) [protected], [virtual]

Resize event

**Parameters**

| | |
|---|---|
| *event* | Resize event |

#### 12.133.4.8 void QwtWidgetOverlay::setMaskMode ( MaskMode *mode* )

Specify how to find the mask for the overlay.

**Parameters**

| | |
|---|---|
| *mode* | New mode |

**See Also**

maskMode()

#### 12.133.4.9 void QwtWidgetOverlay::setRenderMode ( RenderMode *mode* )

Set the render mode

**Parameters**

| | |
|---|---|
| *mode* | Render mode |

**See Also**

RenderMode, renderMode()

#### 12.133.4.10 void QwtWidgetOverlay::updateOverlay ( )

Recalculate the mask and repaint the overlay

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