

# Qwt User's Guide

6.1.2

Generated by Doxygen 1.8.5

Thu Dec 11 2014 15:13:18

## Contents

<b>1</b>	<b>Qwt - Qt Widgets for Technical Applications</b>	<b>2</b>
1.1	License	2
1.2	Platforms	2
1.3	What's new	2
1.4	Screenshots	2
1.5	Downloads	2
1.6	Installation	2
1.7	Support	3
1.8	Related Projects	3
1.9	Donations	3
1.10	Credits:	3
<b>2</b>	<b>What's new in Qwt 6.1</b>	<b>3</b>
2.1	New plot items	3
2.2	Scales beyond linear and logarithmic transformations	4
2.2.1	Datetime scales	4
2.3	Redesign of the dial and meter widgets	4
2.4	Basic support for an OpenGL plot canvas	5
2.5	A new system for plot legends	5
2.6	Off-screen paint device for vector graphics	5
2.7	QwtWidgetOverlay	5
2.8	QwtSymbol	5
2.9	QwtPlotCurve	6
2.10	QwtPlot	6
2.11	Other	6
2.11.1	QwtScaleDiv	6
2.11.2	QwtScaleEngine	7
2.11.3	QwtPlotLayout	7
2.11.4	QwtPlotCanvas	7
2.11.5	Other changes	7
2.12	Summary of the new classes	8
<b>3</b>	<b>Installing Qwt</b>	<b>8</b>
3.1	Download	8
3.2	Installing Qwt	9
3.2.1	Configuration	9
3.2.2	Build and installation	10
3.3	Qwt and the Qt tool chain	11
3.3.1	Designer plugin	11

3.3.2	Online Help . . . . .	11
3.4	Building a Qwt application . . . . .	12
3.5	Running a Qwt application . . . . .	12
3.5.1	Windows . . . . .	12
3.5.2	GNU/Linux . . . . .	12
<b>4</b>	<b>Qwt License, Version 1.0</b>	<b>13</b>
<b>5</b>	<b>Curve Plots</b>	<b>19</b>
<b>6</b>	<b>Scatter Plot</b>	<b>19</b>
<b>7</b>	<b>Spectrogram, Contour Plot</b>	<b>19</b>
<b>8</b>	<b>Histogram</b>	<b>19</b>
<b>9</b>	<b>Dials, Compasses, Knobs, Wheels, Sliders, Thermos</b>	<b>19</b>
<b>10</b>	<b>Hierarchical Index</b>	<b>19</b>
10.1	Class Hierarchy . . . . .	19
<b>11</b>	<b>Class Index</b>	<b>24</b>
11.1	Class List . . . . .	24
<b>12</b>	<b>Class Documentation</b>	<b>31</b>
12.1	QwtEventPattern::KeyPattern Class Reference . . . . .	31
12.1.1	Detailed Description . . . . .	31
12.2	QwtEventPattern::MousePattern Class Reference . . . . .	31
12.2.1	Detailed Description . . . . .	32
12.3	QwtAbstractLegend Class Reference . . . . .	32
12.3.1	Detailed Description . . . . .	33
12.3.2	Constructor & Destructor Documentation . . . . .	33
12.3.3	Member Function Documentation . . . . .	33
12.4	QwtAbstractScale Class Reference . . . . .	34
12.4.1	Detailed Description . . . . .	35
12.4.2	Constructor & Destructor Documentation . . . . .	36
12.4.3	Member Function Documentation . . . . .	37
12.5	QwtAbstractScaleDraw Class Reference . . . . .	42
12.5.1	Detailed Description . . . . .	43
12.5.2	Member Enumeration Documentation . . . . .	43
12.5.3	Constructor & Destructor Documentation . . . . .	44
12.5.4	Member Function Documentation . . . . .	44
12.6	QwtAbstractSeriesStore Class Reference . . . . .	50
12.6.1	Detailed Description . . . . .	51

12.6.2 Member Function Documentation . . . . .	51
12.7 QwtAbstractSlider Class Reference . . . . .	52
12.7.1 Detailed Description . . . . .	54
12.7.2 Constructor & Destructor Documentation . . . . .	54
12.7.3 Member Function Documentation . . . . .	54
12.8 QwtAlphaColorMap Class Reference . . . . .	61
12.8.1 Detailed Description . . . . .	62
12.8.2 Constructor & Destructor Documentation . . . . .	62
12.8.3 Member Function Documentation . . . . .	62
12.9 QwtAnalogClock Class Reference . . . . .	63
12.9.1 Detailed Description . . . . .	64
12.9.2 Member Enumeration Documentation . . . . .	64
12.9.3 Constructor & Destructor Documentation . . . . .	65
12.9.4 Member Function Documentation . . . . .	66
12.10 QwtArraySeriesData< T > Class Template Reference . . . . .	67
12.10.1 Detailed Description . . . . .	68
12.10.2 Constructor & Destructor Documentation . . . . .	68
12.10.3 Member Function Documentation . . . . .	68
12.11 QwtArrowButton Class Reference . . . . .	69
12.11.1 Detailed Description . . . . .	70
12.11.2 Constructor & Destructor Documentation . . . . .	70
12.11.3 Member Function Documentation . . . . .	70
12.12 QwtClipper Class Reference . . . . .	71
12.12.1 Detailed Description . . . . .	71
12.12.2 Member Function Documentation . . . . .	71
12.13 QwtColorMap Class Reference . . . . .	72
12.13.1 Detailed Description . . . . .	73
12.13.2 Member Enumeration Documentation . . . . .	73
12.13.3 Member Function Documentation . . . . .	74
12.14 QwtColumnRect Class Reference . . . . .	75
12.14.1 Detailed Description . . . . .	75
12.14.2 Member Enumeration Documentation . . . . .	76
12.14.3 Member Function Documentation . . . . .	76
12.15 QwtColumnSymbol Class Reference . . . . .	76
12.15.1 Detailed Description . . . . .	77
12.15.2 Member Enumeration Documentation . . . . .	77
12.15.3 Constructor & Destructor Documentation . . . . .	77
12.15.4 Member Function Documentation . . . . .	77
12.16 QwtCompass Class Reference . . . . .	79
12.16.1 Detailed Description . . . . .	80

12.16.2 Constructor & Destructor Documentation . . . . .	81
12.16.3 Member Function Documentation . . . . .	81
12.17 QwtCompassMagnetNeedle Class Reference . . . . .	82
12.17.1 Detailed Description . . . . .	83
12.17.2 Member Enumeration Documentation . . . . .	83
12.17.3 Member Function Documentation . . . . .	83
12.18 QwtCompassRose Class Reference . . . . .	84
12.18.1 Detailed Description . . . . .	84
12.18.2 Member Function Documentation . . . . .	84
12.19 QwtCompassScaleDraw Class Reference . . . . .	85
12.19.1 Detailed Description . . . . .	85
12.19.2 Constructor & Destructor Documentation . . . . .	86
12.19.3 Member Function Documentation . . . . .	86
12.20 QwtCompassWindArrow Class Reference . . . . .	87
12.20.1 Detailed Description . . . . .	87
12.20.2 Member Enumeration Documentation . . . . .	88
12.20.3 Constructor & Destructor Documentation . . . . .	88
12.20.4 Member Function Documentation . . . . .	88
12.21 QwtCounter Class Reference . . . . .	88
12.21.1 Detailed Description . . . . .	90
12.21.2 Member Enumeration Documentation . . . . .	90
12.21.3 Constructor & Destructor Documentation . . . . .	91
12.21.4 Member Function Documentation . . . . .	91
12.22 QwtCPointerData Class Reference . . . . .	97
12.22.1 Detailed Description . . . . .	97
12.22.2 Constructor & Destructor Documentation . . . . .	97
12.22.3 Member Function Documentation . . . . .	98
12.23 QwtCurveFitter Class Reference . . . . .	99
12.23.1 Detailed Description . . . . .	99
12.23.2 Member Function Documentation . . . . .	99
12.24 QwtDate Class Reference . . . . .	100
12.24.1 Detailed Description . . . . .	100
12.24.2 Member Enumeration Documentation . . . . .	100
12.24.3 Member Function Documentation . . . . .	101
12.25 QwtDateScaleDraw Class Reference . . . . .	105
12.25.1 Detailed Description . . . . .	106
12.25.2 Constructor & Destructor Documentation . . . . .	106
12.25.3 Member Function Documentation . . . . .	107
12.26 QwtDateScaleEngine Class Reference . . . . .	110
12.26.1 Detailed Description . . . . .	111

12.26.2 Constructor & Destructor Documentation . . . . .	111
12.26.3 Member Function Documentation . . . . .	111
12.27QwtDial Class Reference . . . . .	115
12.27.1 Detailed Description . . . . .	116
12.27.2 Member Enumeration Documentation . . . . .	117
12.27.3 Constructor & Destructor Documentation . . . . .	117
12.27.4 Member Function Documentation . . . . .	117
12.28QwtDialNeedle Class Reference . . . . .	124
12.28.1 Detailed Description . . . . .	125
12.28.2 Member Function Documentation . . . . .	125
12.29QwtDialSimpleNeedle Class Reference . . . . .	126
12.29.1 Detailed Description . . . . .	127
12.29.2 Member Enumeration Documentation . . . . .	127
12.29.3 Constructor & Destructor Documentation . . . . .	127
12.29.4 Member Function Documentation . . . . .	127
12.30QwtDynGridLayout Class Reference . . . . .	128
12.30.1 Detailed Description . . . . .	129
12.30.2 Constructor & Destructor Documentation . . . . .	129
12.30.3 Member Function Documentation . . . . .	130
12.31QwtEventPattern Class Reference . . . . .	134
12.31.1 Detailed Description . . . . .	135
12.31.2 Member Enumeration Documentation . . . . .	135
12.31.3 Constructor & Destructor Documentation . . . . .	137
12.31.4 Member Function Documentation . . . . .	137
12.32QwtGraphic Class Reference . . . . .	139
12.32.1 Detailed Description . . . . .	141
12.32.2 Member Typedef Documentation . . . . .	142
12.32.3 Member Enumeration Documentation . . . . .	142
12.32.4 Constructor & Destructor Documentation . . . . .	142
12.32.5 Member Function Documentation . . . . .	144
12.33QwtInterval Class Reference . . . . .	152
12.33.1 Detailed Description . . . . .	153
12.33.2 Member Enumeration Documentation . . . . .	153
12.33.3 Constructor & Destructor Documentation . . . . .	153
12.33.4 Member Function Documentation . . . . .	154
12.34QwtIntervalSample Class Reference . . . . .	160
12.34.1 Detailed Description . . . . .	161
12.34.2 Constructor & Destructor Documentation . . . . .	161
12.35QwtIntervalSeriesData Class Reference . . . . .	161
12.35.1 Detailed Description . . . . .	161

12.35.2 Constructor & Destructor Documentation . . . . .	161
12.35.3 Member Function Documentation . . . . .	163
12.36QwtIntervalSymbol Class Reference . . . . .	163
12.36.1 Detailed Description . . . . .	164
12.36.2 Member Enumeration Documentation . . . . .	164
12.36.3 Constructor & Destructor Documentation . . . . .	164
12.36.4 Member Function Documentation . . . . .	164
12.37QwtKnob Class Reference . . . . .	166
12.37.1 Detailed Description . . . . .	168
12.37.2 Member Enumeration Documentation . . . . .	169
12.37.3 Constructor & Destructor Documentation . . . . .	169
12.37.4 Member Function Documentation . . . . .	169
12.38QwtLegend Class Reference . . . . .	176
12.38.1 Detailed Description . . . . .	177
12.38.2 Constructor & Destructor Documentation . . . . .	177
12.38.3 Member Function Documentation . . . . .	177
12.39QwtLegendData Class Reference . . . . .	183
12.39.1 Detailed Description . . . . .	183
12.39.2 Member Enumeration Documentation . . . . .	183
12.39.3 Member Function Documentation . . . . .	184
12.40QwtLegendLabel Class Reference . . . . .	186
12.40.1 Detailed Description . . . . .	187
12.40.2 Constructor & Destructor Documentation . . . . .	187
12.40.3 Member Function Documentation . . . . .	188
12.41QwtLinearColorMap Class Reference . . . . .	189
12.41.1 Detailed Description . . . . .	190
12.41.2 Member Enumeration Documentation . . . . .	190
12.41.3 Constructor & Destructor Documentation . . . . .	191
12.41.4 Member Function Documentation . . . . .	191
12.42QwtLinearScaleEngine Class Reference . . . . .	193
12.42.1 Detailed Description . . . . .	194
12.42.2 Constructor & Destructor Documentation . . . . .	194
12.42.3 Member Function Documentation . . . . .	194
12.43QwtLogScaleEngine Class Reference . . . . .	196
12.43.1 Detailed Description . . . . .	197
12.43.2 Constructor & Destructor Documentation . . . . .	197
12.43.3 Member Function Documentation . . . . .	197
12.44QwtLogTransform Class Reference . . . . .	199
12.44.1 Detailed Description . . . . .	200
12.44.2 Member Function Documentation . . . . .	200

12.45QwtMagnifier Class Reference . . . . .	200
12.45.1 Detailed Description . . . . .	202
12.45.2 Constructor & Destructor Documentation . . . . .	202
12.45.3 Member Function Documentation . . . . .	202
12.46QwtMathMLTextEngine Class Reference . . . . .	208
12.46.1 Detailed Description . . . . .	209
12.46.2 Member Function Documentation . . . . .	209
12.47QwtMatrixRasterData Class Reference . . . . .	210
12.47.1 Detailed Description . . . . .	211
12.47.2 Member Enumeration Documentation . . . . .	212
12.47.3 Member Function Documentation . . . . .	212
12.48QwtNullPaintDevice Class Reference . . . . .	214
12.48.1 Detailed Description . . . . .	216
12.48.2 Member Enumeration Documentation . . . . .	216
12.48.3 Member Function Documentation . . . . .	216
12.49QwtNullTransform Class Reference . . . . .	217
12.49.1 Detailed Description . . . . .	218
12.49.2 Member Function Documentation . . . . .	218
12.50QwtOHLCSample Class Reference . . . . .	218
12.50.1 Detailed Description . . . . .	219
12.50.2 Constructor & Destructor Documentation . . . . .	219
12.50.3 Member Function Documentation . . . . .	219
12.50.4 Member Data Documentation . . . . .	220
12.51QwtPainter Class Reference . . . . .	220
12.51.1 Detailed Description . . . . .	222
12.51.2 Member Function Documentation . . . . .	222
12.52QwtPainterCommand Class Reference . . . . .	225
12.52.1 Detailed Description . . . . .	226
12.52.2 Member Enumeration Documentation . . . . .	226
12.52.3 Constructor & Destructor Documentation . . . . .	226
12.52.4 Member Function Documentation . . . . .	227
12.53QwtPanner Class Reference . . . . .	228
12.53.1 Detailed Description . . . . .	230
12.53.2 Constructor & Destructor Documentation . . . . .	230
12.53.3 Member Function Documentation . . . . .	230
12.54QwtPicker Class Reference . . . . .	234
12.54.1 Detailed Description . . . . .	236
12.54.2 Member Enumeration Documentation . . . . .	237
12.54.3 Constructor & Destructor Documentation . . . . .	238
12.54.4 Member Function Documentation . . . . .	239



12.55QwtPickerClickPointMachine Class Reference . . . . .	252
12.55.1 Detailed Description . . . . .	252
12.56QwtPickerClickRectMachine Class Reference . . . . .	252
12.56.1 Detailed Description . . . . .	253
12.57QwtPickerDragLineMachine Class Reference . . . . .	254
12.57.1 Detailed Description . . . . .	254
12.58QwtPickerDragPointMachine Class Reference . . . . .	254
12.58.1 Detailed Description . . . . .	255
12.59QwtPickerDragRectMachine Class Reference . . . . .	255
12.59.1 Detailed Description . . . . .	256
12.60QwtPickerMachine Class Reference . . . . .	256
12.60.1 Detailed Description . . . . .	257
12.60.2 Member Enumeration Documentation . . . . .	257
12.61QwtPickerPolygonMachine Class Reference . . . . .	258
12.61.1 Detailed Description . . . . .	258
12.62QwtPickerTrackerMachine Class Reference . . . . .	259
12.62.1 Detailed Description . . . . .	259
12.63QwtPixelMatrix Class Reference . . . . .	259
12.63.1 Detailed Description . . . . .	260
12.63.2 Constructor & Destructor Documentation . . . . .	260
12.63.3 Member Function Documentation . . . . .	260
12.64QwtPlainTextEngine Class Reference . . . . .	261
12.64.1 Detailed Description . . . . .	262
12.64.2 Member Function Documentation . . . . .	262
12.65QwtPlot Class Reference . . . . .	264
12.65.1 Detailed Description . . . . .	267
12.65.2 Member Enumeration Documentation . . . . .	267
12.65.3 Constructor & Destructor Documentation . . . . .	268
12.65.4 Member Function Documentation . . . . .	268
12.66QwtPlotAbstractBarChart Class Reference . . . . .	285
12.66.1 Detailed Description . . . . .	286
12.66.2 Member Enumeration Documentation . . . . .	286
12.66.3 Constructor & Destructor Documentation . . . . .	286
12.66.4 Member Function Documentation . . . . .	286
12.67QwtPlotBarChart Class Reference . . . . .	290
12.67.1 Detailed Description . . . . .	291
12.67.2 Member Enumeration Documentation . . . . .	291
12.67.3 Constructor & Destructor Documentation . . . . .	292
12.67.4 Member Function Documentation . . . . .	292
12.68QwtPlotCanvas Class Reference . . . . .	296

12.68.1 Detailed Description . . . . .	297
12.68.2 Member Enumeration Documentation . . . . .	297
12.68.3 Constructor & Destructor Documentation . . . . .	298
12.68.4 Member Function Documentation . . . . .	299
12.69QwtPlotCurve Class Reference . . . . .	302
12.69.1 Detailed Description . . . . .	304
12.69.2 Member Enumeration Documentation . . . . .	304
12.69.3 Constructor & Destructor Documentation . . . . .	306
12.69.4 Member Function Documentation . . . . .	307
12.70QwtPlotDict Class Reference . . . . .	316
12.70.1 Detailed Description . . . . .	316
12.70.2 Constructor & Destructor Documentation . . . . .	316
12.70.3 Member Function Documentation . . . . .	317
12.71QwtPlotDirectPainter Class Reference . . . . .	318
12.71.1 Detailed Description . . . . .	319
12.71.2 Member Enumeration Documentation . . . . .	319
12.71.3 Member Function Documentation . . . . .	320
12.72QwtPlotGLCanvas Class Reference . . . . .	321
12.72.1 Detailed Description . . . . .	323
12.72.2 Member Enumeration Documentation . . . . .	323
12.72.3 Constructor & Destructor Documentation . . . . .	323
12.72.4 Member Function Documentation . . . . .	324
12.73QwtPlotGrid Class Reference . . . . .	327
12.73.1 Detailed Description . . . . .	328
12.73.2 Member Function Documentation . . . . .	328
12.74QwtPlotHistogram Class Reference . . . . .	332
12.74.1 Detailed Description . . . . .	334
12.74.2 Member Enumeration Documentation . . . . .	334
12.74.3 Constructor & Destructor Documentation . . . . .	334
12.74.4 Member Function Documentation . . . . .	335
12.75QwtPlotIntervalCurve Class Reference . . . . .	341
12.75.1 Detailed Description . . . . .	342
12.75.2 Member Enumeration Documentation . . . . .	342
12.75.3 Constructor & Destructor Documentation . . . . .	343
12.75.4 Member Function Documentation . . . . .	343
12.76QwtPlotItem Class Reference . . . . .	348
12.76.1 Detailed Description . . . . .	351
12.76.2 Member Enumeration Documentation . . . . .	351
12.76.3 Constructor & Destructor Documentation . . . . .	353
12.76.4 Member Function Documentation . . . . .	353

12.77QwtPlotLayout Class Reference . . . . .	363
12.77.1 Detailed Description . . . . .	364
12.77.2 Member Enumeration Documentation . . . . .	364
12.77.3 Member Function Documentation . . . . .	365
12.78QwtPlotLegendItem Class Reference . . . . .	372
12.78.1 Detailed Description . . . . .	374
12.78.2 Member Enumeration Documentation . . . . .	374
12.78.3 Member Function Documentation . . . . .	375
12.79QwtPlotMagnifier Class Reference . . . . .	381
12.79.1 Detailed Description . . . . .	382
12.79.2 Constructor & Destructor Documentation . . . . .	383
12.79.3 Member Function Documentation . . . . .	383
12.80QwtPlotMarker Class Reference . . . . .	383
12.80.1 Detailed Description . . . . .	385
12.80.2 Member Enumeration Documentation . . . . .	385
12.80.3 Member Function Documentation . . . . .	386
12.81QwtPlotMultiBarChart Class Reference . . . . .	390
12.81.1 Detailed Description . . . . .	391
12.81.2 Member Enumeration Documentation . . . . .	392
12.81.3 Constructor & Destructor Documentation . . . . .	392
12.81.4 Member Function Documentation . . . . .	392
12.82QwtPlotPanner Class Reference . . . . .	398
12.82.1 Detailed Description . . . . .	399
12.82.2 Constructor & Destructor Documentation . . . . .	399
12.82.3 Member Function Documentation . . . . .	399
12.83QwtPlotPicker Class Reference . . . . .	400
12.83.1 Detailed Description . . . . .	402
12.83.2 Constructor & Destructor Documentation . . . . .	402
12.83.3 Member Function Documentation . . . . .	403
12.84QwtPlotRasterItem Class Reference . . . . .	407
12.84.1 Detailed Description . . . . .	408
12.84.2 Member Enumeration Documentation . . . . .	408
12.84.3 Member Function Documentation . . . . .	409
12.85QwtPlotRenderer Class Reference . . . . .	412
12.85.1 Detailed Description . . . . .	413
12.85.2 Member Enumeration Documentation . . . . .	413
12.85.3 Constructor & Destructor Documentation . . . . .	414
12.85.4 Member Function Documentation . . . . .	414
12.86QwtPlotRescaler Class Reference . . . . .	420
12.86.1 Detailed Description . . . . .	421

12.86.2 Member Enumeration Documentation . . . . .	421
12.86.3 Constructor & Destructor Documentation . . . . .	422
12.86.4 Member Function Documentation . . . . .	423
12.87QwtPlotScaleItem Class Reference . . . . .	429
12.87.1 Detailed Description . . . . .	431
12.87.2 Constructor & Destructor Documentation . . . . .	431
12.87.3 Member Function Documentation . . . . .	431
12.88QwtPlotSeriesItem Class Reference . . . . .	435
12.88.1 Detailed Description . . . . .	436
12.88.2 Constructor & Destructor Documentation . . . . .	436
12.88.3 Member Function Documentation . . . . .	436
12.89QwtPlotShapeItem Class Reference . . . . .	437
12.89.1 Detailed Description . . . . .	439
12.89.2 Member Enumeration Documentation . . . . .	439
12.89.3 Constructor & Destructor Documentation . . . . .	439
12.89.4 Member Function Documentation . . . . .	440
12.90QwtPlotSpectroCurve Class Reference . . . . .	444
12.90.1 Detailed Description . . . . .	445
12.90.2 Member Enumeration Documentation . . . . .	445
12.90.3 Constructor & Destructor Documentation . . . . .	445
12.90.4 Member Function Documentation . . . . .	445
12.91QwtPlotSpectrogram Class Reference . . . . .	448
12.91.1 Detailed Description . . . . .	450
12.91.2 Member Enumeration Documentation . . . . .	450
12.91.3 Constructor & Destructor Documentation . . . . .	450
12.91.4 Member Function Documentation . . . . .	450
12.92QwtPlotSvgItem Class Reference . . . . .	457
12.92.1 Detailed Description . . . . .	458
12.92.2 Constructor & Destructor Documentation . . . . .	458
12.92.3 Member Function Documentation . . . . .	458
12.93QwtPlotTextLabel Class Reference . . . . .	460
12.93.1 Detailed Description . . . . .	460
12.93.2 Constructor & Destructor Documentation . . . . .	461
12.93.3 Member Function Documentation . . . . .	461
12.94QwtPlotTradingCurve Class Reference . . . . .	464
12.94.1 Detailed Description . . . . .	465
12.94.2 Member Enumeration Documentation . . . . .	466
12.94.3 Constructor & Destructor Documentation . . . . .	466
12.94.4 Member Function Documentation . . . . .	467
12.95QwtPlotZoneItem Class Reference . . . . .	474

12.95.1 Detailed Description . . . . .	474
12.95.2 Constructor & Destructor Documentation . . . . .	475
12.95.3 Member Function Documentation . . . . .	475
12.96QwtPlotZoomer Class Reference . . . . .	477
12.96.1 Detailed Description . . . . .	479
12.96.2 Constructor & Destructor Documentation . . . . .	480
12.96.3 Member Function Documentation . . . . .	480
12.97QwtPoint3D Class Reference . . . . .	486
12.97.1 Detailed Description . . . . .	486
12.97.2 Constructor & Destructor Documentation . . . . .	487
12.97.3 Member Function Documentation . . . . .	487
12.98QwtPoint3DSeriesData Class Reference . . . . .	488
12.98.1 Detailed Description . . . . .	489
12.98.2 Constructor & Destructor Documentation . . . . .	489
12.98.3 Member Function Documentation . . . . .	489
12.99QwtPointArrayData Class Reference . . . . .	489
12.99.1 Detailed Description . . . . .	490
12.99.2 Constructor & Destructor Documentation . . . . .	490
12.99.3 Member Function Documentation . . . . .	490
12.100QwtPointMapper Class Reference . . . . .	491
12.100.1 Detailed Description . . . . .	492
12.100.2 Member Typedef Documentation . . . . .	492
12.100.3 Member Enumeration Documentation . . . . .	492
12.100.4 Member Function Documentation . . . . .	492
12.101QwtPointPolar Class Reference . . . . .	496
12.101.1 Detailed Description . . . . .	496
12.101.2 Constructor & Destructor Documentation . . . . .	497
12.101.3 Member Function Documentation . . . . .	497
12.102QwtPointSeriesData Class Reference . . . . .	499
12.102.1 Detailed Description . . . . .	499
12.102.2 Constructor & Destructor Documentation . . . . .	499
12.102.3 Member Function Documentation . . . . .	500
12.103QwtPowerTransform Class Reference . . . . .	500
12.103.1 Detailed Description . . . . .	500
12.103.2 Constructor & Destructor Documentation . . . . .	501
12.103.3 Member Function Documentation . . . . .	502
12.104QwtRasterData Class Reference . . . . .	502
12.104.1 Detailed Description . . . . .	503
12.104.2 Member Enumeration Documentation . . . . .	503
12.104.3 Member Function Documentation . . . . .	503

12.105	<a href="#">QwtRichTextEngine Class Reference</a>	505
12.105.1	<a href="#">Detailed Description</a>	506
12.105.2	<a href="#">Member Function Documentation</a>	506
12.106	<a href="#">QwtRoundScaleDraw Class Reference</a>	507
12.106.1	<a href="#">Detailed Description</a>	508
12.106.2	<a href="#">Constructor &amp; Destructor Documentation</a>	509
12.106.3	<a href="#">Member Function Documentation</a>	509
12.107	<a href="#">QwtSamplingThread Class Reference</a>	511
12.107.1	<a href="#">Detailed Description</a>	512
12.107.2	<a href="#">Member Function Documentation</a>	512
12.108	<a href="#">QwtScaleArithmetic Class Reference</a>	513
12.108.1	<a href="#">Detailed Description</a>	513
12.108.2	<a href="#">Member Function Documentation</a>	513
12.109	<a href="#">QwtScaleDiv Class Reference</a>	514
12.109.1	<a href="#">Detailed Description</a>	515
12.109.2	<a href="#">Member Enumeration Documentation</a>	515
12.109.3	<a href="#">Constructor &amp; Destructor Documentation</a>	516
12.109.4	<a href="#">Member Function Documentation</a>	517
12.110	<a href="#">QwtScaleDraw Class Reference</a>	520
12.110.1	<a href="#">Detailed Description</a>	522
12.110.2	<a href="#">Member Enumeration Documentation</a>	522
12.110.3	<a href="#">Constructor &amp; Destructor Documentation</a>	522
12.110.4	<a href="#">Member Function Documentation</a>	522
12.111	<a href="#">QwtScaleEngine Class Reference</a>	530
12.111.1	<a href="#">Detailed Description</a>	531
12.111.2	<a href="#">Member Enumeration Documentation</a>	531
12.111.3	<a href="#">Constructor &amp; Destructor Documentation</a>	531
12.111.4	<a href="#">Member Function Documentation</a>	532
12.112	<a href="#">QwtScaleMap Class Reference</a>	536
12.112.1	<a href="#">Detailed Description</a>	536
12.112.2	<a href="#">Constructor &amp; Destructor Documentation</a>	537
12.112.3	<a href="#">Member Function Documentation</a>	537
12.113	<a href="#">QwtScaleWidget Class Reference</a>	540
12.113.1	<a href="#">Detailed Description</a>	542
12.113.2	<a href="#">Member Enumeration Documentation</a>	542
12.113.3	<a href="#">Constructor &amp; Destructor Documentation</a>	542
12.113.4	<a href="#">Member Function Documentation</a>	542
12.114	<a href="#">QwtSeriesData&lt; T &gt; Class Template Reference</a>	550
12.114.1	<a href="#">Detailed Description</a>	551
12.114.2	<a href="#">Member Function Documentation</a>	552

12.115	<a href="#">QwtSeriesStore&lt; T &gt; Class Template Reference</a>	552
12.115.1	<a href="#">Detailed Description</a>	553
12.115.2	<a href="#">Member Function Documentation</a>	553
12.116	<a href="#">QwtSetSample Class Reference</a>	555
12.116.1	<a href="#">Detailed Description</a>	555
12.116.2	<a href="#">Constructor &amp; Destructor Documentation</a>	555
12.116.3	<a href="#">Member Function Documentation</a>	557
12.117	<a href="#">QwtSetSeriesData Class Reference</a>	557
12.117.1	<a href="#">Detailed Description</a>	557
12.117.2	<a href="#">Constructor &amp; Destructor Documentation</a>	557
12.117.3	<a href="#">Member Function Documentation</a>	559
12.118	<a href="#">QwtSimpleCompassRose Class Reference</a>	559
12.118.1	<a href="#">Detailed Description</a>	560
12.118.2	<a href="#">Constructor &amp; Destructor Documentation</a>	560
12.118.3	<a href="#">Member Function Documentation</a>	560
12.119	<a href="#">QwtSlider Class Reference</a>	562
12.119.1	<a href="#">Detailed Description</a>	564
12.119.2	<a href="#">Member Enumeration Documentation</a>	564
12.119.3	<a href="#">Constructor &amp; Destructor Documentation</a>	564
12.119.4	<a href="#">Member Function Documentation</a>	564
12.120	<a href="#">QwtSpline Class Reference</a>	570
12.120.1	<a href="#">Detailed Description</a>	571
12.120.2	<a href="#">Member Enumeration Documentation</a>	572
12.120.3	<a href="#">Constructor &amp; Destructor Documentation</a>	572
12.120.4	<a href="#">Member Function Documentation</a>	572
12.121	<a href="#">QwtSplineCurveFitter Class Reference</a>	574
12.121.1	<a href="#">Detailed Description</a>	574
12.121.2	<a href="#">Member Enumeration Documentation</a>	575
12.121.3	<a href="#">Member Function Documentation</a>	575
12.122	<a href="#">QwtSymbol Class Reference</a>	576
12.122.1	<a href="#">Detailed Description</a>	578
12.122.2	<a href="#">Member Enumeration Documentation</a>	578
12.122.3	<a href="#">Constructor &amp; Destructor Documentation</a>	579
12.122.4	<a href="#">Member Function Documentation</a>	580
12.123	<a href="#">QwtSyntheticPointData Class Reference</a>	587
12.123.1	<a href="#">Detailed Description</a>	588
12.123.2	<a href="#">Constructor &amp; Destructor Documentation</a>	589
12.123.3	<a href="#">Member Function Documentation</a>	589
12.124	<a href="#">QwtSystemClock Class Reference</a>	591
12.124.1	<a href="#">Detailed Description</a>	592

12.124.2	Member Function Documentation	592
12.125	QwtText Class Reference	592
12.125.1	Detailed Description	594
12.125.2	Member Enumeration Documentation	594
12.125.3	Constructor & Destructor Documentation	595
12.125.4	Member Function Documentation	595
12.126	QwtTextEngine Class Reference	601
12.126.1	Detailed Description	601
12.126.2	Member Function Documentation	602
12.127	QwtTextLabel Class Reference	603
12.127.1	Detailed Description	604
12.127.2	Constructor & Destructor Documentation	604
12.127.3	Member Function Documentation	605
12.128	QwtThermo Class Reference	607
12.128.1	Detailed Description	609
12.128.2	Member Enumeration Documentation	609
12.128.3	Constructor & Destructor Documentation	610
12.128.4	Member Function Documentation	610
12.129	QwtTradingChartData Class Reference	619
12.129.1	Detailed Description	619
12.129.2	Constructor & Destructor Documentation	620
12.129.3	Member Function Documentation	620
12.130	QwtTransform Class Reference	620
12.130.1	Detailed Description	621
12.130.2	Member Function Documentation	621
12.131	QwtWeedingCurveFitter Class Reference	622
12.131.1	Detailed Description	622
12.131.2	Constructor & Destructor Documentation	623
12.131.3	Member Function Documentation	623
12.132	QwtWheel Class Reference	624
12.132.1	Detailed Description	626
12.132.2	Member Function Documentation	627
12.133	QwtWidgetOverlay Class Reference	637
12.133.1	Detailed Description	639
12.133.2	Member Enumeration Documentation	639
12.133.3	Constructor & Destructor Documentation	640
12.133.4	Member Function Documentation	640



# 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 (  $\geq 4.4$  ) 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](mailto: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:

Authors:

Uwe Rathmann, Josef Wilgen ( <= Qwt 0.2 )

Project admin:

Uwe Rathmann <[rathmann@users.sourceforge.net](mailto: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"

- [QwtPlotZonItem](#)

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 [QwtTransform](#) ( 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::OpenGL/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 WYS-WYG. [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](#)
- [QwtPlotShapelItem](#)
- [QwtPlotTextLabel](#)
- [QwtPlotTradingCurve](#)
- [QwtPlotZonelItem](#)
- [QwtPointData](#)
- [QwtPointMapper](#)
- [QwtTransform](#), [QwtNullTransform](#), [QwtLogTransform](#), [QwtPowerTransform](#)
- [QwtWidgetOverlay](#)

## 3 Installing Qwt

### 3.1 Download

Stable Qwt releases are available from the [Qwt project page](#).

Qwt-6.1.2 consists of 4 files:

- [qwt-6.1.2.zip](#)  
Zip file with the Qwt sources and the html documentation for Windows
- [qwt-6.1.2.tar.bz2](#)  
Compressed tar file with the Qwt sources and the html documentation for UNIX systems ( Linux, Mac, ... )
- [qwt-6.1.2.pdf](#)  
Qwt documentation as PDF document.

- qwt-6.1.2.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:

- qwt designer-6.1.2-\*.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-6.1.2
- Unix like systems  
/usr/local/qwt-6.1.2

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-6.1.2
/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-6.1.2
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 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-6.1.2.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-6.1.2.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 be 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).
```

-----

GNU LESSER GENERAL PUBLIC LICENSE  
Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.  
59 Temple Place, Suite 330, Boston, MA 02111-1307 USA  
Everyone is permitted to copy and distribute verbatim copies  
of this license document, but changing it is not allowed.

[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.

When we speak of free software, we are referring to freedom of use, 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

it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

#### GNU LESSER GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated

straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) The modified work must itself be a software library.
- b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

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 from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the



integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

#### NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

#### END OF TERMS AND CONDITIONS

#### How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the library's name and a brief idea of what it does.>
Copyright (C) <year> <name of author>
```

```
This library is free software; you can redistribute it and/or
modify it under the terms of the GNU Lesser General Public
License as published by the Free Software Foundation; either
version 2.1 of the License, or (at your option) any later version.
```

This library is distributed in the hope that it will be useful,  
but WITHOUT ANY WARRANTY; without even the implied warranty of  
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU  
Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public  
License along with this library; if not, write to the Free Software  
Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA 02111-1307 USA

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your  
school, if any, to sign a "copyright disclaimer" for the library, if  
necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the  
library 'Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!

## 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:

<b>QwtEventPattern::KeyPattern</b>	<b>31</b>
<b>QwtEventPattern::MousePattern</b>	<b>31</b>
QByteArray	
<b>QwtPixelMatrix</b>	<b>259</b>
QFrame	
<b>QwtAbstractLegend</b>	<b>32</b>
<b>QwtLegend</b>	<b>176</b>
<b>QwtPlot</b>	<b>264</b>
<b>QwtPlotCanvas</b>	<b>296</b>
<b>QwtTextLabel</b>	<b>603</b>

<b>QwtLegendLabel</b>	<b>186</b>
QGLWidget	
<b>QwtPlotGLCanvas</b>	<b>321</b>
QLayout	
<b>QwtDynGridLayout</b>	<b>128</b>
QObject	
<b>QwtMagnifier</b>	<b>200</b>
<b>QwtPlotMagnifier</b>	<b>381</b>
<b>QwtPicker</b>	<b>234</b>
<b>QwtPlotPicker</b>	<b>400</b>
<b>QwtPlotZoomer</b>	<b>477</b>
<b>QwtPlotDirectPainter</b>	<b>318</b>
<b>QwtPlotRenderer</b>	<b>412</b>
<b>QwtPlotRescaler</b>	<b>420</b>
QPaintDevice	
<b>QwtNullPaintDevice</b>	<b>214</b>
<b>QwtGraphic</b>	<b>139</b>
QPushButton	
<b>QwtArrowButton</b>	<b>69</b>
QThread	
<b>QwtSamplingThread</b>	<b>511</b>
QWidget	
<b>QwtAbstractScale</b>	<b>34</b>
<b>QwtAbstractSlider</b>	<b>52</b>
<b>QwtDial</b>	<b>115</b>
<b>QwtAnalogClock</b>	<b>63</b>
<b>QwtCompass</b>	<b>79</b>
<b>QwtKnob</b>	<b>166</b>
<b>QwtSlider</b>	<b>562</b>
<b>QwtThermo</b>	<b>607</b>
<b>QwtCounter</b>	<b>88</b>
<b>QwtPanner</b>	<b>228</b>
<b>QwtPlotPanner</b>	<b>398</b>
<b>QwtScaleWidget</b>	<b>540</b>
<b>QwtWheel</b>	<b>624</b>

QwtWidgetOverlay	637
QwtAbstractScaleDraw	42
QwtRoundScaleDraw	507
QwtCompassScaleDraw	85
QwtScaleDraw	520
QwtDateScaleDraw	105
QwtAbstractSeriesStore	50
QwtPlotSeriesItem	435
QwtPlotAbstractBarChart	285
QwtPlotBarChart	290
QwtPlotMultiBarChart	390
QwtPlotCurve	302
QwtPlotHistogram	332
QwtPlotIntervalCurve	341
QwtPlotSpectroCurve	444
QwtPlotTradingCurve	464
QwtSeriesStore< T >	552
QwtSeriesStore< QPointF >	552
QwtPlotBarChart	290
QwtPlotCurve	302
QwtSeriesStore< QwtIntervalSample >	552
QwtPlotHistogram	332
QwtPlotIntervalCurve	341
QwtSeriesStore< QwtOHLCSample >	552
QwtPlotTradingCurve	464
QwtSeriesStore< QwtPoint3D >	552
QwtPlotSpectroCurve	444
QwtSeriesStore< QwtSetSample >	552
QwtPlotMultiBarChart	390
QwtClipper	71
QwtColorMap	72
QwtAlphaColorMap	61

QwtLinearColorMap	189
QwtColumnRect	75
QwtColumnSymbol	76
QwtCompassRose	84
QwtSimpleCompassRose	559
QwtCurveFitter	99
QwtSplineCurveFitter	574
QwtWeedingCurveFitter	622
QwtDate	100
QwtDialNeedle	124
QwtCompassMagnetNeedle	82
QwtCompassWindArrow	87
QwtDialSimpleNeedle	126
QwtEventPattern	134
QwtPicker	234
QwtInterval	152
QwtIntervalSample	160
QwtIntervalSymbol	163
QwtLegendData	183
QwtOHLCSSample	218
QwtPainter	220
QwtPainterCommand	225
QwtPickerMachine	256
QwtPickerClickPointMachine	252
QwtPickerClickRectMachine	252
QwtPickerDragLineMachine	254
QwtPickerDragPointMachine	254
QwtPickerDragRectMachine	255
QwtPickerPolygonMachine	258
QwtPickerTrackerMachine	259
QwtPlotDict	316
QwtPlot	264

<b>QwtPlotItem</b>	<b>348</b>
<b>QwtPlotGrid</b>	<b>327</b>
<b>QwtPlotLegendItem</b>	<b>372</b>
<b>QwtPlotMarker</b>	<b>383</b>
<b>QwtPlotRasterItem</b>	<b>407</b>
<b>QwtPlotSpectrogram</b>	<b>448</b>
<b>QwtPlotScaleItem</b>	<b>429</b>
<b>QwtPlotSeriesItem</b>	<b>435</b>
<b>QwtPlotShapelItem</b>	<b>437</b>
<b>QwtPlotSvgItem</b>	<b>457</b>
<b>QwtPlotTextLabel</b>	<b>460</b>
<b>QwtPlotZonelItem</b>	<b>474</b>
<b>QwtPlotLayout</b>	<b>363</b>
<b>QwtPoint3D</b>	<b>486</b>
<b>QwtPointMapper</b>	<b>491</b>
<b>QwtPointPolar</b>	<b>496</b>
<b>QwtRasterData</b>	<b>502</b>
<b>QwtMatrixRasterData</b>	<b>210</b>
<b>QwtScaleArithmetic</b>	<b>513</b>
<b>QwtScaleDiv</b>	<b>514</b>
<b>QwtScaleEngine</b>	<b>530</b>
<b>QwtLinearScaleEngine</b>	<b>193</b>
<b>QwtDateScaleEngine</b>	<b>110</b>
<b>QwtLogScaleEngine</b>	<b>196</b>
<b>QwtScaleMap</b>	<b>536</b>
<b>QwtSeriesData&lt; T &gt;</b>	<b>550</b>
<b>QwtArraySeriesData&lt; T &gt;</b>	<b>67</b>
<b>QwtSeriesData&lt; QPointF &gt;</b>	<b>550</b>
<b>QwtArraySeriesData&lt; QPointF &gt;</b>	<b>67</b>
<b>QwtPointSeriesData</b>	<b>499</b>
<b>QwtCPointerData</b>	<b>97</b>
<b>QwtPointArrayData</b>	<b>489</b>

QwtSyntheticPointData	587
QwtSeriesData< QwtIntervalSample >	550
QwtArraySeriesData< QwtIntervalSample >	67
QwtIntervalSeriesData	161
QwtSeriesData< QwtOHLCSample >	550
QwtArraySeriesData< QwtOHLCSample >	67
QwtTradingChartData	619
QwtSeriesData< QwtPoint3D >	550
QwtArraySeriesData< QwtPoint3D >	67
QwtPoint3DSeriesData	488
QwtSeriesData< QwtSetSample >	550
QwtArraySeriesData< QwtSetSample >	67
QwtSetSeriesData	557
QwtSetSample	555
QwtSpline	570
QwtSymbol	576
QwtSystemClock	591
QwtText	592
QwtTextEngine	601
QwtMathMLTextEngine	208
QwtPlainTextEngine	261
QwtRichTextEngine	505
QwtTransform	620
QwtLogTransform	199
QwtNullTransform	217
QwtPowerTransform	500

## 11 Class Index

### 11.1 Class List

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

QwtEventPattern::KeyPattern	
A pattern for key events	31

<a href="#">QwtEventPattern::MousePattern</a>	31
A pattern for mouse events	
<a href="#">QwtAbstractLegend</a>	32
Abstract base class for legend widgets	
<a href="#">QwtAbstractScale</a>	34
An abstract base class for widgets having a scale	
<a href="#">QwtAbstractScaleDraw</a>	42
A abstract base class for drawing scales	
<a href="#">QwtAbstractSeriesStore</a>	50
Bridge between <a href="#">QwtSeriesStore</a> and <a href="#">QwtPlotSeriesItem</a>	
<a href="#">QwtAbstractSlider</a>	52
An abstract base class for slider widgets with a scale	
<a href="#">QwtAlphaColorMap</a>	61
<a href="#">QwtAlphaColorMap</a> varies the alpha value of a color	
<a href="#">QwtAnalogClock</a>	63
An analog clock	
<a href="#">QwtArraySeriesData&lt; T &gt;</a>	67
Template class for data, that is organized as QVector	
<a href="#">QwtArrowButton</a>	69
Arrow Button	
<a href="#">QwtClipper</a>	71
Some clipping algorithms	
<a href="#">QwtColorMap</a>	72
<a href="#">QwtColorMap</a> is used to map values into colors	
<a href="#">QwtColumnRect</a>	75
Directed rectangle representing bounding rectangle and orientation of a column	
<a href="#">QwtColumnSymbol</a>	76
A drawing primitive for columns	
<a href="#">QwtCompass</a>	79
A Compass Widget	
<a href="#">QwtCompassMagnetNeedle</a>	82
A magnet needle for compass widgets	
<a href="#">QwtCompassRose</a>	84
Abstract base class for a compass rose	
<a href="#">QwtCompassScaleDraw</a>	85
A special scale draw made for <a href="#">QwtCompass</a>	
<a href="#">QwtCompassWindArrow</a>	87
An indicator for the wind direction	
<a href="#">QwtCounter</a>	88
The Counter Widget	
<a href="#">QwtCPointerData</a>	97
Data class containing two pointers to memory blocks of doubles	



<b>QwtCurveFitter</b>	
Abstract base class for a curve fitter	99
<b>QwtDate</b>	
A collection of methods around date/time values	100
<b>QwtDateScaleDraw</b>	
A class for drawing datetime scales	105
<b>QwtDateScaleEngine</b>	
A scale engine for date/time values	110
<b>QwtDial</b>	
<b>QwtDial</b> class provides a rounded range control	115
<b>QwtDialNeedle</b>	
Base class for needles that can be used in a <b>QwtDial</b>	124
<b>QwtDialSimpleNeedle</b>	
A needle for dial widgets	126
<b>QwtDynGridLayout</b>	
Lays out widgets in a grid, adjusting the number of columns and rows to the current size	128
<b>QwtEventPattern</b>	
A collection of event patterns	134
<b>QwtGraphic</b>	
A paint device for scalable graphics	139
<b>QwtInterval</b>	
A class representing an interval	152
<b>QwtIntervalSample</b>	
A sample of the types (x1-x2, y) or (x, y1-y2)	160
<b>QwtIntervalSeriesData</b>	
Interface for iterating over an array of intervals	161
<b>QwtIntervalSymbol</b>	
A drawing primitive for displaying an interval like an error bar	163
<b>QwtKnob</b>	
The Knob Widget	166
<b>QwtLegend</b>	
The legend widget	176
<b>QwtLegendData</b>	
Attributes of an entry on a legend	183
<b>QwtLegendLabel</b>	
A widget representing something on a <b>QwtLegend</b>	186
<b>QwtLinearColorMap</b>	
<b>QwtLinearColorMap</b> builds a color map from color stops	189
<b>QwtLinearScaleEngine</b>	
A scale engine for linear scales	193
<b>QwtLogScaleEngine</b>	
A scale engine for logarithmic scales	196

<a href="#">QwtLogTransform</a>	
Logarithmic transformation	199
<a href="#">QwtMagnifier</a>	
<a href="#">QwtMagnifier</a> provides zooming, by magnifying in steps	200
<a href="#">QwtMathMLTextEngine</a>	
Text Engine for the MathML renderer of the Qt solutions package	208
<a href="#">QwtMatrixRasterData</a>	
A class representing a matrix of values as raster data	210
<a href="#">QwtNullPaintDevice</a>	
A null paint device doing nothing	214
<a href="#">QwtNullTransform</a>	
Null transformation	217
<a href="#">QwtOHLCSample</a>	
Open-High-Low-Close sample used in financial charts	218
<a href="#">QwtPainter</a>	
A collection of QPainter workarounds	220
<a href="#">QwtPainterCommand</a>	225
<a href="#">QwtPanner</a>	
<a href="#">QwtPanner</a> provides panning of a widget	228
<a href="#">QwtPicker</a>	
<a href="#">QwtPicker</a> provides selections on a widget	234
<a href="#">QwtPickerClickPointMachine</a>	
A state machine for point selections	252
<a href="#">QwtPickerClickRectMachine</a>	
A state machine for rectangle selections	252
<a href="#">QwtPickerDragLineMachine</a>	
A state machine for line selections	254
<a href="#">QwtPickerDragPointMachine</a>	
A state machine for point selections	254
<a href="#">QwtPickerDragRectMachine</a>	
A state machine for rectangle selections	255
<a href="#">QwtPickerMachine</a>	
A state machine for <a href="#">QwtPicker</a> selections	256
<a href="#">QwtPickerPolygonMachine</a>	
A state machine for polygon selections	258
<a href="#">QwtPickerTrackerMachine</a>	
A state machine for indicating mouse movements	259
<a href="#">QwtPixelMatrix</a>	
A bit field corresponding to the pixels of a rectangle	259
<a href="#">QwtPlainTextEngine</a>	
A text engine for plain texts	261

<b>QwtPlot</b>	
A 2-D plotting widget	264
<b>QwtPlotAbstractBarChart</b>	
Abstract base class for bar chart items	285
<b>QwtPlotBarChart</b>	
<b>QwtPlotBarChart</b> displays a series of a values as bars	290
<b>QwtPlotCanvas</b>	
Canvas of a <b>QwtPlot</b>	296
<b>QwtPlotCurve</b>	
A plot item, that represents a series of points	302
<b>QwtPlotDict</b>	
A dictionary for plot items	316
<b>QwtPlotDirectPainter</b>	
Painter object trying to paint incrementally	318
<b>QwtPlotGLCanvas</b>	
An alternative canvas for a <b>QwtPlot</b> derived from QGLWidget	321
<b>QwtPlotGrid</b>	
A class which draws a coordinate grid	327
<b>QwtPlotHistogram</b>	
<b>QwtPlotHistogram</b> represents a series of samples, where an interval is associated with a value ( $y = f([x1, x2])$ )	332
<b>QwtPlotIntervalCurve</b>	
<b>QwtPlotIntervalCurve</b> represents a series of samples, where each value is associated with an interval ( $[y1, y2] = f(x)$ )	341
<b>QwtPlotItem</b>	
Base class for items on the plot canvas	348
<b>QwtPlotLayout</b>	
Layout engine for <b>QwtPlot</b>	363
<b>QwtPlotLegendItem</b>	
A class which draws a legend inside the plot canvas	372
<b>QwtPlotMagnifier</b>	
<b>QwtPlotMagnifier</b> provides zooming, by magnifying in steps	381
<b>QwtPlotMarker</b>	
A class for drawing markers	383
<b>QwtPlotMultiBarChart</b>	
<b>QwtPlotMultiBarChart</b> displays a series of a samples that consist each of a set of values	390
<b>QwtPlotPanner</b>	
<b>QwtPlotPanner</b> provides panning of a plot canvas	398
<b>QwtPlotPicker</b>	
<b>QwtPlotPicker</b> provides selections on a plot canvas	400
<b>QwtPlotRasterItem</b>	
A class, which displays raster data	407

<b>QwtPlotRenderer</b>	
Renderer for exporting a plot to a document, a printer or anything else, that is supported by QPainter/QPaintDevice	412
<b>QwtPlotRescaler</b>	
QwtPlotRescaler takes care of fixed aspect ratios for plot scales	420
<b>QwtPlotScaleItem</b>	
A class which draws a scale inside the plot canvas	429
<b>QwtPlotSeriesItem</b>	
Base class for plot items representing a series of samples	435
<b>QwtPlotShapelItem</b>	
A plot item, which displays any graphical shape, that can be defined by a QPainterPath	437
<b>QwtPlotSpectroCurve</b>	
Curve that displays 3D points as dots, where the z coordinate is mapped to a color	444
<b>QwtPlotSpectrogram</b>	
A plot item, which displays a spectrogram	448
<b>QwtPlotSvgItem</b>	
A plot item, which displays data in Scalable Vector Graphics (SVG) format	457
<b>QwtPlotTextLabel</b>	
A plot item, which displays a text label	460
<b>QwtPlotTradingCurve</b>	
QwtPlotTradingCurve illustrates movements in the price of a financial instrument over time	464
<b>QwtPlotZonelItem</b>	
A plot item, which displays a zone	474
<b>QwtPlotZoomer</b>	
QwtPlotZoomer provides stacked zooming for a plot widget	477
<b>QwtPoint3D</b>	
QwtPoint3D class defines a 3D point in double coordinates	486
<b>QwtPoint3DSeriesData</b>	
Interface for iterating over an array of 3D points	488
<b>QwtPointArrayData</b>	
Interface for iterating over two QVector<double> objects	489
<b>QwtPointMapper</b>	
A helper class for translating a series of points	491
<b>QwtPointPolar</b>	
A point in polar coordinates	496
<b>QwtPointSeriesData</b>	
Interface for iterating over an array of points	499
<b>QwtPowerTransform</b>	
A transformation using pow()	500
<b>QwtRasterData</b>	
QwtRasterData defines an interface to any type of raster data	502

<a href="#"><b>QwtRichTextEngine</b></a>	
A text engine for Qt rich texts	505
<a href="#"><b>QwtRoundScaleDraw</b></a>	
A class for drawing round scales	507
<a href="#"><b>QwtSamplingThread</b></a>	
A thread collecting samples at regular intervals	511
<a href="#"><b>QwtScaleArithmetic</b></a>	
Arithmetic including a tolerance	513
<a href="#"><b>QwtScaleDiv</b></a>	
A class representing a scale division	514
<a href="#"><b>QwtScaleDraw</b></a>	
A class for drawing scales	520
<a href="#"><b>QwtScaleEngine</b></a>	
Base class for scale engines	530
<a href="#"><b>QwtScaleMap</b></a>	
A scale map	536
<a href="#"><b>QwtScaleWidget</b></a>	
A Widget which contains a scale	540
<a href="#"><b>QwtSeriesData&lt; T &gt;</b></a>	
Abstract interface for iterating over samples	550
<a href="#"><b>QwtSeriesStore&lt; T &gt;</b></a>	
Class storing a <a href="#">QwtSeriesData</a> object	552
<a href="#"><b>QwtSetSample</b></a>	
A sample of the types (x1...xn, y) or (x, y1..yn)	555
<a href="#"><b>QwtSetSeriesData</b></a>	
Interface for iterating over an array of samples	557
<a href="#"><b>QwtSimpleCompassRose</b></a>	
A simple rose for <a href="#">QwtCompass</a>	559
<a href="#"><b>QwtSlider</b></a>	
The Slider Widget	562
<a href="#"><b>QwtSpline</b></a>	
A class for spline interpolation	570
<a href="#"><b>QwtSplineCurveFitter</b></a>	
A curve fitter using cubic splines	574
<a href="#"><b>QwtSymbol</b></a>	
A class for drawing symbols	576
<a href="#"><b>QwtSyntheticPointData</b></a>	
Synthetic point data	587
<a href="#"><b>QwtSystemClock</b></a>	
<a href="#">QwtSystemClock</a> provides high resolution clock time functions	591
<a href="#"><b>QwtText</b></a>	
A class representing a text	592

<a href="#">QwtTextEngine</a>	Abstract base class for rendering text strings	601
<a href="#">QwtTextLabel</a>	A Widget which displays a <a href="#">QwtText</a>	603
<a href="#">QwtThermo</a>	The Thermometer Widget	607
<a href="#">QwtTradingChartData</a>		619
<a href="#">QwtTransform</a>	A transformation between coordinate systems	620
<a href="#">QwtWeedingCurveFitter</a>	A curve fitter implementing Douglas and Peucker algorithm	622
<a href="#">QwtWheel</a>	The Wheel Widget	624
<a href="#">QwtWidgetOverlay</a>	An overlay for a widget	637

## 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

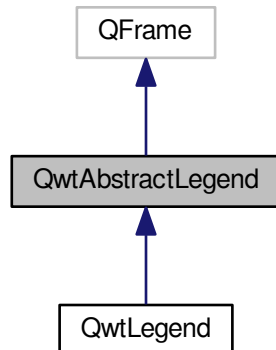
A pattern for mouse events.

### 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

<i>parent</i>	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

<i>painter</i>	Painter
<i>rect</i>	Bounding rectangle
<i>fillBackground</i>	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

<i>orientation</i>	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

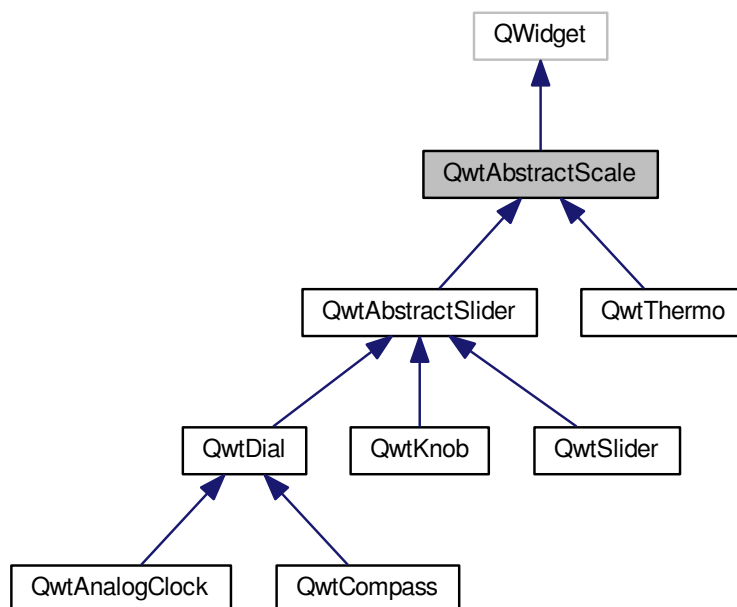
<i>itemInfo</i>	Info about an item
<i>data</i>	List of legend entry attributes for the item

## 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 `QwtScaleEngine`.

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

<i>parent</i>	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 [scaleMaxMinor\(\)](#) 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

<i>value</i>	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

<i>lowerBound</i>	Lower limit of the scale interval
<i>upperBound</i>	Upper limit of the scale interval
<i>stepSize</i>	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

<i>value</i>	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

<i>lowerBound</i>	lower limit of the scale interval
<i>upperBound</i>	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

<i>interval</i>	Interval
-----------------	----------

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

Specify a scale.

[scaleMaxMinor\(\)](#), [scaleMaxMajor\(\)](#) and [scaleStepSize\(\)](#) and have no effect.

Parameters

<i>scaleDiv</i>	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

<i>ticks</i>	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

<i>ticks</i>	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

<i>stepSize</i>	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

<i>value</i>	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**

<i>value</i>	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**

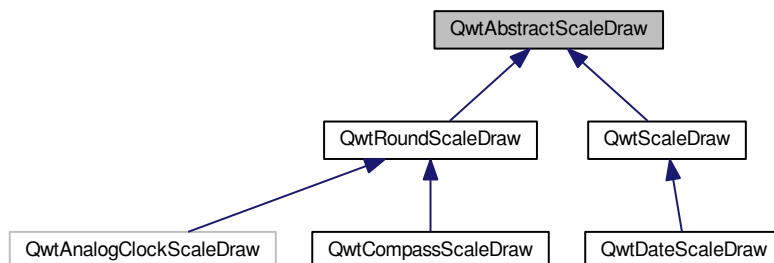
[setUpperBound\(\)](#), [setScale\(\)](#), [lowerBound\(\)](#)

**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 &amp; 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

<i>painter</i>	The painter
<i>palette</i>	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

<i>painter</i>	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

<i>painter</i>	Painter
<i>value</i>	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

<i>painter</i>	Painter
<i>value</i>	Value of the tick
<i>len</i>	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

<i>component</i>	Scale component
<i>enable</i>	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

<i>font</i>	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

<i>component</i>	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

<i>value</i>	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

<i>minExtent</i>	Minimum extent
------------------	----------------

##### See Also

[extent\(\)](#), [minimumExtent\(\)](#)

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

Specify the width of the scale pen.

##### Parameters

<i>width</i>	Pen width
--------------	-----------

##### See Also

[penWidth\(\)](#)

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

Change the scale division

##### Parameters

<i>scaleDiv</i>	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

<i>spacing</i>	Spacing
----------------	---------

##### See Also

[spacing\(\)](#)

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

Set the length of the ticks



## Parameters

<i>tickType</i>	Tick type
<i>length</i>	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

<i>transformation</i>	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

<i>font</i>	Font
<i>value</i>	Value

## Returns

Tick label

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

## Returns

Length of the ticks

## See Also

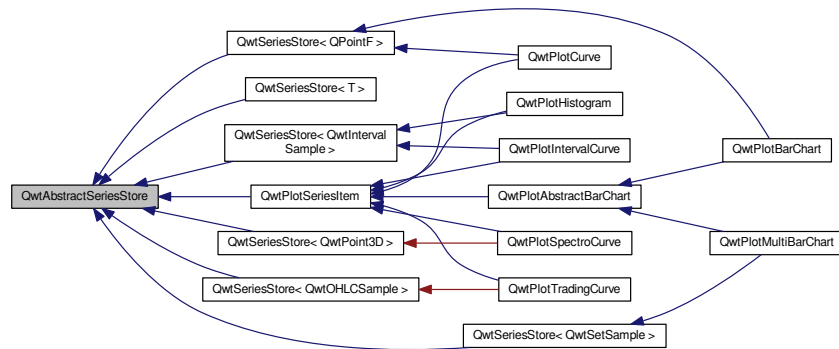
[setTickLength\(\)](#), [maxTickLength\(\)](#)

## 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< QwtOHLC-Sample >](#), [QwtSeriesStore< QwtPointF >](#), [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< QwtOHLC-Sample >](#), [QwtSeriesStore< QwtPointF >](#), [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\(\)](#)

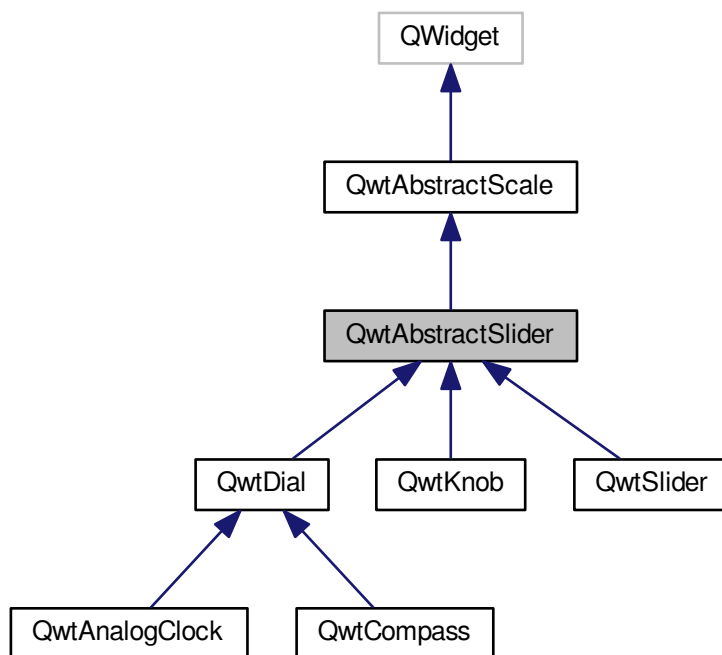
Implemented in [QwtSeriesStore< T >](#), [QwtSeriesStore< QwtIntervalSample >](#), [QwtSeriesStore< QwtOHLC-Sample >](#), [QwtSeriesStore< QPointF >](#), [QwtSeriesStore< QwtSetSample >](#), and [QwtSeriesStore< QwtPoint3D >](#).

## 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 not `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

<i>parent</i>	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

<i>value</i>	Value
<i>stepCount</i>	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

<i>stepCount</i>	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

<i>pos</i>	Mouse position
------------	----------------

Return values

<i>True, when</i>	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

<i>event</i>	Key event
--------------	-----------

## See Also

[isReadOnly\(\)](#)

Reimplemented in [QwtCompass](#).

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

Mouse Move Event handler

## Parameters

<i>event</i>	Mouse event
--------------	-------------

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

Mouse press event handler

## Parameters

<i>event</i>	Mouse event
--------------	-------------

Reimplemented in [QwtSlider](#).

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

Mouse Release Event handler

## Parameters

<i>event</i>	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

<i>pos</i>	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

<i>on</i>	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

<i>stepCount</i>	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

<i>on</i>	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

<i>stepCount</i>	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

<i>on</i>	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

<i>stepCount</i>	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

<i>on</i>	<code>true</code> (enable) or <code>false</code> (disable) tracking.
-----------	--

## See Also

[isTracking\(\)](#), [sliderMoved\(\)](#)

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

Set the value to be valid/invalid

## Parameters

<i>on</i>	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

<i>value</i>	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

<i>on</i>	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

<i>value</i>	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

<i>value</i>	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

<i>event</i>	Wheel event
--------------	-------------

Reimplemented in [QwtDial](#).

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

## Returns

True, when wrapping is set

## See Also

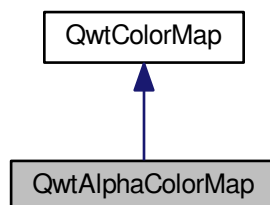
[setWrapping\(\)](#)

## 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

<i>color</i>	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.

$\text{alpha} := (\text{value} - \text{interval.minValue}()) / \text{interval.width}();$

Parameters

<i>interval</i>	Range for all values
<i>value</i>	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

<i>color</i>	Color
--------------	-------

## See Also

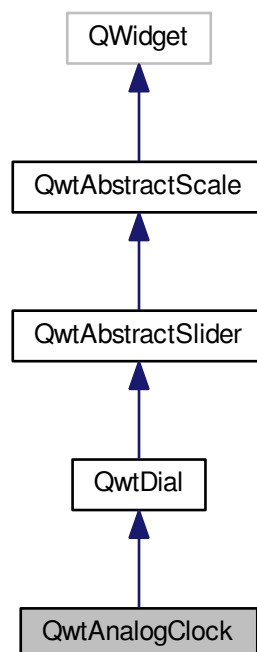
[color\(\)](#)

## 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

<i>parent</i>	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

<i>painter</i>	Painter
<i>hd</i>	Specify the type of hand
<i>center</i>	Center of the clock
<i>radius</i>	Maximum length for the hands
<i>direction</i>	Direction of the hand in degrees, counter clockwise
<i>cg</i>	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

<i>painter</i>	Painter
<i>center</i>	Center of the clock
<i>radius</i>	Maximum length for the hands
<i>dir</i>	Dummy, not used.
<i>colorGroup</i>	ColorGroup

## See Also

[drawHand\(\)](#)

Reimplemented from [QwtDial](#).

12.9.4.3 `const QwtDialNeedle * QwtAnalogClock::hand ( Hand hd ) const`

## Returns

Clock hand

## Parameters

<i>hd</i>	Specifies the type of hand
-----------	----------------------------

## See Also

[setHand\(\)](#)

12.9.4.4 `QwtDialNeedle * QwtAnalogClock::hand ( Hand hd )`

## Returns

Clock hand

## Parameters

<i>hd</i>	Specifies the type of hand
-----------	----------------------------

## See Also

[setHand\(\)](#)

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

Set a clock hand

## Parameters

<i>hand</i>	Specifies the type of hand
<i>needle</i>	Hand

## See Also

[hand\(\)](#)

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

Set a time

## Parameters

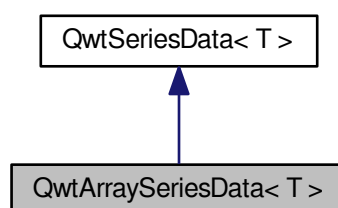
<i>time</i>	Time to display
-------------	-----------------

## 12.10 QwtArraySeriesData&lt; T &gt; 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

<i><a href="#">samples</a></i>	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

<i>index</i>	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

<i>samples</i>	Array of samples
----------------	------------------

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

## Returns

Number of samples

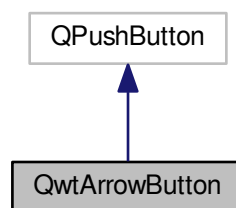
Implements [QwtSeriesData<T>](#).

## 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

<i>num</i>	Number of arrows
<i>arrowType</i>	see Qt::ArrowType in the Qt docs.
<i>parent</i>	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

<i>arrowType</i>	Arrow type
<i>boundingSize</i>	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

<i>painter</i>	Painter
<i>r</i>	Rectangle where to paint the arrow
<i>arrowType</i>	Arrow type

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

Draw the button label.

Parameters

<i>painter</i>	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**

<i>event</i>	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**

<i>clipRect</i>	Clip rectangle
<i>center</i>	Center of the circle
<i>radius</i>	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**

<i>clipRect</i>	Clip rectangle
<i>polygon</i>	Polygon
<i>closePolygon</i>	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**

<i>clipRect</i>	Clip rectangle
<i>polygon</i>	Polygon
<i>closePolygon</i>	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**

<i>clipRect</i>	Clip rectangle
<i>polygon</i>	Polygon
<i>closePolygon</i>	True, when the polygon is closed

**Returns**

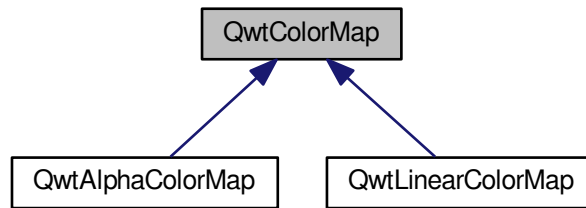
Clipped polygon

**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

<i>interval</i>	Valid interval for values
<i>value</i>	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

<i>interval</i>	Range for the values
<i>value</i>	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

<i>interval</i>	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

<i>interval</i>	Range for the values
<i>value</i>	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  $\geq$  [QwtColumnSymbol::UserStyle](#) are reserved for derived classes of [QwtColumnSymbol](#) that overload [draw\(\)](#) with additional application specific symbol types.

## 12.15.3 Constructor &amp; Destructor Documentation

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

Constructor

Parameters

<i>style</i>	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 &amp; rect ) const [virtual]

Draw the symbol depending on its style.

## Parameters

<i>painter</i>	Painter
<i>rect</i>	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

<i>painter</i>	Painter
<i>rect</i>	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

<i>frameStyle</i>	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

<i>width</i>	Width
--------------	-------

## See Also

[lineWidth\(\)](#), [setFrameStyle\(\)](#)

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

Assign a palette for the symbol

## Parameters

<i>palette</i>	Palette
----------------	---------

## See Also

[palette\(\)](#), [setStyle\(\)](#)

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

Specify the symbol style

## Parameters

<i>style</i>	Style
--------------	-------

## See Also

[style\(\)](#), [setPalette\(\)](#)

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

## Returns

Current symbol style

## See Also

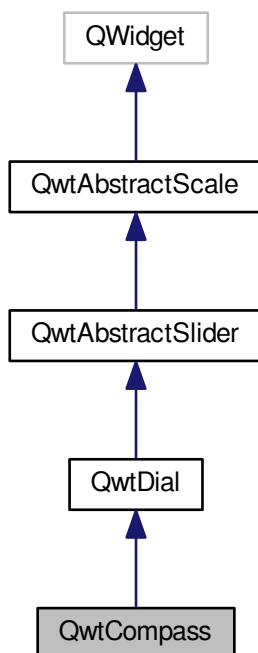
[setStyle\(\)](#)

## 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 &amp; Destructor Documentation

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

Constructor.

Parameters

<i>parent</i>	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

<i>painter</i>	Painter
<i>center</i>	Center of the compass
<i>radius</i>	of the circle, where to paint the rose
<i>north</i>	Direction pointing north, in degrees counter clockwise
<i>cg</i>	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

<i>painter</i>	Painter
<i>center</i>	Center of the content circle
<i>radius</i>	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

<i>rose</i>	Compass rose
-------------	--------------

Warning

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

See Also

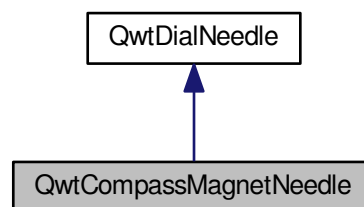
[rose\(\)](#)

## 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

<i>painter</i>	Painter
----------------	---------

<i>length</i>	Length of the needle
<i>colorGroup</i>	Color group, used for painting

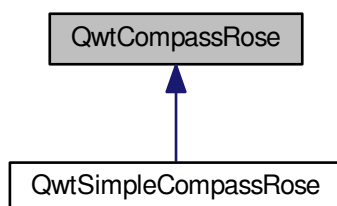
Implements [QwtDialNeedle](#).

## 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

<i>painter</i>	Painter
----------------	---------

<i>center</i>	Center point
<i>radius</i>	Radius of the rose
<i>north</i>	Position
<i>colorGroup</i>	Color group

Implemented in [QwtSimpleCompassRose](#).

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

Returns

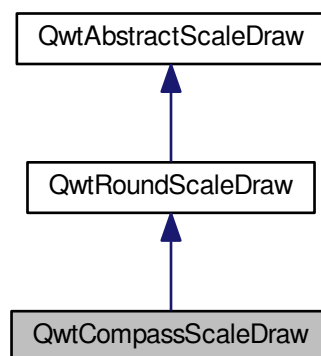
Current palette

## 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

<i>map</i>	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

<i>value</i>	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

<i>map</i>	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 `QwtScaleDraw::setScale`

## See Also

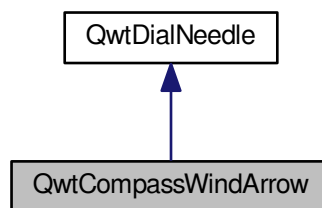
[labelMap\(\)](#), [scaleDraw\(\)](#), [setScale\(\)](#)

## 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

<i>style</i>	Arrow style
<i>light</i>	Light color
<i>dark</i>	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

<i>painter</i>	Painter
<i>length</i>	Length of the needle
<i>colorGroup</i>	Color group, used for painting

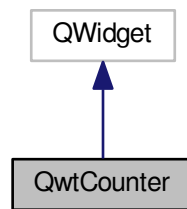
Implements [QwtDialNeedle](#).

## 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 or 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

<i>parent</i>	
---------------	--

### 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

<i>value</i>	The new value
--------------	---------------

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

Handle QEvent::PolishRequest events

#### Parameters

<i>event</i>	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

<i>button</i>	Button index
---------------	--------------

#### See Also

[setIncSteps\(\)](#)

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

##### Returns

True, when the 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

<i>event</i>	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

<i>button</i>	Button index
<i>numSteps</i>	Number of steps

See Also

[incSteps\(\)](#)

12.21.4.11 `void QwtCounter::setMaximum ( double value )`

Set the maximum value of the range

Parameters

<i>value</i>	Maximum value
--------------	---------------

See Also

[setRange\(\)](#), [setMinimum\(\)](#), [maximum\(\)](#)

12.21.4.12 `void QwtCounter::setMinimum ( double value )`

Set the minimum value of the range

Parameters

<i>value</i>	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

<i>numButtons</i>	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

<i>min</i>	Minimum value
<i>max</i>	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

<i>on</i>	True disable editing
-----------	----------------------

## See Also

[isReadOnly\(\)](#)

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

Set the step size of the counter.

A value  $\leq 0.0$  disables stepping

## Parameters

<i>stepSize</i>	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

<i>nSteps</i>	Number of steps
---------------	-----------------

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

Set the number of increment steps for button 2

## Parameters

<i>nSteps</i>	Number of steps
---------------	-----------------

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

Set the number of increment steps for button 3

## Parameters

<i>nSteps</i>	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

<i>on</i>	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

<i>value</i>	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

<i>on</i>	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**

<i>value</i>	The new value
--------------	---------------

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

Handle wheel events

**Parameters**

<i>event</i>	Wheel event
--------------	-------------

12.21.4.27 `bool QwtCounter::wrapping ( ) const`

**Returns**

True, when wrapping is set

See Also

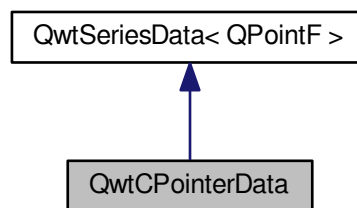
[setWrapping\(\)](#)

## 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

<i>x</i>	Array of x values
<i>y</i>	Array of y values



<i>size</i>	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**

<i>index</i>	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**

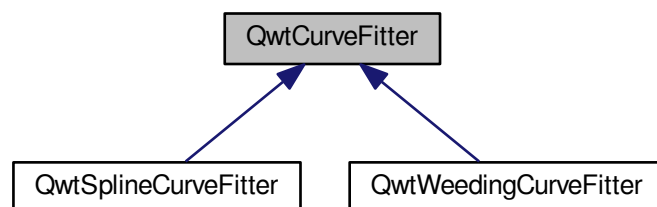
Array of the y-values

## 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

<i>polygon</i>	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

<i>dateTime</i>	Datetime value
<i>intervalType</i>	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

<i>year</i>	Year
<i>type</i>	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

<i>dateTime</i>	Datetime value
<i>intervalType</i>	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

<i>value</i>	Number of milliseconds since the epoch, 1970-01-01T00:00:00 UTC
<i>timeSpec</i>	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

<i>dateTime</i>	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

<i>dateTime</i>	Datetime value
<i>format</i>	Format string
<i>week0Type</i>	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

<i>dateTime</i>	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

<i>date</i>	Date
<i>type</i>	Option how to identify the first week

## Returns

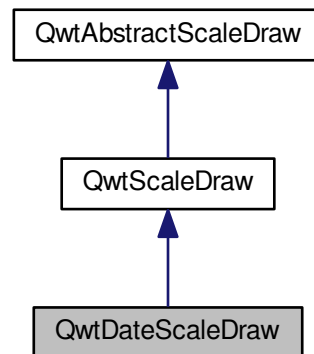
Week number, starting with 1

## 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

<i>timeSpec</i>	Time specification
-----------------	--------------------

## See Also

[setTimeSpec\(\)](#), [setWeek0Type\(\)](#)

## 12.25.3 Member Function Documentation

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

## Parameters

<i>intervalType</i>	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

<i>dateTime</i>	Datetime value
<i>intervalType</i>	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

<i>scaleDiv</i>	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

<i>value</i>	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

<i>intervalType</i>	Interval type
<i>format</i>	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

<i>timeSpec</i>	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

<i>seconds</i>	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

<i>week0Type</i>	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

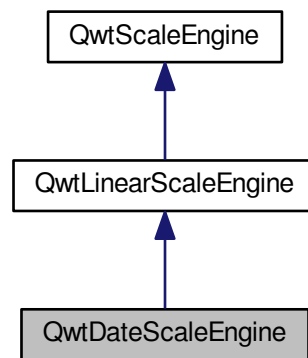
[setWeek0Type\(\)](#)

## 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 [toDate](#) (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. [QwtDateScaleEngine](#) 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 &amp; 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  $\geq$  Qt::Month. The first week of a year is defined like for [QwtDate::FirstThursday](#).

## Parameters

<i>timeSpec</i>	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

<i>dateTime</i>	Date/time value
<i>stepSize</i>	Step size
<i>intervalType</i>	Interval type
<i>up</i>	When true <i>dateTime</i> 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

<i>maxNumSteps</i>	Max. number of steps
<i>x1</i>	First limit of the interval (In/Out)
<i>x2</i>	Second limit of the interval (In/Out)
<i>stepSize</i>	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

<i>x1</i>	First interval limit
<i>x2</i>	Second interval limit
<i>maxMajorSteps</i>	Maximum for the number of major steps
<i>maxMinorSteps</i>	Maximum number of minor steps
<i>stepSize</i>	Step size. If <code>stepSize == 0</code> , the <code>scaleEngine</code> 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

<i>minDate</i>	Minimum ( = earlier ) of the interval
<i>maxDate</i>	Maximum ( = later ) of the interval
<i>maxSteps</i>	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

<i>weeks</i>	Upper limit for the number of weeks
--------------	-------------------------------------

Note

In business charts a year is often divided 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

<i>timeSpec</i>	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

<i>seconds</i>	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



<i>week0Type</i>	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

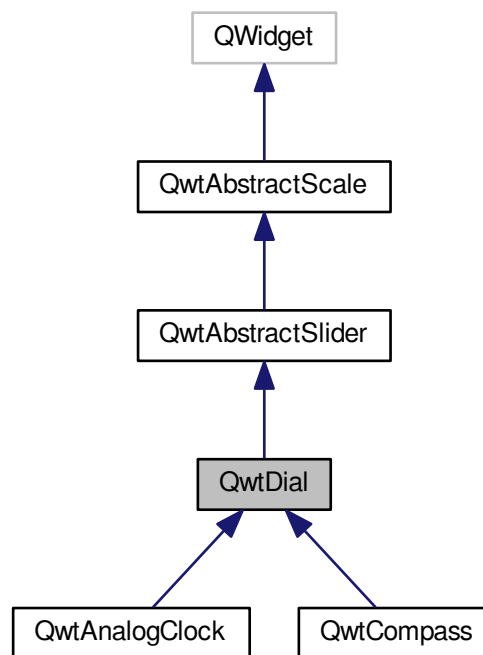
[setWeek0Type\(\)](#), [maxWeeks\(\)](#)

## 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

<i>parent</i>	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**

<i>event</i>	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**

<i>painter</i>	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**

<i>painter</i>	Painter
----------------	---------

**12.27.4.5** `void QwtDial::drawFrame ( QPainter * painter )` [protected],[virtual]

Draw the frame around the dial

**Parameters**

<i>painter</i>	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

<i>painter</i>	Painter
<i>center</i>	Center of the dial
<i>radius</i>	Length for the needle
<i>direction</i>	Direction of the needle in degrees, counter clockwise
<i>colorGroup</i>	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

<i>painter</i>	Painter
<i>center</i>	Center of the dial
<i>radius</i>	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

<i>painter</i>	Painter
<i>center</i>	Center of the contents circle
<i>radius</i>	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

<i>pos</i>	Mouse position
------------	----------------

## Return values

<i>True, when</i>	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

<i>event</i>	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

<i>pos</i>	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

<i>shadow</i>	Frame shadow
---------------	--------------

#### See Also

[setLineWidth\(\)](#), [QFrame::setFrameShadow\(\)](#)

12.27.4.28 `void QwtDial::setLineWidth ( int lineWidth )`

Sets the line width of the frame

#### Parameters

<i>lineWidth</i>	Line width
------------------	------------

#### See Also

[setFrameShadow\(\)](#)

12.27.4.29 `void QwtDial::setMaxScaleArc ( double max )`

Set the upper limit for the scale arc

## Parameters

<i>max</i>	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

<i>min</i>	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

<i>mode</i>	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

<i>needle</i>	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

<i>origin</i>	New origin
---------------	------------

## See Also

[origin\(\)](#)

12.27.4.34 void QwtDial::setScaleArc ( double *minArc*, double *maxArc* )

Change the arc of the scale

## Parameters

<i>minArc</i>	Lower limit
<i>maxArc</i>	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

<i>scaleDraw</i>	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

<i>event</i>	Wheel event
--------------	-------------

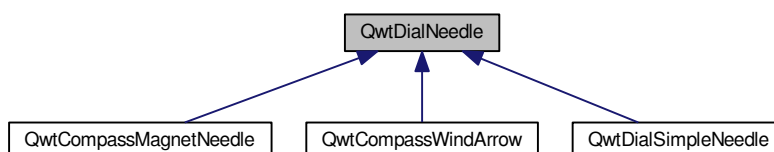
Reimplemented from [QwtAbstractSlider](#).

## 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::ColorGroup=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

<i>painter</i>	Painter
<i>center</i>	Center of the dial, start position for the needle
<i>length</i>	Length of the needle
<i>direction</i>	Direction of the needle, in degrees counter clockwise
<i>colorGroup</i>	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

<i>painter</i>	Painter
<i>length</i>	Length of the needle
<i>colorGroup</i>	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

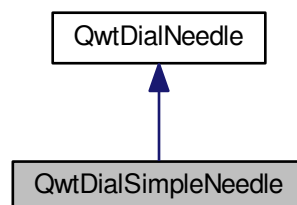
<i>palette</i>	New Palette
----------------	-------------

## 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 &amp; 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

<i>style</i>	Style
<i>hasKnob</i>	With/Without knob
<i>mid</i>	Middle color
<i>base</i>	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

<i>painter</i>	Painter
<i>length</i>	Length of the needle
<i>colorGroup</i>	Color group, used for painting

Implements [QwtDialNeedle](#).

#### 12.29.4.2 void QwtDialSimpleNeedle::setWidth ( double *width* )

Set the width of the needle

## Parameters

<i>width</i>	Width
--------------	-------

## See Also

[width\(\)](#)

#### 12.29.4.3 double QwtDialSimpleNeedle::width ( ) const

## Returns

the width of the needle

## See Also

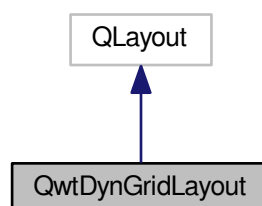
[setWidth\(\)](#)

## 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

<i>parent</i>	Parent widget
<i>margin</i>	Margin
<i>spacing</i>	Spacing

**12.30.2.2** [QwtDynGridLayout::QwtDynGridLayout](#) ( int *spacing* = -1 ) [explicit]



## Parameters

<i>spacing</i>	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

<i>item</i>	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

<i>width</i>	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

<i>index</i>	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

<i>numColumns</i>	Number of columns.
<i>rowHeight</i>	Array where to fill in the calculated row heights.
<i>colWidth</i>	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

<i>rect</i>	Rect where to place the items
-------------	-------------------------------

<i>numColumns</i>	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

<i>expanding</i>	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

<i>rect</i>	Layout geometry
-------------	-----------------

**12.30.3.18** void QwtDynGridLayout::setMaxColumns ( uint *maxColumns* )

Limit the number of columns.

## Parameters

<i>maxColumns</i>	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

<i>rect</i>	Bounding rectangle
<i>numColumns</i>	Number of columns
<i>rowHeight</i>	Array to be filled with the calculated row heights
<i>colWidth</i>	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

<i>index</i>	Index
--------------	-------

## Returns

Layout item, removed from the layout

## See Also

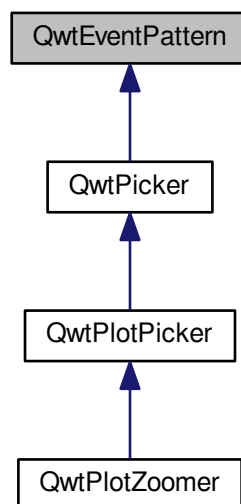
[itemAt\(\)](#)

## 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](#) > &)
- void [setKeyPattern](#) (const QVector< [KeyPattern](#) > &)  
*Change the mouse event patterns.*
- const QVector< [MousePattern](#) > & [mousePattern](#) () const  
*Change the key event patterns.*
- 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

<i>numButtons</i>	Number of mouse buttons ( $\leq 3$ )
-------------------	--------------------------------------

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

<i>code</i>	Index of the event pattern
<i>event</i>	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

<i>pattern</i>	Key event pattern
<i>event</i>	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

<i>code</i>	Index of the event pattern
<i>event</i>	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

<i>pattern</i>	Mouse event pattern
<i>event</i>	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

<i>pattern</i>	Index of the pattern
<i>key</i>	Key
<i>modifiers</i>	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

<i>pattern</i>	Index of the pattern
<i>button</i>	Button
<i>modifiers</i>	Keyboard modifiers

## See Also

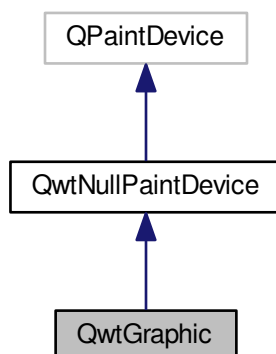
QMouseEvent

## 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 too 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

<i>other</i>	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/pixmapes.

## 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**

<i>rect</i>	target rectangle
<i>image</i>	Image to be painted
<i>subRect</i>	Rectangle of the pixmap to be painted
<i>flags</i>	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**

<i>path</i>	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**

<i>rect</i>	target rectangle
<i>pixmap</i>	Pixmap to be painted
<i>subRect</i>	Rectangle 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

<i>other</i>	Source
--------------	--------

## Returns

A reference of this object

12.32.5.11 void QwtGraphic::render ( QPainter \* *painter* ) const

Replay all recorded painter commands.

## Parameters

<i>painter</i>	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

<i>painter</i>	Qt painter
<i>size</i>	Size for the scaled graphic
<i>aspectRatio-Mode</i>	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

<i>painter</i>	Qt painter
<i>rect</i>	Rectangle for the scaled graphic
<i>aspectRatio-Mode</i>	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

<i>painter</i>	Qt painter
<i>pos</i>	Reference point, where to render
<i>alignment</i>	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

<i>sx</i>	Horizontal scaling factor
<i>sy</i>	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

<i>commands</i>	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

<i>size</i>	Default size
-------------	--------------

See Also

[defaultSize\(\)](#), [boundingRect\(\)](#)

#### 12.32.5.19 void QwtGraphic::setRenderHint ( RenderHint *hint*, bool *on* = true )

Toggle an render hint

## Parameters

<i>hint</i>	Render hint
<i>on</i>	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

<i>hint</i>	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

<i>size</i>	Size of the image
<i>aspectRatio-Mode</i>	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

<i>size</i>	Size of the image
<i>aspectRatio-Mode</i>	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

<i>state</i>	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, [ExcludeBorders](#) = [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

<i>minValue</i>	Minimum value
<i>maxValue</i>	Maximum value
<i>borderFlags</i>	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

<i>value</i>	Value
--------------	-------

## Returns

true, if value  $\geq$  [minValue\(\)](#) && value  $\leq$  [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

<i>value</i>	Value
--------------	-------

## Returns

extended interval

## See Also

[isValid\(\)](#)

12.33.4.4 **QwtInterval** QwtInterval::intersect ( const QwtInterval & *other* ) const

Intersect 2 intervals.

## Parameters

<i>other</i>	Interval to be intersect with
--------------	-------------------------------

## Returns

Intersection

12.33.4.5 `bool QwtInterval::intersects ( const QwtInterval & other ) const`

Test if two intervals overlap.

## Parameters

<i>other</i>	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

<i>lowerBound</i>	Lower limit
<i>upperBound</i>	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

<i>other</i>	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

<i>other</i>	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

<i>other</i>	Interval to be intersected with
--------------	---------------------------------

## Returns

This interval

12.33.4.17 `bool QwtInterval::operator==( const QwtInterval & other ) const` `[inline]`

Compare two intervals.

## Parameters

<i>other</i>	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

<i>other</i>	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

<i>value</i>	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

<i>other</i>	Interval to be united with
--------------	----------------------------

## Returns

This interval

12.33.4.21 QwtInterval & QwtInterval::operator|= ( double *value* )

Extend an interval

## Parameters

<i>value</i>	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

<i>borderFlags</i>	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

<i>minValue</i>	Minimum value
<i>maxValue</i>	Maximum value
<i>borderFlags</i>	Include/Exclude borders

12.33.4.24 void QwtInterval::setMaxValue ( double *maxValue* ) [inline]

Assign the upper limit of the interval

## Parameters

<i>maxValue</i>	Maximum value
-----------------	---------------

12.33.4.25 void QwtInterval::setMinValue ( double *minValue* ) [inline]

Assign the lower limit of the interval

## Parameters

<i>minValue</i>	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

<i>value</i>	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](#) ()  
*Constructor.*
- [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 &amp; Destructor Documentation

## 12.34.2.1 QwtIntervalSample::QwtIntervalSample ( ) [inline]

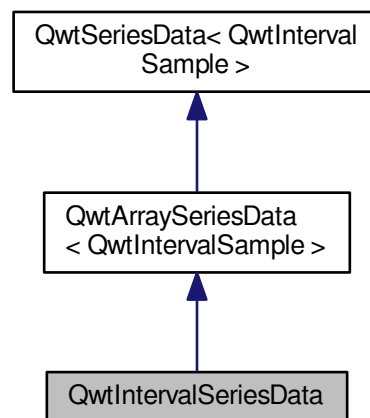
Constructor The value is set to 0.0, the interval is invalid

## 12.35 QwtIntervalSeriesData Class Reference

Interface for iterating over an array of intervals.

```
#include <qwt_series_data.h>
```

Inheritance diagram for QwtIntervalSeriesData:



## 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 &amp; Destructor Documentation



12.35.2.1 `QwtIntervalSeriesData::QwtIntervalSeriesData ( const QVector< QwtIntervalSample > & samples =  
QVector<QwtIntervalSample> () )`

Constructor

## Parameters

<i>samples</i>	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  $\geq$  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( Style style = NoSymbol )`

Constructor

Parameters

<i>style</i>	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

<i>painter</i>	Painter
<i>orientation</i>	Orientation
<i>from</i>	Start point of the interval in target device coordinates
<i>to</i>	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

<i>brush</i>	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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	Pen style

## See Also

[pen\(\)](#), [brush\(\)](#)

12.36.4.6 `void QwtIntervalSymbol::setPen ( const QPen & pen )`

Assign a pen

## Parameters

<i>pen</i>	Pen
------------	-----

## See Also

[pen\(\)](#), [setBrush\(\)](#)

## 12.36.4.7 void QwtIntervalSymbol::setStyle ( Style style )

Specify the symbol style

## Parameters

<i>style</i>	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

<i>width</i>	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

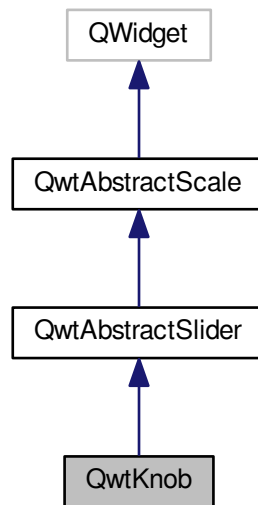
[setWidth\(\)](#), [setStyle\(\)](#)

## 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 &amp; 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

<i>parent</i>	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**

<i>event</i>	Change event
--------------	--------------

**12.37.4.3** `void QwtKnob::drawFocusIndicator ( QPainter * painter ) const` [protected], [virtual]

Draw the focus indicator

**Parameters**

<i>painter</i>	Painter
----------------	---------

**12.37.4.4** `void QwtKnob::drawKnob ( QPainter * painter, const QRectF & knobRect ) const` [protected], [virtual]

Draw the knob.

**Parameters**

<i>painter</i>	painter
<i>knobRect</i>	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**

<i>painter</i>	Painter
<i>rect</i>	Bounding rectangle of the knob without scale
<i>angle</i>	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**

<i>pos</i>	Mouse position
------------	----------------

**Return values**

<i>True, when</i>	<i>pos</i> is inside the circle of the knob.
-------------------	--

**See Also**

[scrollTo\(\)](#)

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

<i>event</i>	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

<i>pos</i>	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

<i>alignment</i>	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

<i>borderWidth</i>	new border width
--------------------	------------------

12.37.4.19 void QwtKnob::setKnobStyle ( KnobStyle knobStyle )

Set the knob type.

## Parameters

<i>knobStyle</i>	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

<i>width</i>	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  $\leq 0$  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

<i>markerStyle</i>	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

<i>angle</i>	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

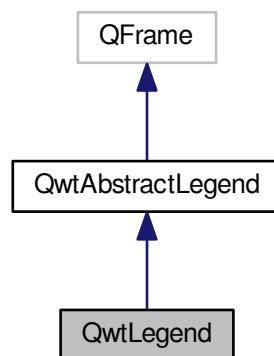
[setTotalAngle\(\)](#), [setNumTurns\(\)](#), [numTurns\(\)](#)

## 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 numColumns)  
*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

<i>parent</i>	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

<i>itemInfo</i>	Info for the item of the selected legend label
<i>index</i>	Index of the legend label in the list of widgets that are associated with the plot item
<i>on</i>	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

<i>itemInfo</i>	Info for the item item of the selected legend item
<i>index</i>	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

<i>data</i>	Attributes of the legend entry
-------------	--------------------------------

## Returns

Widget representing data on the legend

## Note

[updateWidget\(\)](#) will be 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 and QEvent::LayoutRequest events for the [contentsWidget\(\)](#).

## Parameters

<i>object</i>	Object to be filtered
<i>event</i>	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

<i>width</i>	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

<i>widget</i>	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

<i>itemInfo</i>	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

<i>itemInfo</i>	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

<i>painter</i>	Painter
<i>widget</i>	Widget representing a legend entry
<i>rect</i>	Bounding rectangle
<i>fillBackground</i>	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

<i>painter</i>	Painter
<i>rect</i>	Bounding rectangle
<i>fillBackground</i>	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

<i>orientation</i>	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

<i>mode</i>	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 *numColumns* )

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

<i>numColumns</i>	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

<i>itemInfo</i>	Info for an item
<i>data</i>	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

<i>widget</i>	Usually a <a href="#">QwtLegendLabel</a>
<i>data</i>	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 interpret 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

<i>role</i>	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

<i>role</i>	Attribute role
<i>data</i>	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

<i>map</i>	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

<i>role</i>	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

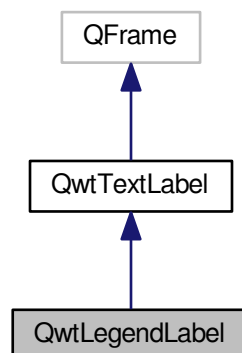
[setValues\(\)](#)

## 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

<i>parent</i>	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

<i>on</i>	check/uncheck
-----------	---------------

## See Also

[setItemMode\(\)](#)

12.40.3.5 `void QwtLegendLabel::setData ( const QwtLegendData & legendData )`

Set the attributes of the legend label

## Parameters

<i>legendData</i>	Attributes of the label
-------------------	-------------------------

## See Also

[data\(\)](#)

12.40.3.6 `void QwtLegendLabel::setIcon ( const QPixmap & icon )`

Assign the icon

## Parameters

<i>icon</i>	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

<i>mode</i>	Item mode
-------------	-----------

## See Also

[itemMode\(\)](#)

## 12.40.3.8 void QwtLegendLabel::setSpacing ( int spacing )

Change the spacing between icon and text.

## Parameters

<i>spacing</i>	Spacing
----------------	---------

## See Also

[spacing\(\)](#), [QwtTextLabel::margin\(\)](#)

## 12.40.3.9 void QwtLegendLabel::setText ( const QwtText &amp; text ) [virtual]

Set the text to the legend item

## Parameters

<i>text</i>	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

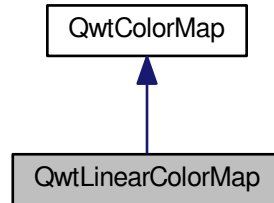
[setSpacing\(\)](#), [QwtTextLabel::margin\(\)](#)

## 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

<i>format</i>	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

<i>color1</i>	Color used for the minimum value of the value interval
<i>color2</i>	Color used for the maximum value of the value interval
<i>format</i>	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

<i>value</i>	Value between [0.0, 1.0]
<i>color</i>	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

<i>interval</i>	Range for all values
<i>value</i>	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

<i>interval</i>	Range for all values
<i>value</i>	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

<i>color1</i>	Color used for the minimum value of the value interval
<i>color2</i>	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

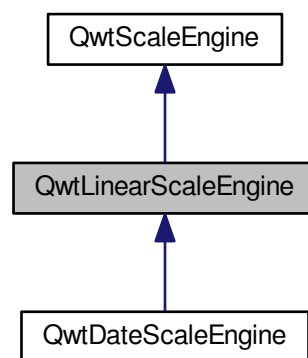
[mode\(\)](#)

## 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

<i>base</i>	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

<i>interval</i>	Interval
<i>stepSize</i>	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

<i>maxNumSteps</i>	Max. number of steps
<i>x1</i>	First limit of the interval (In/Out)
<i>x2</i>	Second limit of the interval (In/Out)
<i>stepSize</i>	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

<i>interval</i>	Interval
<i>stepSize</i>	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

<i>majorTicks</i>	Major ticks
<i>maxMinorSteps</i>	Maximum number of minor steps
<i>stepSize</i>	Step size
<i>minorTicks</i>	Array to be filled with the calculated minor ticks
<i>mediumTicks</i>	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

<i>interval</i>	Interval
<i>stepSize</i>	Step size
<i>maxMinorSteps</i>	Maximum number of minor steps
<i>ticks</i>	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**

<i>x1</i>	First interval limit
<i>x2</i>	Second interval limit
<i>maxMajorSteps</i>	Maximum for the number of major steps
<i>maxMinorSteps</i>	Maximum number of minor steps
<i>stepSize</i>	Step size. If <code>stepSize == 0</code> , the engine calculates one.

**Returns**

Calculated scale division

Implements [QwtScaleEngine](#).

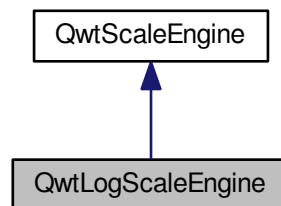
Reimplemented in [QwtDateScaleEngine](#).

**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 `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

### 12.43.1 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

<i>base</i>	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

<i>interval</i>	Interval
<i>stepSize</i>	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

<i>maxNumSteps</i>	Max. number of steps
<i>x1</i>	First limit of the interval (In/Out)
<i>x2</i>	Second limit of the interval (In/Out)
<i>stepSize</i>	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

<i>interval</i>	Interval
<i>stepSize</i>	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

<i>majorTicks</i>	Major ticks
<i>maxMinorSteps</i>	Maximum number of minor steps
<i>stepSize</i>	Step size
<i>minorTicks</i>	Array to be filled with the calculated minor ticks
<i>mediumTicks</i>	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

<i>interval</i>	Interval
<i>maxMinorSteps</i>	Maximum number of minor steps
<i>stepSize</i>	Step size
<i>ticks</i>	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

<i>x1</i>	First interval limit
<i>x2</i>	Second interval limit
<i>maxMajorSteps</i>	Maximum for the number of major steps
<i>maxMinorSteps</i>	Maximum number of minor steps
<i>stepSize</i>	Step size. If <i>stepSize</i> == 0, the engine calculates one.

## Returns

Calculated scale division

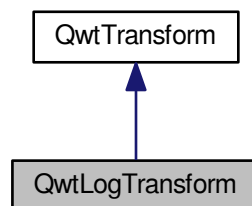
Implements [QwtScaleEngine](#).

## 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 [QwtLogTransform](#) 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

<i>value</i>	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

<i>value</i>	Value to be transformed
--------------	-------------------------

#### Returns

`exp( value )`

Implements [QwtTransform](#).

12.44.2.4 `double QwtLogTransform::transform ( double value ) const` [virtual]

#### Parameters

<i>value</i>	Value to be transformed
--------------	-------------------------

#### Returns

`log( value )`

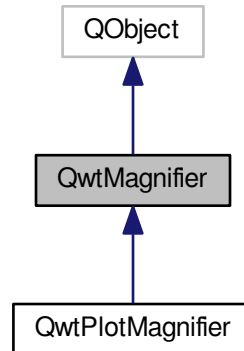
Implements [QwtTransform](#).

## 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 [widgetMouseEvent](#) (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 &amp; Destructor Documentation

12.45.2.1 [QwtMagnifier::QwtMagnifier](#) ( [QWidget](#) \* *parent* ) [explicit]

Constructor

Parameters

<i>parent</i>	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

<i>object</i>	Object to be filtered
<i>event</i>	Event

Returns

Forwarded to [QObject::eventFilter\(\)](#)

See Also

[widgetMouseEvent\(\)](#), [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

<i>key</i>	Key code, see Qt::Key
<i>modifiers</i>	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

<i>key</i>	Key code, see Qt::Key
<i>modifiers</i>	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

<i>factor</i>	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

<i>on</i>	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

<i>factor</i>	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

<i>button</i>	Button
<i>modifiers</i>	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

<i>factor</i>	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

<i>factor</i>	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

<i>modifiers</i>	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

<i>key</i>	
<i>modifiers</i>	

#### 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

<i>key</i>	
<i>modifiers</i>	

#### 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

<i>keyEvent</i>	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

<i>keyEvent</i>	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

<i>mouseEvent</i>	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

<i>mouseEvent</i>	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

<i>mouseEvent</i>	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

<i>wheelEvent</i>	Wheel event
-------------------	-------------

## See Also

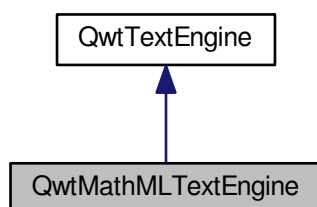
[eventFilter\(\)](#)

## 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

<i>painter</i>	Painter
<i>rect</i>	Clipping rectangle
<i>flags</i>	Bitwise OR of the flags like in for QPainter::drawText
<i>text</i>	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

<i>font</i>	Font of the text
-------------	------------------



<i>flags</i>	Bitwise OR of the flags used like in QPainter::drawText
<i>text</i>	Text to be rendered
<i>width</i>	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**

<i>text</i>	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**

<i>left</i>	Return 0
<i>right</i>	Return 0
<i>top</i>	Return 0
<i>bottom</i>	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**

<i>font</i>	Font of the text
<i>flags</i>	Bitwise OR of the flags used like in QPainter::drawText
<i>text</i>	Text to be rendered

**Returns**

Calculated size

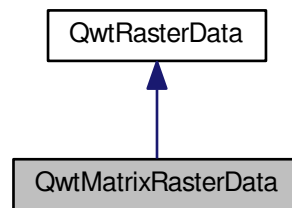
Implements [QwtTextEngine](#).

**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

<i>area</i>	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

<i>axis</i>	X, Y or Z axis
<i>interval</i>	Interval

## See Also

[QwtRasterData::interval\(\)](#), [setValueMatrix\(\)](#)

Reimplemented from [QwtRasterData](#).

12.47.3.6 void QwtMatrixRasterData::setResampleMode ( ResampleMode *mode* )

Set the resampling algorithm.

## Parameters

<i>mode</i>	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

<i>row</i>	Row index
<i>col</i>	Column index
<i>value</i>	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

<i>values</i>	Vector of values
<i>numColumns</i>	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

<i>x</i>	X value in plot coordinates
<i>y</i>	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

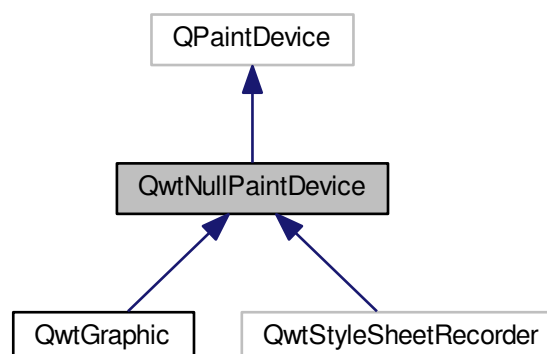
[setValueMatrix\(\)](#), [numColumns\(\)](#), [numRows\(\)](#), [setInterval\(\)](#)

## 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

<i>deviceMetric</i>	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

<i>mode</i>	New mode
-------------	----------

See Also

[mode\(\)](#)

12.48.3.4 virtual QSize QwtNullPaintDevice::sizeMetrics ( ) const [protected],[pure virtual]

Returns

Size needed to implement [metric\(\)](#)

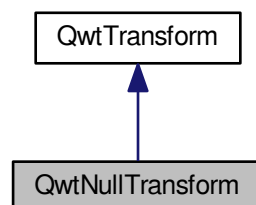
Implemented in [QwtGraphic](#).

## 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

<i>value</i>	Value to be transformed
--------------	-------------------------

Returns

value unmodified

Implements [QwtTransform](#).

##### 12.49.2.3 double [QwtNullTransform::transform](#) ( double value ) const [virtual]

Parameters

<i>value</i>	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 &amp; 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

<i>t</i>	Time value
<i>o</i>	Open value
<i>h</i>	High value
<i>l</i>	Low value
<i>c</i>	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 [drawPolyline](#) (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 [drawBackground](#) (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

<i>widget</i>	Widget, for which the backinstore is intended
<i>size</i>	Size of the pixmap

#### 12.51.2.2 void QwtPainter::drawBackground ( QPainter \* *painter*, const QRectF & *rect*, const QWidget \* *widget* ) [static]

Fill rect with the background of a widget

##### Parameters

<i>painter</i>	Painter
<i>rect</i>	Rectangle to be filled
<i>widget</i>	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

<i>painter</i>	Painter
<i>colorMap</i>	Color map
<i>interval</i>	Value range
<i>scaleMap</i>	Scale map
<i>orientation</i>	Orientation
<i>rect</i>	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

<i>painter</i>	Painter
<i>rect</i>	Frame rectangle

<i>palette</i>	Palette
<i>foregroundRole</i>	Foreground role used for QFrame::Plain
<i>frameWidth</i>	Frame width
<i>midLineWidth</i>	Used for QFrame::Box
<i>frameStyle</i>	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

<i>painter</i>	Painter
<i>rect</i>	Frame rectangle
<i>xRadius</i>	x-radius of the ellipses defining the corners
<i>yRadius</i>	y-radius of the ellipses defining the corners
<i>palette</i>	QPalette::WindowText is used for plain borders QPalette::Dark and QPalette::Light for raised or sunken borders
<i>lineWidth</i>	Line width
<i>frameStyle</i>	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

<i>painter</i>	Painter
<i>rect</i>	Frame rectangle
<i>palette</i>	QPalette::WindowText is used for plain borders QPalette::Dark and QPalette::Light for raised or sunken borders
<i>lineWidth</i>	Line width
<i>frameStyle</i>	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

<i>painter</i>	Painter
<i>rect</i>	Target rectangle
<i>flags</i>	Alignments/Text flags, see QPainter::drawText()
<i>text</i>	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

<i>widget</i>	Widget
<i>pixmap</i>	Pixmap to be filled
<i>offset</i>	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

<i>painter</i>	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

<i>painter</i>	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  $\geq$  Qt 5.0 when drawing an antialiased polyline with a pen width  $\geq 2$ .

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::ImageConversionFlags)
- [QwtPainterCommand](#) (const QPaintEngineState &)
- [~QwtPainterCommand](#) ()  
*Destructor.*
- [QwtPainterCommand](#) & operator= (const [QwtPainterCommand](#) &)
- [Type](#) type () const
- QPainterPath \* [path](#) ()
- const QPainterPath \* [path](#) () const
- QPixmapData \* [pixmapData](#) ()
- const QPixmapData \* [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 &amp; Destructor Documentation

12.52.3.1 [QwtPainterCommand::QwtPainterCommand](#) ( const [QwtPainterCommand](#) & *other* )

Copy constructor

## Parameters

<i>other</i>	Command to be copied
--------------	----------------------

### 12.52.3.2 QwtPainterCommand::QwtPainterCommand ( const QRectF & *rect*, const QPixmap & *pixmap*, const QRectF & *subRect* )

Constructor for QPixmap paint operation

## Parameters

<i>rect</i>	Target rectangle
<i>pixmap</i>	Pixmap
<i>subRect</i>	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

<i>rect</i>	Target rectangle
<i>image</i>	Image
<i>subRect</i>	Rectangle inside the image
<i>flags</i>	Conversion flags

## See Also

QPainter::drawImage()

### 12.52.3.4 QwtPainterCommand::QwtPainterCommand ( const QPaintEngineState & *state* )

Constructor for State paint operation

## Parameters

<i>state</i>	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**

<i>other</i>	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**

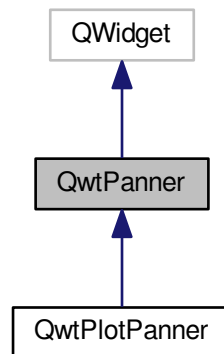
Type of the command

**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 panning 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

<i>parent</i>	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

<i>object</i>	Object to be filtered
<i>event</i>	Event

Returns

Always false, beside for paint events for the parent widget.

See Also

[widgetMouseEvent\(\)](#), [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

<i>dx</i>	Offset in horizontal direction
<i>dy</i>	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

<i>pe</i>	Paint event
-----------	-------------

**12.53.3.9** `void QwtPanner::panned ( int dx, int dy )` `[signal]`

Signal emitted, when panning is done

## Parameters

<i>dx</i>	Offset in horizontal direction
<i>dy</i>	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

<i>key</i>	Key ( See Qt::Keycode )
<i>modifiers</i>	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

<i>cursor</i>	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

<i>on</i>	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

<i>keyEvent</i>	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

<i>keyEvent</i>	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

<i>mouseEvent</i>	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

<i>mouseEvent</i>	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

<i>mouseEvent</i>	Mouse event
-------------------	-------------

## See Also

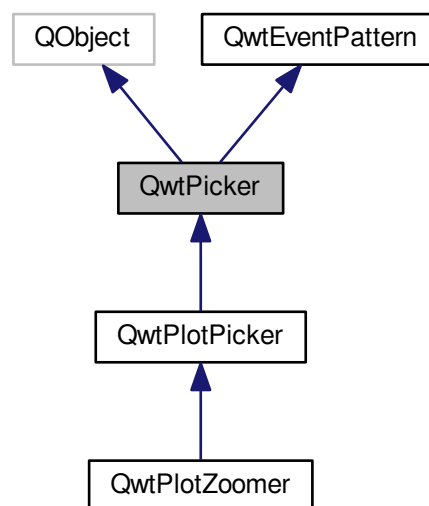
[eventFilter\(\)](#), [widgetMouseEvent\(\)](#), [widgetMouseMoveEvent\(\)](#),

## 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 [widgetMouseEvent](#) (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 AlwaysOn.

### 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  $\geq$  `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

<i>parent</i>	Parent widget, that will be observed
---------------	--------------------------------------

### 12.54.3.2 `QwtPicker::QwtPicker ( RubberBand rubberBand, DisplayMode trackerMode, QWidget * parent )` `[explicit]`

Constructor

Parameters

<i>rubberBand</i>	Rubber band style
<i>trackerMode</i>	Tracker mode
<i>parent</i>	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

<i>selection</i>	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

<i>on</i>	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

<i>points</i>	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

<i>pos</i>	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

<i>pos</i>	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

<i>selection</i>	Changed selection
------------------	-------------------

## See Also

[stretchSelection\(\)](#)

12.54.4.8 `void QwtPicker::drawRubberBand ( QPainter * painter ) const` [virtual]

Draw a rubber band, depending on [rubberBand\(\)](#)

## Parameters

<i>painter</i>	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

<i>painter</i>	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

<i>ok</i>	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

<i>object</i>	Object to be filtered
<i>event</i>	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

<i>pos</i>	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

<i>pos</i>	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

<i>pos</i>	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::SizeMode QwtPicker::resizeMode ( )` const

Returns

Resize mode

See Also

[setSizeMode\(\)](#), [SizeMode](#)

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

<i>polygon</i>	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

<i>enabled</i>	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

<i>mode</i>	Resize mode
-------------	-------------

##### See Also

[resizeMode\(\)](#), [ResizeMode](#)

#### 12.54.4.30 void QwtPicker::setRubberBand ( **RubberBand** *rubberBand* )

Set the rubber band style

## Parameters

<i>rubberBand</i>	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

<i>pen</i>	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

<i>stateMachine</i>	State machine
---------------------	---------------

## See Also

[stateMachine\(\)](#)

12.54.4.33 void QwtPicker::setTrackerFont ( const QFont & *font* )

Set the font for the tracker

## Parameters

<i>font</i>	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

<i>mode</i>	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

<i>pen</i>	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

<i>oldSize</i>	Previous size
<i>newSize</i>	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

<i>font</i>	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

<i>pos</i>	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

<i>event</i>	Event
--------------	-------

**12.54.4.47** void QwtPicker::widgetEnterEvent ( QEvent \* *event* ) [protected],[virtual]

Handle a enter event for the observed widget.

## Parameters

<i>event</i>	Qt event
--------------	----------

## See Also

[eventFilter\(\)](#), [widgetMouseEvent\(\)](#), [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

<i>keyEvent</i>	Key event
-----------------	-----------

## See Also

[eventFilter\(\)](#), [widgetMouseEvent\(\)](#), [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

<i>keyEvent</i>	Key event
-----------------	-----------

## See Also

[eventFilter\(\)](#), [widgetMouseEvent\(\)](#), [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

<i>event</i>	Qt event
--------------	----------

## See Also

[eventFilter\(\)](#), [widgetMouseEvent\(\)](#), [widgetMouseReleaseEvent\(\)](#), [widgetMouseDoubleClickEvent\(\)](#), [widgetWheelEvent\(\)](#), [widgetKeyPressEvent\(\)](#), [widgetKeyReleaseEvent\(\)](#)



12.54.4.51 `void QwtPicker::widgetMouseEvent ( QMouseEvent * mouseEvent )` [protected],  
[virtual]

Handle mouse double click event for the observed widget.

## Parameters

<i>mouseEvent</i>	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

<i>mouseEvent</i>	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

<i>mouseEvent</i>	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

<i>mouseEvent</i>	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

<i>wheelEvent</i>	Wheel event
-------------------	-------------

## See Also

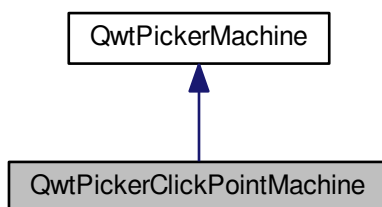
[eventFilter\(\)](#), [widgetMouseEvent\(\)](#), [widgetMouseReleaseEvent\(\)](#), [widgetMouseDoubleClickEvent\(\)](#), [widgetMouseMoveEvent\(\)](#), [widgetKeyPressEvent\(\)](#), [widgetKeyReleaseEvent\(\)](#)

## 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

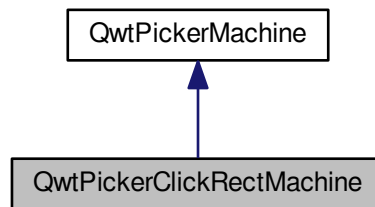
[QwtEventPattern::MousePatternCode](#), [QwtEventPattern::KeyPatternCode](#)

## 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

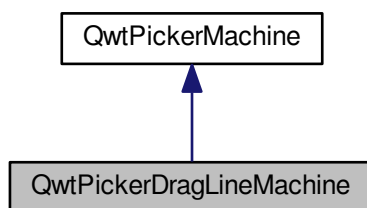
[QwtEventPattern::MousePatternCode](#), [QwtEventPattern::KeyPatternCode](#)

## 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 [QwtEventPattern::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

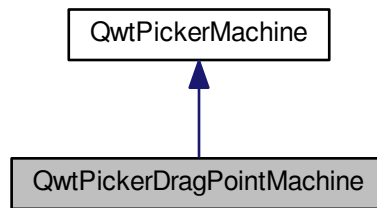
[QwtEventPattern::MousePatternCode](#), [QwtEventPattern::KeyPatternCode](#)

## 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.

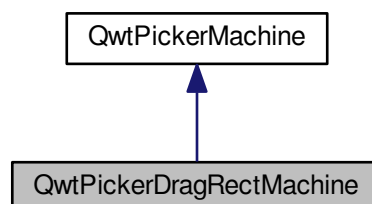
Pressing [QwtEventPattern::MouseSelect1](#) or [QwtEventPattern::KeySelect1](#) starts the selection, releasing [QwtEventPattern::MouseSelect1](#) or a second press of [QwtEventPattern::KeySelect1](#) terminates it.

## 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 [QwtEventPattern::KeySelect1](#) also selects the first point, a second press selects the second point and terminates the selection.

## See Also

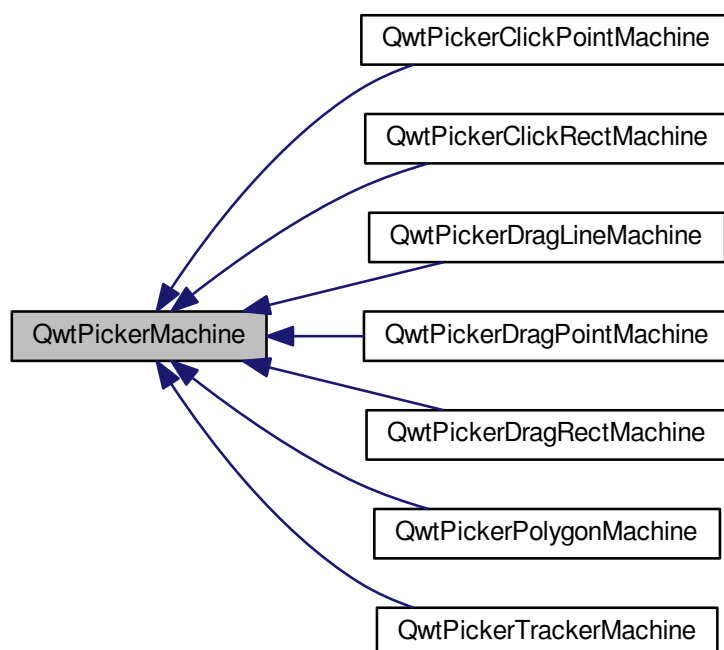
[QwtEventPattern::MousePatternCode](#), [QwtEventPattern::KeyPatternCode](#)

## 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).

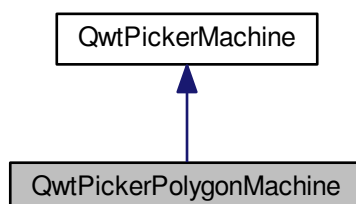


## 12.61 QwtPickerPolygonMachine Class Reference

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

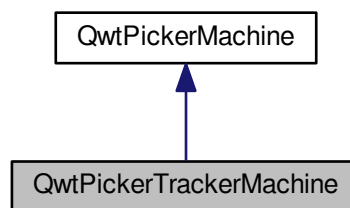
[QwtEventPattern::MousePatternCode](#), [QwtEventPattern::KeyPatternCode](#)

## 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.

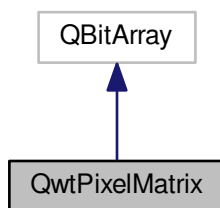
[QwtPickerTrackerMachine](#) supports displaying information corresponding to mouse movements, but is not intended for selecting anything. Begin/End are related to Enter/Leave events.

## 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

<i>rect</i>	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

<i>x</i>	X-coordinate
<i>y</i>	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

<i>rect</i>	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

<i>x</i>	X-coordinate
<i>y</i>	Y-coordinate
<i>on</i>	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

<i>x</i>	X-coordinate
<i>y</i>	Y-coordinate

## Returns

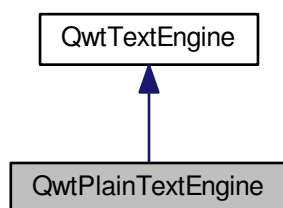
true, when pos is outside of [rect\(\)](#), or when the pixel has already been set.

## 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

<i>painter</i>	Painter
<i>rect</i>	Clipping rectangle

<i>flags</i>	Bitwise OR of the flags used like in QPainter::drawText
<i>text</i>	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

<i>font</i>	Font of the text
<i>flags</i>	Bitwise OR of the flags used like in QPainter::drawText
<i>text</i>	Text to be rendered
<i>width</i>	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

<i>font</i>	Font of the text
<i>left</i>	Return 0
<i>right</i>	Return 0
<i>top</i>	Return value for the top margin
<i>bottom</i>	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

<i>font</i>	Font of the text
<i>flags</i>	Bitwise OR of the flags used like in QPainter::drawText
<i>text</i>	Text to be rendered

Returns

Calculated size

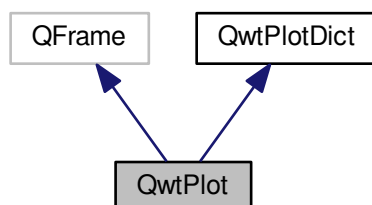
Implements [QwtTextEngine](#).

## 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](#) \*w=NULL)  
*Constructor.*
- [QwtPlot](#) (const [QwtText](#) &title, [QWidget](#) \*w=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 been 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

<i>parent</i>	Parent widget
---------------	---------------

#### 12.65.3.2 QwtPlot::QwtPlot ( const QwtText & *title*, QWidget \* *parent* = NULL ) [explicit]

Constructor.

Parameters

<i>title</i>	Title text
<i>parent</i>	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

<i>axisId</i>	Axis index
---------------	------------

12.65.4.4 `bool QwtPlot::axisEnabled ( int axisId ) const`

## Returns

True, if a specified axis is enabled

## Parameters

<i>axisId</i>	Axis index
---------------	------------

12.65.4.5 `QFont QwtPlot::axisFont ( int axisId ) const`

## Returns

The font of the scale labels for a specified axis

## Parameters

<i>axisId</i>	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

<i>axisId</i>	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

<i>axisId</i>	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

<i>axisId</i>	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

<i>axisId</i>	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

<i>axisId</i>	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

<i>axisId</i>	Axis index
---------------	------------

## Returns

Specified `scaleDraw` for axis, or NULL if axis is invalid.

12.65.4.12 **QwtScaleEngine \* QwtPlot::axisScaleEngine ( int *axisId* )**

## Parameters

<i>axisId</i>	Axis index
---------------	------------

## Returns

Scale engine for a specific axis

12.65.4.13 **const QwtScaleEngine \* QwtPlot::axisScaleEngine ( int *axisId* ) const**

## Parameters

<i>axisId</i>	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

<i>axisId</i>	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

<i>axisId</i>	Axis index
---------------	------------

**12.65.4.16 bool QwtPlot::axisValid ( int *axisId* ) [static], [protected]**

## Returns

true if the specified axis exists, otherwise false

## Parameters

<i>axisId</i>	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

<i>axisId</i>	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

<i>axisId</i>	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

<i>axisId</i>	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

<i>painter</i>	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

<i>painter</i>	Painter used for drawing
<i>canvasRect</i>	Bounding rectangle where to paint
<i>maps</i>	<a href="#">QwtPlot::axisCnt</a> 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

<i>axisId</i>	Axis index
<i>tf</i>	true (enabled) or false (disabled)

**12.65.4.26** `bool QwtPlot::event ( QEvent * event )` [virtual]

Adds handling of layout requests.

## Parameters

<i>event</i>	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

<i>object</i>	Object to be filtered
<i>event</i>	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

<i>maps</i>	<a href="#">QwtPlot::axisCnt</a> maps, mapping between plot and paint device coordinates
<i>canvasRect</i>	Bounding rectangle where to paint
<i>left</i>	Return parameter for the left margin
<i>top</i>	Return parameter for the top margin
<i>right</i>	Return parameter for the right margin
<i>bottom</i>	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 been generated from [itemToInfo\(\)](#).

The default implementation simply tries to unwrap a [QwtPlotItem](#) pointer:

```
if ( itemInfo.canConvert<QwtPlotItem *>() )
    return qvariant_cast<QwtPlotItem *>( itemInfo );
```

## Parameters

<i>itemInfo</i>	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

<i>legend</i>	Legend
<i>pos</i>	The legend's position. For top/left position the number of columns will be limited to 1, otherwise it will be set to unlimited.
<i>ratio</i>	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 $\leq 0.0$ 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

<i>axisId</i>	Axis index
<i>pos</i>	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

<i>plotItem</i>	Plot item
<i>on</i>	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 reimplemented too.

```
QVariant itemInfo;
qVariantSetValue( itemInfo, plotItem );
```

## Parameters

<i>plotItem</i>	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

<i>itemInfo</i>	Info about a plot item, build from <a href="#">itemToInfo()</a>
-----------------	---

<i>data</i>	Attributes of the entries ( usually $\leq 1$ ) 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

<i>e</i>	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

<i>tf</i>	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

<i>axisId</i>	Axis index
<i>on</i>	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

<i>axisId</i>	Axis index
<i>font</i>	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

<i>axisId</i>	Axis index
<i>alignment</i>	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

<i>axisId</i>	Axis index
<i>rotation</i>	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

<i>axisId</i>	Axis index
<i>maxMajor</i>	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

<i>axisId</i>	Axis index
<i>maxMinor</i>	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

<i>axisId</i>	Axis index
<i>min</i>	Minimum of the scale
<i>max</i>	Maximum of the scale
<i>stepSize</i>	Major step size. If <code>step == 0</code> , the step size is calculated automatically using the <code>maxMajor</code> 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

<i>axisId</i>	Axis index
<i>scaleDiv</i>	Scale division

## See Also

[setAxisScale\(\)](#), [setAxisAutoScale\(\)](#)

12.65.4.54 void QwtPlot::setAxisScaleDraw ( int *axisId*, QwtScaleDraw \* *scaleDraw* )

Set a scale draw.

## Parameters

<i>axisId</i>	Axis index
<i>scaleDraw</i>	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

<i>axisId</i>	Axis index
<i>scaleEngine</i>	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

<i>axisId</i>	Axis index
<i>title</i>	axis title

**12.65.4.57** void [QwtPlot::setAxisTitle](#) ( int *axisId*, const [QwtText](#) & *title* )

Change the title of a specified axis.

## Parameters

<i>axisId</i>	Axis index
<i>title</i>	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

<i>canvas</i>	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

<i>brush</i>	New background brush
--------------	----------------------

## See Also

[canvasBackground\(\)](#)

12.65.4.60 void QwtPlot::setFooter ( const QString & *text* )

Change the text the footer

## Parameters

<i>text</i>	New text of the footer
-------------	------------------------

12.65.4.61 void QwtPlot::setFooter ( const QwtText & *text* )

Change the text the footer

## Parameters

<i>text</i>	New text of the footer
-------------	------------------------

12.65.4.62 void QwtPlot::setPlotLayout ( QwtPlotLayout \* *layout* )

Assign a new plot layout.

## Parameters

<i>layout</i>	Layout()
---------------	----------

## See Also

[plotLayout\(\)](#)

12.65.4.63 void QwtPlot::setTitle ( const QString & *title* )

Change the plot's title

## Parameters

<i>title</i>	New title
--------------	-----------

12.65.4.64 void QwtPlot::setTitle ( const QwtText & *title* )

Change the plot's title

Parameters

<i>title</i>	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

<i>axisId</i>	Axis index
<i>value</i>	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::divideScale\(\)](#) ) and assigned to scale widget.

When the scale boundaries have been assigned with [setAxisScale\(\)](#) a scale division is calculated ( [QwtScaleEngine::divideScale\(\)](#) ) 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

<i>plotItem</i>	Plot item
-----------------	-----------

See Also

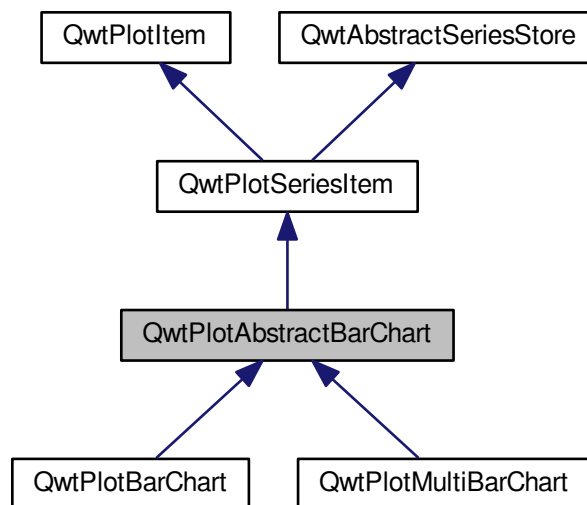
[QwtPlotItem::legendData\(\)](#), [legendDataChanged\(\)](#)

## 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

<i>title</i>	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

<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rectangle of the canvas in painter coordinates
<i>left</i>	Returns the left margin
<i>top</i>	Returns the top margin
<i>right</i>	Returns the right margin
<i>bottom</i>	Returns the bottom margin

## Returns

Margin

## See Also

[layoutPolicy\(\)](#), [layoutHint\(\)](#), [QwtPlotItem::Margins](#) [QwtPlot::getCanvasMarginsHint\(\)](#), [QwtPlot::updateCanvasMargins\(\)](#)

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

<i>map</i>	Scale map for the corresponding scale
<i>canvasSize</i>	Size of the canvas in paint device coordinates
<i>boundingSize</i>	Bounding size of the chart in plot coordinates ( used in AutoAdjustSamples mode )
<i>value</i>	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

<i>value</i>	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

<i>hint</i>	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

<i>policy</i>	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

<i>margin</i>	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

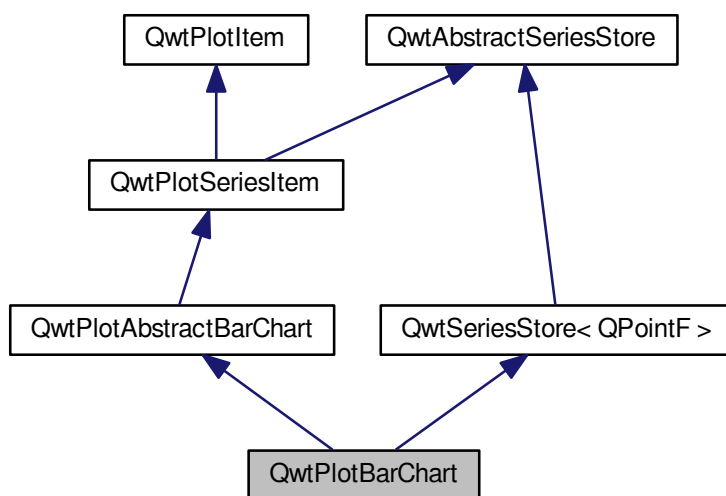
[setSpacing\(\)](#), [margin\(\)](#)

## 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\(\)](#), [QwtPlot-AbstractBarChart::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

<i>title</i>	Title of the curve
--------------	--------------------

#### 12.67.3.2 `QwtPlotBarChart::QwtPlotBarChart ( const QwtText & title ) [explicit]`

Constructor

Parameters

<i>title</i>	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

<i>sampleIndex</i>	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

<i>painter</i>	Painter
<i>sampleIndex</i>	Index of the sample represented by the bar

<i>sample</i>	Value of the sample
<i>rect</i>	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

<i>painter</i>	Painter
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rect of the canvas
<i>boundingInterval</i>	Bounding interval of sample values
<i>index</i>	Index of the sample
<i>sample</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rect of the canvas
<i>from</i>	Index of the first point to be painted
<i>to</i>	Index of the last point to be painted. If <i>to</i> < 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

<i>index</i>	Index of the legend entry
<i>size</i>	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

<i>mode</i>	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

<i>samples</i>	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

<i>samples</i>	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

<i>data</i>	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

<i>symbol</i>	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

<i>sampleIndex</i>	Index of the sample represented by the bar
<i>sample</i>	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

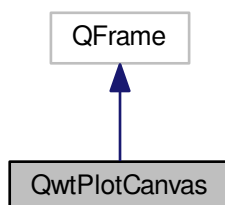
[setSymbol\(\)](#)

## 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](#) \**plot* =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 [paintFocus\(\)](#)

**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

<i>plot</i>	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

<i>rect</i>	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

<i>painter</i>	Painter
----------------	---------

## See Also

[setBorderRadius\(\)](#)12.68.4.5 `void QwtPlotCanvas::drawFocusIndicator ( QPainter * painter ) [protected], [virtual]`

Draw the focus indication

## Parameters

<i>painter</i>	Painter
----------------	---------

12.68.4.6 `bool QwtPlotCanvas::event ( QEvent * event ) [virtual]`

Qt event handler for QEvent::PolishRequest and QEvent::StyleChange

## Parameters

<i>event</i>	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

<i>event</i>	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

<i>event</i>	Resize event
--------------	--------------

12.68.4.11 `void QwtPlotCanvas::setBorderRadius ( double radius )`

Set the radius for the corners of the border frame

## Parameters

---

<i>radius</i>	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

<i>attribute</i>	Paint attribute
<i>on</i>	On/Off

See Also

[testPaintAttribute\(\)](#), [backingStore\(\)](#)

12.68.4.14 bool QwtPlotCanvas::testPaintAttribute ( **PaintAttribute** *attribute* ) const

Test whether a paint attribute is enabled

Parameters

<i>attribute</i>	Paint attribute
------------------	-----------------

Returns

true, when attribute is enabled

See Also

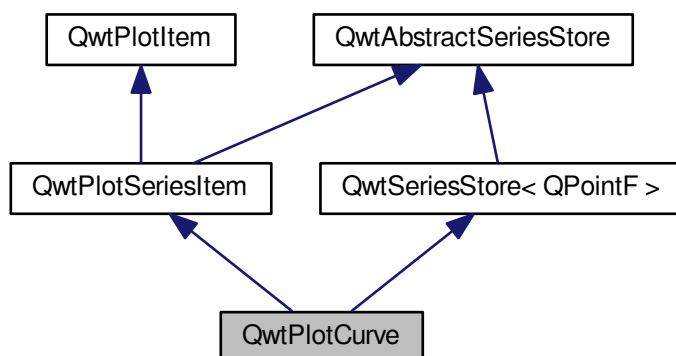
[setPaintAttribute\(\)](#)

## 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

- 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\(\)](#).
- 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.
- 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  $\geq$  [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

<i>title</i>	Title of the curve
--------------	--------------------

12.69.3.2 QwtPlotCurve::QwtPlotCurve ( const QwtText & *title* ) [explicit]

## Constructor

## Parameters

<i>title</i>	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 &amp; 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

<i>painter</i>	Painter
<i>xMap</i>	X map
<i>yMap</i>	Y map
<i>polygon</i>	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

<i>pos</i>	Position, where to look for the closest curve point
<i>dist</i>	If <i>dist</i> != NULL, <a href="#">closestPoint()</a> 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

<i>painter</i>	Painter
<i>style</i>	curve style, see <a href="#">QwtPlotCurve::CurveStyle</a>
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	index of the first point to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	index of the first point to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	index of the first point to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first point to be painted
<i>to</i>	Index of the last point to be painted. If <i>to</i> < 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

<i>painter</i>	Painter
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	index of the first point to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	index of the first point to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>symbol</i>	Curve symbol
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first point to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>polygon</i>	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

<i>index</i>	Index of the legend entry ( ignored as there is only one )
<i>size</i>	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

<i>value</i>	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

<i>brush</i>	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

<i>attribute</i>	Curve attribute
<i>on</i>	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

<a href="#">curveFitter()</a>	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

<i>attribute</i>	Attribute
<i>on</i>	On/Off /sa <a href="#">testLegendAttribute()</a> , <a href="#">legendIcon()</a>

12.69.4.22 void QwtPlotCurve::setPaintAttribute ( **PaintAttribute** *attribute*, bool *on* = true )

Specify an attribute how to draw the curve

## Parameters

<i>attribute</i>	Paint attribute
<i>on</i>	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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	Pen style

See Also

[pen\(\)](#), [brush\(\)](#)

12.69.4.24 void QwtPlotCurve::setPen ( const QPen & *pen* )

Assign a pen

Parameters

<i>pen</i>	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

<i>xData</i>	pointer to x data
<i>yData</i>	pointer to y data
<i>size</i>	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

<i>xData</i>	pointer to x values
<i>yData</i>	pointer to y values
<i>size</i>	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

<i>xData</i>	x data
<i>yData</i>	y data

## See Also

[QwtPointArrayData](#)

12.69.4.28 void QwtPlotCurve::setSamples ( const QVector< QPointF > & *samples* )

Initialize data with an array of points.

## Parameters

<i>samples</i>	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

<i>data</i>	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

<i>style</i>	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

<i>symbol</i>	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

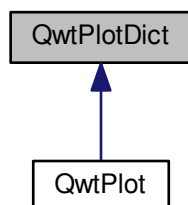
[setPaintAttribute\(\)](#)

## 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

<i>rtti</i>	In case of <a href="#">QwtPlotItem::Rtti_PlotItem</a> detach all items otherwise only those items of the type <i>rtti</i> .
<i>autoDelete</i>	If true, delete all detached items

#### 12.70.3.3 void QwtPlotDict::insertItem ( QwtPlotItem \* *item* ) [protected]

Insert a plot item

Parameters

<i>item</i>	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

<i>rtti</i>	See <a href="#">QwtPlotItem::RttiValues</a>
-------------	---

#### See Also

[QwtPlotItem::rtti\(\)](#)

### 12.70.3.6 void QwtPlotDict::removeItem ( QwtPlotItem \* *item* ) [protected]

Remove a plot item

#### Parameters

<i>item</i>	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

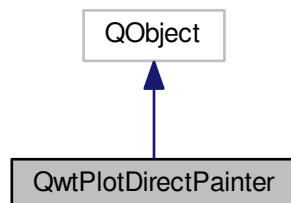
[autoDelete\(\)](#), [insertItem\(\)](#)

## 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 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

<i>seriesItem</i>	Item to be painted
<i>from</i>	Index of the first point to be painted
<i>to</i>	Index of the last point to be painted. If <i>to</i> < 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

<i>attribute</i>	Attribute to change
<i>on</i>	On/Off

## See Also

[Attribute](#), [testAttribute\(\)](#)

12.71.3.5 void QwtPlotDirectPainter::setClipping ( bool *enable* )

En/Disables clipping

## Parameters

<i>enable</i>	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

<i>region</i>	Clip region
---------------	-------------

## See Also

[clipRegion\(\)](#), [hasClipping\(\)](#), [setClipping\(\)](#)

12.71.3.7 bool QwtPlotDirectPainter::testAttribute ( Attribute *attribute* ) const

## Returns

True, when attribute is enabled

## Parameters

<i>attribute</i>	Attribute to be tested
------------------	------------------------

## See Also

[Attribute](#), [setAttribute\(\)](#)

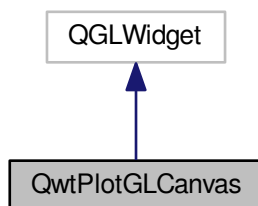
## 12.72 QwtPlotGLCanvas Class Reference

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 unsupported and will be displayed as QFrame::Panel.

## 12.72.3 Constructor &amp; Destructor Documentation

12.72.3.1 QwtPlotGLCanvas::QwtPlotGLCanvas ( QwtPlot \* *plot* = NULL ) [explicit]

Constructor.

## Parameters

<i>plot</i>	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

<i>painter</i>	Painter
----------------	---------

12.72.4.3 void QwtPlotGLCanvas::drawBorder ( QPainter \* *painter* ) [protected], [virtual]

Draw the border of the canvas

## Parameters

<i>painter</i>	Painter
----------------	---------

12.72.4.4 void QwtPlotGLCanvas::drawItems ( QPainter \* *painter* ) [protected], [virtual]

Draw the plot items

## Parameters

<i>painter</i>	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

<i>event</i>	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

<i>event</i>	Paint event
--------------	-------------

## See Also

[QwtPlot::drawCanvas\(\)](#)

12.72.4.14 void QwtPlotGLCanvas::setFrameShadow ( *Shadow shadow* )

Set the frame shadow

## Parameters

<i>shadow</i>	Frame shadow
---------------	--------------

## See Also

[frameShadow\(\)](#), [setFrameShape\(\)](#), [QFrame::setFrameShadow\(\)](#)

12.72.4.15 void QwtPlotGLCanvas::setFrameShape ( *Shape shape* )

Set the frame shape

## Parameters

<i>shape</i>	Frame shape
--------------	-------------

## See Also

[frameShape\(\)](#), [setFrameShadow\(\)](#), [QFrame::frameShape\(\)](#)

12.72.4.16 void QwtPlotGLCanvas::setFrameStyle ( *int style* )

Set the frame style

## Parameters

<i>style</i>	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

<i>width</i>	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

<i>width</i>	Midline width of the frame
--------------	----------------------------

## See Also

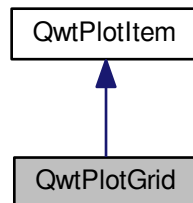
[midLineWidth\(\)](#), [setLineWidth\(\)](#)

## 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

<i>painter</i>	Painter
<i>xMap</i>	X axis map
<i>yMap</i>	Y axis
<i>canvasRect</i>	Contents rectangle of the plot canvas

Implements [QwtPlotItem](#).

**12.73.2.2** void [QwtPlotGrid::enableX](#) ( bool *on* )

Enable or disable vertical grid lines.

#### Parameters

<i>on</i>	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

<i>on</i>	Enable (true) or disable
-----------	--------------------------

## See Also

[enableX\(\)](#)12.73.2.4 void QwtPlotGrid::enableY ( bool *on* )

Enable or disable horizontal grid lines.

## Parameters

<i>on</i>	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

<i>on</i>	Enable (true) or disable
-----------	--------------------------

## See Also

[enableY\(\)](#)

## 12.73.2.6 const QPen &amp; QwtPlotGrid::majorPen ( ) const

## Returns

the pen for the major grid lines

## See Also

[setMajorPen\(\)](#), [setMinorPen\(\)](#), [setPen\(\)](#)

## 12.73.2.7 const QPen &amp; 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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	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

<i>pen</i>	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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	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

<i>pen</i>	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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	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

<i>pen</i>	Pen
------------	-----

See Also

[setMajorPen\(\)](#), [setMinorPen\(\)](#)

12.73.2.15 void QwtPlotGrid::setXDiv ( const QwtScaleDiv & *scaleDiv* )

Assign an x axis scale division

Parameters

<i>scaleDiv</i>	Scale division
-----------------	----------------

12.73.2.16 void QwtPlotGrid::setYDiv ( const QwtScaleDiv & *scaleDiv* )

Assign a y axis division

Parameters

<i>scaleDiv</i>	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

<i>xScaleDiv</i>	Scale division of the x-axis
<i>yScaleDiv</i>	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

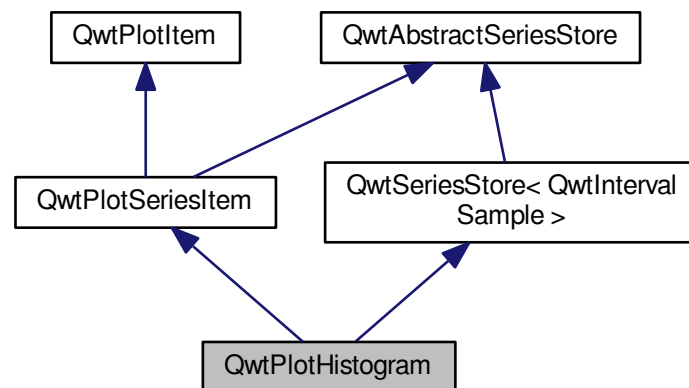
the scale division of the y axis

## 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 ( $y = f([x_1, x_2])$ ).

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  $\geq$  UserStyle are reserved for derived classes that overload [drawSeries\(\)](#) with additional application specific ways to display a histogram.

## 12.74.3 Constructor &amp; Destructor Documentation

12.74.3.1 [QwtPlotHistogram::QwtPlotHistogram](#) ( const [QString](#) & *title* = [QString::null](#) ) [explicit]

## Constructor

## Parameters

<i>title</i>	Title of the histogram.
--------------	-------------------------

12.74.3.2 **QwtPlotHistogram::QwtPlotHistogram ( const QwtText & *title* )** `[explicit]`

## Constructor

## Parameters

<i>title</i>	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

<i>sample</i>	Sample
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	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

<i>painter</i>	Painter
<i>rect</i>	Rectangle where to paint the column in paint device coordinates
<i>sample</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>from</i>	Index of the first sample to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>from</i>	Index of the first sample to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.



<i>from</i>	Index of the first sample to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first sample to be painted
<i>to</i>	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

<i>index</i>	Index of the legend entry ( ignored as there is only one )
<i>size</i>	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

<i>value</i>	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

<i>brush</i>	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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	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

<i>pen</i>	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

<i>samples</i>	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

<i>data</i>	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

<i>style</i>	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

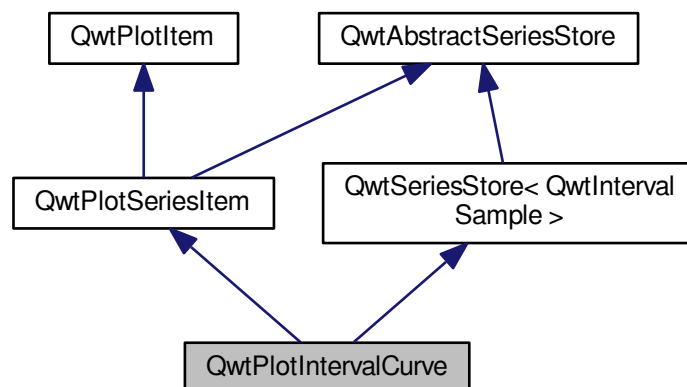
[setSymbol\(\)](#)

## 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  $\geq$  [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

<i>title</i>	Title of the curve
--------------	--------------------

#### 12.75.3.2 QwtPlotIntervalCurve::QwtPlotIntervalCurve ( const QwtText & title ) [explicit]

Constructor

Parameters

<i>title</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first sample to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>symbol</i>	Interval symbol
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first sample to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.

<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first sample to be painted
<i>to</i>	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

<i>index</i>	Index of the legend entry ( ignored as there is only one )
<i>size</i>	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

<i>brush</i>	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

<i>attribute</i>	Paint attribute
<i>on</i>	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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	Pen style

## See Also

[pen\(\)](#), [brush\(\)](#)

12.75.4.12 void QwtPlotIntervalCurve::setPen ( const QPen & *pen* )

Assign a pen.

## Parameters

<i>pen</i>	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

<i>samples</i>	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

<i>data</i>	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

<i>style</i>	Curve style
--------------	-------------

## See Also

[CurveStyle](#), [style\(\)](#)

12.75.4.16 `void QwtPlotIntervalCurve::setSymbol ( const QwtIntervalSymbol * symbol )`

Assign a symbol.

## Parameters

<i>symbol</i>	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

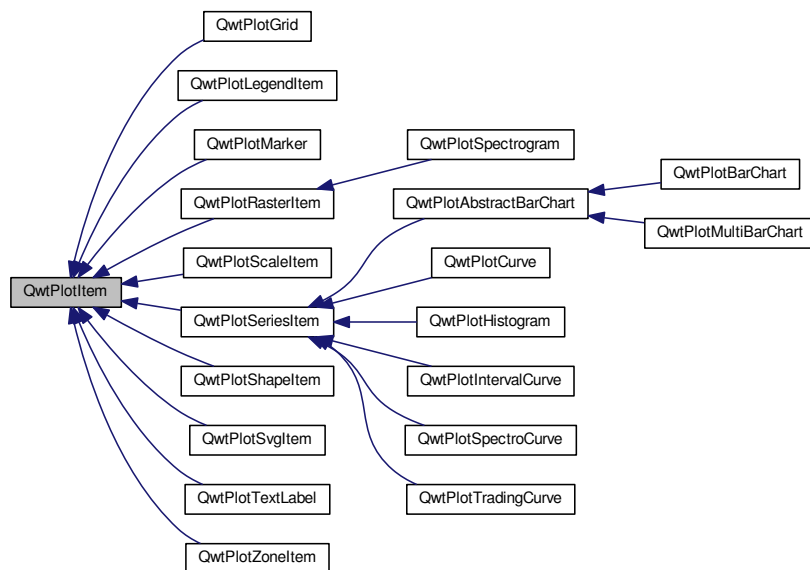
[PaintAttribute](#), [setPaintAttribute\(\)](#)

## 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](#) ()
- void [attach](#) ([QwtPlot](#) \*[plot](#))

*Destroy the [QwtPlotItem](#).*

*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  $\geq 0.0$ .

**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 [QwtPlotShapelItem](#).

**Rtti\_PlotTextLabel** For [QwtPlotTextLabel](#).

**Rtti\_PlotZone** For [QwtPlotZoneItem](#).

**Rtti\_PlotUserItem** Values  $\geq$  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

<i>title</i>	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

<i>plot</i>	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](#), [QwtPlotShapelItem](#), [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

<i>brush</i>	Fill brush
<i>size</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rect of the canvas in painter coordinates

Implemented in [QwtPlotMarker](#), [QwtPlotLegendItem](#), [QwtPlotRasterItem](#), [QwtPlotShapelItem](#), [QwtPlotSpectrogram](#), [QwtPlotScaleItem](#), [QwtPlotGrid](#), [QwtPlotTextLabel](#), [QwtPlotZoneItem](#), [QwtPlotSvgItem](#), and [QwtPlotSeriesItem](#).

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

<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rectangle of the canvas in painter coordinates
<i>left</i>	Returns the left margin
<i>top</i>	Returns the top margin
<i>right</i>	Returns the right margin
<i>bottom</i>	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

<i>index</i>	Index of the legend entry ( usually there is only one )
<i>size</i>	Icon size

## See Also

[setLegendIconSize\(\)](#), [legendData\(\)](#)

Reimplemented in [QwtPlotCurve](#), [QwtPlotTradingCurve](#), [QwtPlotMarker](#), [QwtPlotIntervalCurve](#), [QwtPlotHistogram](#), [QwtPlotBarChart](#), [QwtPlotShapelItem](#), 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

<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	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](#), [QwtPlotShapelItem](#), [QwtPlotSpectrogram](#), [QwtPlotIntervalCurve](#), [QwtPlotHistogram](#), [QwtPlotMarker](#), [QwtPlotBarChart](#), [QwtPlotMultiBarChart](#), [QwtPlotLegendItem](#), [QwtPlotScaleItem](#), [QwtPlotTextLabel](#), [QwtPlotSpectroCurve](#), [QwtPlotSvgItem](#), [QwtPlotGrid](#), and [QwtPlotZonelItem](#).

12.76.4.16 `QRectF QwtPlotItem::scaleRect ( const QwtScaleMap & xMap, const QwtScaleMap & yMap ) const`

Calculate the bounding scale rectangle of 2 maps.

## Parameters

<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	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

<i>xAxis</i>	X Axis ( <a href="#">QwtPlot::xBottom</a> or <a href="#">QwtPlot::xTop</a> )
<i>yAxis</i>	Y Axis ( <a href="#">QwtPlot::yLeft</a> or <a href="#">QwtPlot::yRight</a> )

## 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

<i>attribute</i>	Attribute type
<i>on</i>	true/false

## See Also

[testItemAttribute\(\)](#), [ItemInterest](#)

12.76.4.19 `void QwtPlotItem::setItemInterest ( ItemInterest interest, bool on = true )`

Toggle an item interest

## Parameters

<i>interest</i>	Interest type
<i>on</i>	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

<i>size</i>	Size
-------------	------

## See Also

[legendIconSize\(\)](#), [legendIcon\(\)](#)

**12.76.4.21** void QwtPlotItem::setRenderHint ( RenderHint *hint*, bool *on* = true )

Toggle an render hint

## Parameters

<i>hint</i>	Render hint
<i>on</i>	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

<i>numThreads</i>	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

<i>title</i>	Title
--------------	-------

## See Also

[title\(\)](#)

**12.76.4.24** void QwtPlotItem::setTitle ( const QwtText & *title* )

Set a new title

## Parameters

<i>title</i>	Title
--------------	-------

## See Also

[title\(\)](#)

**12.76.4.25** void QwtPlotItem::setVisible ( bool *on* ) [virtual]

Show/Hide the item

## Parameters

<i>on</i>	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

<i>axis</i>	X Axis ( <a href="#">QwtPlot::xBottom</a> or <a href="#">QwtPlot::xTop</a> )
-------------	--

## 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

<i>axis</i>	Y Axis ( <a href="#">QwtPlot::yLeft</a> or <a href="#">QwtPlot::yRight</a> )
-------------	--

## 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

<i>z</i>	Z-value
----------	---------

## See Also

[z\(\)](#), [QwtPlotDict::itemList\(\)](#)

12.76.4.29 bool QwtPlotItem::testItemAttribute ( *ItemAttribute attribute* ) const

Test an item attribute

## Parameters

<i>attribute</i>	Attribute type
------------------	----------------

## Returns

true/false

## See Also

[setItemAttribute\(\)](#), [ItemInterest](#)

12.76.4.30 `bool QwtPlotItem::testItemInterest ( ItemInterest interest ) const`

Test an item interest



## Parameters

<i>interest</i>	Interest type
-----------------	---------------

## Returns

true/false

## See Also

[setItemInterest\(\)](#), [ItemAttribute](#)12.76.4.31 `bool QwtPlotItem::testRenderHint ( RenderHint hint ) const`

Test a render hint

## Parameters

<i>hint</i>	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

<i>item</i>	Plot item to be displayed on a legend
<i>data</i>	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

<i>xScaleDiv</i>	Scale division of the x-axis
<i>yScaleDiv</i>	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

<i>plot</i>	Plot to be layout
<i>plotRect</i>	Rectangle where to place the components
<i>options</i>	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

<i>axisId</i>	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

<i>canvasRect</i>	Geometry of the canvas
<i>legendRect</i>	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

<i>options</i>	Layout options
<i>canvasRect</i>	Geometry of the canvas ( IN/OUT )
<i>scaleRect</i>	Geometries of the scales ( IN/OUT )

## See Also

[Options](#)

12.77.3.5 `int QwtPlotLayout::canvasMargin ( int axisId ) const`

## Parameters

<i>axisId</i>	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

<i>options</i>	Options how to layout the legend
<i>rect</i>	Bounding rectangle for title, footer, axes and canvas.
<i>dimTitle</i>	Expanded height of the title widget
<i>dimFooter</i>	Expanded height of the footer widget
<i>dimAxis</i>	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

<i>options</i>	Options how to layout the legend
<i>rect</i>	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

<i>plot</i>	Plot widget
-------------	-------------

#### See Also

[QwtPlot::minimumSizeHint\(\)](#)

12.77.3.15 `QRectF QwtPlotLayout::scaleRect ( int axis ) const`

#### Parameters

<i>axis</i>	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

<i>axisId</i>	Axis index
<i>on</i>	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

<i>on</i>	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

<i>margin</i>	New margin
<i>axis</i>	One of <a href="#">QwtPlot::Axis</a> . 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

<i>pos</i>	The legend's position.
<i>ratio</i>	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 $\leq 0.0$ 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

<i>pos</i>	The legend's position. Valid values are <code>QwtPlot::LeftLegend</code> , <code>QwtPlot::RightLegend</code> , <code>QwtPlot::TopLegend</code> , <code>QwtPlot::BottomLegend</code> .
------------	---

## See Also

`QwtPlot::setLegendPosition()`

12.77.3.23 void QwtPlotLayout::setLegendRatio ( double *ratio* )

Specify the relative size of the legend in the plot

## Parameters

<i>ratio</i>	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 $\leq 0.0$ 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

<i>rect</i>	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

<i>axis</i>	Axis index
<i>rect</i>	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

<i>spacing</i>	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

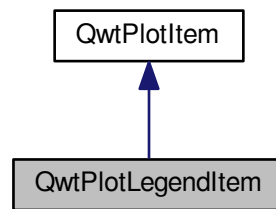
[activate\(\)](#), [invalidate\(\)](#)

## 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 alignment.*
- `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 QRectF &) 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

<i>painter</i>	Painter
<i>xMap</i>	x Scale Map
<i>yMap</i>	y Scale Map
<i>canvasRect</i>	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

<i>painter</i>	Painter
<i>rect</i>	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

<i>painter</i>	Qt Painter
<i>plotItem</i>	Plot item, represented by the entry
<i>data</i>	Attributes of the legend entry
<i>rect</i>	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

<i>canvasRect</i>	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

<i>data</i>	Attributes of the legend entry
<i>width</i>	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

<i>data</i>	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 alignment.

Alignment means the position of the legend relative to the geometry of the plot canvas.

#### Parameters

<i>alignment</i>	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

<i>brush</i>	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

<i>distance</i>	Margin in pixels
-----------------	------------------

## See Also

[setMargin\(\)](#)

12.78.3.25 void QwtPlotLegendItem::setBorderPen ( const QPen & *pen* )

Set the pen for drawing the border

## Parameters

<i>pen</i>	Border pen
------------	------------

## See Also

[borderPen\(\)](#), [setBackgroundBrush\(\)](#)

12.78.3.26 void QwtPlotLegendItem::setBorderRadius ( double *radius* )

Set the radius for the border

## Parameters

<i>radius</i>	A value $\leq 0$ 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

<i>font</i>	Legend font
-------------	-------------

## See Also

[font\(\)](#)

12.78.3.28 void QwtPlotLegendItem::setItemMargin ( int *margin* )

Set the margin around each item

## Parameters

<i>margin</i>	Margin
---------------	--------

## See Also

[itemMargin\(\)](#), [setItemSpacing\(\)](#), [setMargin\(\)](#), [setSpacing\(\)](#)

12.78.3.29 void QwtPlotLegendItem::setItemSpacing ( int *spacing* )

Set the spacing inside of each item

## Parameters

<i>spacing</i>	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

<i>margin</i>	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

<i>maxColumns</i>	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

<i>spacing</i>	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

<i>pen</i>	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

<i>plotItem</i>	Plot item
<i>data</i>	Attributes of the legend entries

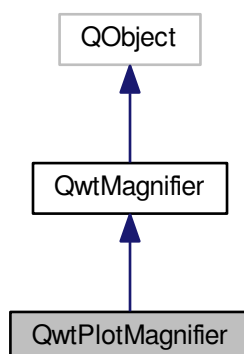
Reimplemented from [QwtPlotItem](#).

## 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 &amp; Destructor Documentation

12.79.2.1 QwtPlotMagnifier::QwtPlotMagnifier ( QWidget \* *canvas* ) [explicit]

Constructor

Parameters

<i>canvas</i>	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

<i>axis</i>	Axis, see <a href="#">QwtPlot::Axis</a>
-------------	---

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

<i>factor</i>	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

<i>axis</i>	Axis, see <a href="#">QwtPlot::Axis</a>
<i>on</i>	On/Off

See Also

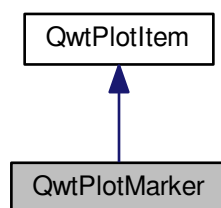
[isAxisEnabled\(\)](#)

## 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

<i>painter</i>	Painter
<i>xMap</i>	x Scale Map
<i>yMap</i>	y Scale Map
<i>canvasRect</i>	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

<i>painter</i>	Painter
<i>canvasRect</i>	Contents rectangle of the canvas in painter coordinates
<i>pos</i>	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

<i>painter</i>	Painter
<i>canvasRect</i>	Contents rectangle of the canvas in painter coordinates
<i>pos</i>	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

<i>index</i>	Index of the legend entry ( usually there is only one )
<i>size</i>	Icon size

## See Also

[setLegendIconSize\(\)](#), [legendData\(\)](#)

Reimplemented from [QwtPlotItem](#).

## 12.80.3.9 const QPen &amp; 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

<i>label</i>	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

<i>align</i>	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

<i>orientation</i>	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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	Pen style

## See Also

[pen\(\)](#), [brush\(\)](#)

12.80.3.16 void QwtPlotMarker::setLinePen ( const QPen & *pen* )

Specify a pen for the line.

## Parameters

<i>pen</i>	New pen
------------	---------

## See Also

[linePen\(\)](#)

12.80.3.17 void QwtPlotMarker::setLineStyle ( LineStyle *style* )

Set the line style.

## Parameters

<i>style</i>	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

<i>spacing</i>	Spacing
----------------	---------

## See Also

[spacing\(\)](#), [setLabelAlignment\(\)](#)

12.80.3.19 void QwtPlotMarker::setSymbol ( const QwtSymbol \* *symbol* )

Assign a symbol.

## Parameters

<i>symbol</i>	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

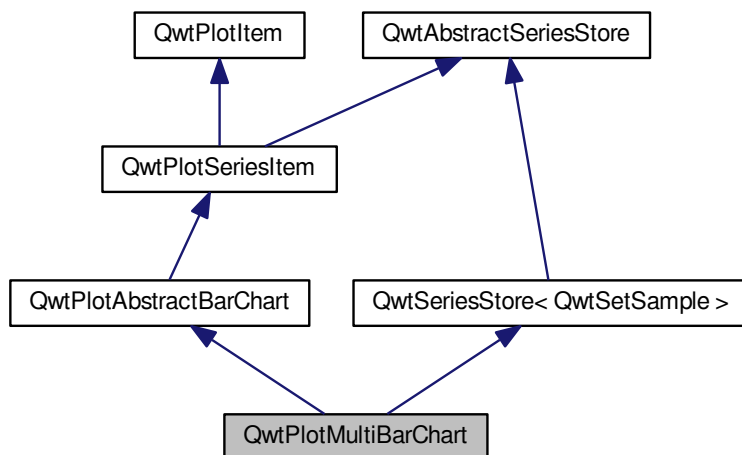
[setSymbol\(\)](#), [QwtSymbol](#)

## 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

<i>title</i>	Title of the chart
--------------	--------------------

### 12.81.3.2 `QwtPlotMultiBarChart::QwtPlotMultiBarChart ( const QwtText & title ) [explicit]`

Constructor

Parameters

<i>title</i>	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

<i>painter</i>	Painter
<i>sampleIndex</i>	Index of the sample - might be -1 when the bar is painted for the legend
<i>valueIndex</i>	Index of a value in a set
<i>rect</i>	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

<i>painter</i>	Painter
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>index</i>	Index of the sample to be painted
<i>sampleWidth</i>	Bounding width for all bars of the sample
<i>sample</i>	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

<i>painter</i>	Painter
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>boundingInterval</i>	Bounding interval of sample values
<i>index</i>	Index of the sample to be painted
<i>sample</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first point to be painted
<i>to</i>	Index of the last point to be painted. If <i>to</i> < 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

<i>painter</i>	Painter
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>index</i>	Index of the sample to be painted
<i>sampleWidth</i>	Width of the bars
<i>sample</i>	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

<i>index</i>	Index of the bar
<i>size</i>	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

<i>titles</i>	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

<i>samples</i>	Vector of points
----------------	------------------

**12.81.4.14** void QwtPlotMultiBarChart::setSamples ( const QVector< QVector< double > > & samples )

Initialize data with an array of samples.

## Parameters

<i>samples</i>	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

<i>data</i>	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

<i>style</i>	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

<i>valueIndex</i>	Index of a value in a set
<i>symbol</i>	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 [specialSymbol\(\)](#) 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

<i>sampleIndex</i>	Index of the sample
<i>valueIndex</i>	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**

<i>valueIndex</i>	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**

<i>valueIndex</i>	Index of a value in a set
-------------------	---------------------------

**Returns**

The symbol, that had been set by [setSymbol\(\)](#) or NULL.

See Also

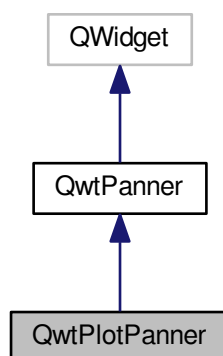
[setSymbol\(\)](#), [specialSymbol\(\)](#), [drawBar\(\)](#)

## 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 QPixmap [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 &amp; 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

<i>canvas</i>	Plot canvas to pan, also the parent object
---------------	--

## See Also

[setAxisEnabled\(\)](#)

## 12.82.3 Member Function Documentation

## 12.82.3.1 QPixmap 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

<i>axis</i>	Axis, see <a href="#">QwtPlot::Axis</a>
-------------	---

#### 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

<i>dx</i>	Pixel offset in x direction
<i>dy</i>	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

<i>axis</i>	Axis, see <a href="#">QwtPlot::Axis</a>
<i>on</i>	On/Off

#### See Also

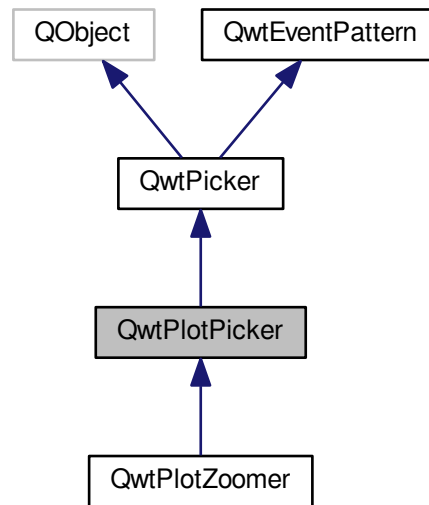
[isAxisEnabled\(\)](#), [moveCanvas\(\)](#)

## 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

<code>canvas</code>	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

<code>xAxis</code>	Set the x axis of the picker
<code>yAxis</code>	Set the y axis of the picker
<code>canvas</code>	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

<i>xAxis</i>	X axis of the picker
<i>yAxis</i>	Y axis of the picker
<i>rubberBand</i>	Rubber band style
<i>trackerMode</i>	Tracker mode
<i>canvas</i>	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

<i>pos</i>	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

<i>pos</i>	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

<i>ok</i>	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

<i>pos</i>	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

<i>pos</i>	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

<i>pos</i>	Selected point
------------	----------------

12.83.3.14 **void QwtPlotPicker::selected ( const QRectF & *rect* )** [signal]

A signal emitted in case of [QwtPickerMachine::RectSelection](#).

## Parameters

<i>rect</i>	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

<i>pa</i>	Selected points
-----------	-----------------

12.83.3.16 **void QwtPlotPicker::setAxis ( int *xAxis*, int *yAxis* )** [virtual]

Set the x and y axes of the picker

## Parameters

<i>xAxis</i>	X axis
<i>yAxis</i>	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

<i>pos</i>	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

<i>pos</i>	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

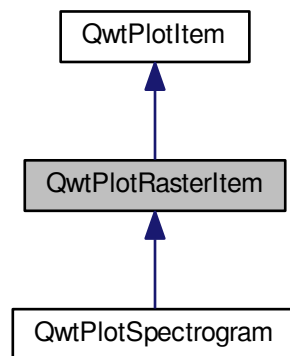
[invTransform\(\)](#)

## 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 QSize &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::pixelHint\(\)](#) ) 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 QPainterEngine.

## 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

<i>painter</i>	Painter
<i>xMap</i>	X-Scale Map
<i>yMap</i>	Y-Scale Map
<i>canvasRect</i>	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



<i>orientation</i>	Orientation, Qt::Horizontal means a X axis
<i>map</i>	Scale map for rendering the plot item
<i>area</i>	Area to be painted on the image
<i>imageSize</i>	Image size
<i>pixelSize</i>	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**

<i>axis</i>	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 calculate 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**

<i>area</i>	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

<i>xMap</i>	X-Scale Map
<i>yMap</i>	Y-Scale Map
<i>area</i>	Requested area for the image in scale coordinates
<i>imageSize</i>	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

<i>alpha</i>	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

<i>policy</i>	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

<i>attribute</i>	Paint attribute
<i>on</i>	On/Off /sa PaintAttribute, <a href="#">testPaintAttribute()</a>

12.84.3.13 `bool QwtPlotRasterItem::testPaintAttribute ( PaintAttribute attribute ) const`

## Returns

True, when attribute is enabled

## See Also

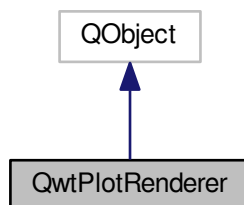
[PaintAttribute](#), [setPaintAttribute\(\)](#)

## 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

<i>parent</i>	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

<i>plot</i>	Plot widget
<i>documentName</i>	Default document name
<i>sizeMM</i>	Size for the document in millimeters.
<i>resolution</i>	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

<i>plot</i>	Plot to be rendered
<i>painter</i>	Painter
<i>plotRect</i>	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

<i>plot</i>	Plot widget
<i>painter</i>	Painter
<i>map</i>	Maps mapping between plot and paint device coordinates
<i>canvasRect</i>	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

<i>plot</i>	Plot widget
<i>fileName</i>	Path of the file, where the document will be stored
<i>sizeMM</i>	Size for the document in millimeters.
<i>resolution</i>	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  
Postscript
- 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

<i>plot</i>	Plot widget
<i>fileName</i>	Path of the file, where the document will be stored
<i>format</i>	Format for the document
<i>sizeMM</i>	Size for the document in millimeters.
<i>resolution</i>	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

<i>plot</i>	Plot widget
<i>painter</i>	Painter
<i>rect</i>	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

<i>plot</i>	Plot widget
<i>painter</i>	Painter
<i>rect</i>	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

<i>plot</i>	Plot widget
<i>painter</i>	Painter
<i>axisId</i>	Axis

<i>startDist</i>	Start border distance
<i>endDist</i>	End border distance
<i>baseDist</i>	Base distance
<i>rect</i>	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

<i>plot</i>	Plot widget
<i>painter</i>	Painter
<i>rect</i>	Bounding rectangle

12.85.4.12 `void QwtPlotRenderer::renderTo ( QwtPlot * plot, QPainter & printer ) const`

Render the plot to a QPainter.

This function renders the contents of a [QwtPlot](#) instance to `QPaintDevice` object. The size is derived from the printer metrics.

Parameters

<i>plot</i>	Plot to be rendered
<i>printer</i>	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

<i>plot</i>	Plot to be rendered
<i>paintDevice</i>	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

<i>flag</i>	Flag to change
<i>on</i>	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

<i>flags</i>	Flags
--------------	-------

## See Also

[DiscardFlag](#), [setDiscardFlag\(\)](#), [testDiscardFlag\(\)](#), [discardFlags\(\)](#)

12.85.4.16 void QwtPlotRenderer::setLayoutFlag ( **LayoutFlag** *flag*, bool *on* = true )

Change a layout flag

## Parameters

<i>flag</i>	Flag to change
<i>on</i>	On/Off

## See Also

[LayoutFlag](#), [testLayoutFlag\(\)](#), [setLayoutFlags\(\)](#), [layoutFlags\(\)](#)

12.85.4.17 void QwtPlotRenderer::setLayoutFlags ( **LayoutFlags** *flags* )

Set the layout flags

## Parameters

<i>flags</i>	Flags
--------------	-------

## See Also

[LayoutFlag](#), [setLayoutFlag\(\)](#), [testLayoutFlag\(\)](#), [layoutFlags\(\)](#)

12.85.4.18 bool QwtPlotRenderer::testDiscardFlag ( **DiscardFlag** *flag* ) const

## Returns

True, if flag is enabled.

## Parameters

<i>flag</i>	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

<i>flag</i>	Flag to be tested
-------------	-------------------

#### See Also

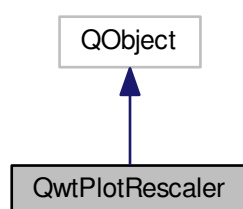
[LayoutFlag](#), [setLayoutFlag\(\)](#), [setLayoutFlags\(\)](#), [layoutFlags\(\)](#)

## 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

<i>canvas</i>	Canvas
<i>referenceAxis</i>	Reference axis, see RescalePolicy
<i>policy</i>	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

<i>axis</i>	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

<i>event</i>	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

<i>axis</i>	Axis index ( see <a href="#">QwtPlot::AxisId</a> )
-------------	--

## See Also

[setExpandingDirection\(\)](#)

**12.86.4.6** `QwtInterval QwtPlotRescaler::expandInterval ( const QwtInterval & interval, double width, ExpandingDirection direction ) const` [protected]

Expand the interval

## Parameters

<i>interval</i>	Interval to be expanded
<i>width</i>	Distance to be added to the interval
<i>direction</i>	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

<i>axis</i>	Axis index ( see <a href="#">QwtPlot::AxisId</a> )
<i>oldSize</i>	Previous size of the canvas
<i>newSize</i>	New size of the canvas

## Returns

Calculated new interval for the axis

**12.86.4.8** `QwtInterval QwtPlotRescaler::interval ( int axis ) const` [protected]

## Parameters

<i>axis</i>	Axis index ( see <a href="#">QwtPlot::AxisId</a> )
-------------	--

## Returns

Normalized interval of an axis

**12.86.4.9** `QwtInterval QwtPlotRescaler::intervalHint ( int axis ) const`

## Parameters

<i>axis</i>	Axis, see <a href="#">QwtPlot::Axis</a>
-------------	---

## 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

<i>axis</i>	Axis index ( see <code>QwtPlot::AxisId</code> )
-------------	---

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

<i>oldSize</i>	Previous size of the canvas
<i>newSize</i>	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

<i>ratio</i>	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

<i>axis</i>	Axis index ( see QwtPlot::AxisId )
<i>ratio</i>	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

<i>on</i>	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

<i>direction</i>	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

<i>axis</i>	Axis index ( see QwtPlot::AxisId )
<i>direction</i>	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

<i>axis</i>	Axis, see <a href="#">QwtPlot::Axis</a>
<i>interval</i>	Axis

## See Also

[intervalHint\(\)](#), [RescalePolicy](#)

12.86.4.23 void QwtPlotRescaler::setReferenceAxis ( int *axis* )

Set the reference axis ( see [RescalePolicy](#) )

## Parameters

<i>axis</i>	Axis index ( <a href="#">QwtPlot::Axis</a> )
-------------	--

## See Also

[referenceAxis\(\)](#)

12.86.4.24 void QwtPlotRescaler::setRescalePolicy ( [RescalePolicy](#) *policy* )

Change the rescale policy

## Parameters

<i>policy</i>	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

<i>axis</i>	Axis index ( see <a href="#">QwtPlot::AxisId</a> )
<i>reference</i>	Interval of the reference axis
<i>size</i>	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

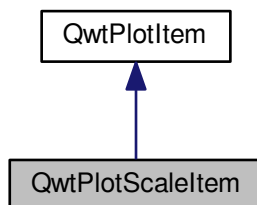
<i>intervals</i>	Scale intervals
------------------	-----------------

## 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 be 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 &amp; 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

<i>alignment</i>	In case of <a href="#">QwtScaleDraw::BottomScale</a> or <a href="#">QwtScaleDraw::TopScale</a> the scale item is corresponding to the <a href="#">xAxis()</a> , otherwise it corresponds to the <a href="#">yAxis()</a> .
<i>pos</i>	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  $\geq 0$  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

<i>distance</i>	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

<i>pos</i>	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

<i>scaleDiv</i>	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

<i>on</i>	true/false
-----------	------------

## See Also

[isScaleDivFromAxis\(\)](#)

12.87.3.17 void QwtPlotScaleItem::setScaleDraw ( QwtScaleDraw \* *scaleDraw* )

Set a scale draw.

## Parameters

<i>scaleDraw</i>	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

<i>xScaleDiv</i>	Scale division of the x-axis
<i>yScaleDiv</i>	Scale division of the y-axis

See Also

[QwtPlot::updateAxes\(\)](#)

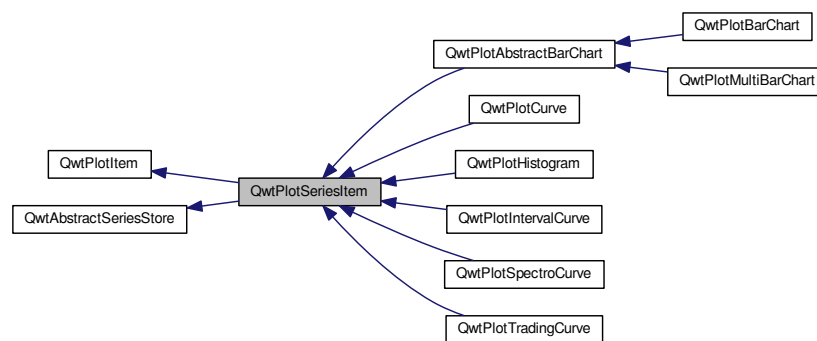
Reimplemented from [QwtPlotItem](#).

## 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 &amp; Destructor Documentation

12.88.2.1 `QwtPlotSeriesItem::QwtPlotSeriesItem ( const QString & title = QString::null ) [explicit]`

Constructor

Parameters

<i>title</i>	Title of the curve
--------------	--------------------

12.88.2.2 `QwtPlotSeriesItem::QwtPlotSeriesItem ( const QwtText & title ) [explicit]`

Constructor

Parameters

<i>title</i>	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 [QwtPlotMultiBarChart](#).

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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first point to be painted
<i>to</i>	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

<i>xScaleDiv</i>	Scale division of the x-axis
<i>yScaleDiv</i>	Scale division of the y-axis

## See Also

[QwtPlot::updateAxes\(\)](#), [ScaleInterest](#)

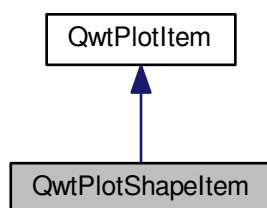
Reimplemented from [QwtPlotItem](#).

## 12.89 QwtPlotShapeltem 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 QwtPlotShapeltem:



### 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

- `QwtPlotShapeltem` (const `QString` &`title`=`QString::null`)  
*Constructor.*
- `QwtPlotShapeltem` (const `QwtText` &`title`)  
*Constructor.*
- virtual `~QwtPlotShapeltem` ()  
*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. [QwtPlotShapeltem](#) displays a shape with a pen and brush.

[QwtPlotShapeltem](#) 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 QwtPlotShapeltem::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 QwtPlotShapeltem::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 QwtPlotShapeltem::QwtPlotShapeltem ( const QString & title = QString::null ) [explicit]

Constructor.

Sets the following item attributes:

- [QwtPlotItem::AutoScale](#): true
- [QwtPlotItem::Legend](#): false

## Parameters

<i>title</i>	Title
--------------	-------

12.89.3.2 `QwtPlotShapelItem::QwtPlotShapelItem ( const QwtText & title ) [explicit]`

Constructor.

Sets the following item attributes:

- `QwtPlotItem::AutoScale`: true
- `QwtPlotItem::Legend`: false

## Parameters

<i>title</i>	Title
--------------	-------

## 12.89.4 Member Function Documentation

12.89.4.1 `QBrush QwtPlotShapelItem::brush ( ) const`

Returns

Brush used to fill the shape

See Also

[setBrush\(\)](#), [pen\(\)](#)

12.89.4.2 `void QwtPlotShapelItem::draw ( QPainter * painter, const QwtScaleMap & xMap, const QwtScaleMap & yMap, const QRectF & canvasRect ) const [virtual]`

Draw the shape item

## Parameters

<i>painter</i>	Painter
<i>xMap</i>	X-Scale Map
<i>yMap</i>	Y-Scale Map
<i>canvasRect</i>	Contents rect of the plot canvas

Implements [QwtPlotItem](#).

12.89.4.3 `QwtGraphic QwtPlotShapelItem::legendIcon ( int index, const QSizeF & size ) const [virtual]`

Returns

A rectangle filled with the color of the brush ( or the pen )

## Parameters

<i>index</i>	Index of the legend entry ( usually there is only one )
<i>size</i>	Icon size

See Also

[setLegendIconSize\(\)](#), [legendData\(\)](#)

Reimplemented from [QwtPlotItem](#).

12.89.4.4 **QwtPlotShapelItem::LegendMode** QwtPlotShapelItem::legendMode ( ) const

Returns

Mode how to represent the item on the legend

See Also

[legendMode\(\)](#)

12.89.4.5 **QPen** QwtPlotShapelItem::pen ( ) const

Returns

Pen used to draw the outline of the shape

See Also

[setPen\(\)](#), [brush\(\)](#)

12.89.4.6 **double** QwtPlotShapelItem::renderTolerance ( ) const

Returns

Tolerance for the weeding optimization

See Also

[setRenderTolerance\(\)](#)

12.89.4.7 **int** QwtPlotShapelItem::rtti ( ) const [virtual]

Returns

[QwtPlotItem::Rtti\\_PlotShape](#)

Reimplemented from [QwtPlotItem](#).

12.89.4.8 **void** QwtPlotShapelItem::setBrush ( const QBrush & brush )

Assign a brush.

The brush is used to fill the path

Parameters

<i>brush</i>	Brush
--------------	-------

See Also

[brush\(\)](#), [pen\(\)](#)

12.89.4.9 **void** QwtPlotShapelItem::setLegendMode ( LegendMode mode )

Set the mode how to represent the item on the legend



## Parameters

<i>mode</i>	Mode
-------------	------

## See Also

[legendMode\(\)](#)

12.89.4.10 void QwtPlotShapeltem::setPaintAttribute ( PaintAttribute *attribute*, bool *on* = true )

Specify an attribute how to draw the shape

## Parameters

<i>attribute</i>	Paint attribute
<i>on</i>	On/Off

## See Also

[testPaintAttribute\(\)](#)

12.89.4.11 void QwtPlotShapeltem::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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	Pen style

## See Also

[pen\(\)](#), [brush\(\)](#)

12.89.4.12 void QwtPlotShapeltem::setPen ( const QPen & *pen* )

Assign a pen.

The pen is used to draw the outline of the shape

## Parameters

<i>pen</i>	Pen
------------	-----

## See Also

[pen\(\)](#), [brush\(\)](#)

12.89.4.13 void QwtPlotShapeltem::setPolygon ( const QPolygonF & *polygon* )

Set a path built from a polygon.

## Parameters

<i>polygon</i>	Polygon
----------------	---------

## See Also

[setShape\(\)](#), [setRect\(\)](#), [shape\(\)](#)

12.89.4.14 void QwtPlotShapeltem::setRect ( const QRectF & *rect* )

Set a path built from a rectangle.

## Parameters

<i>rect</i>	Rectangle
-------------	-----------

## See Also

[setShape\(\)](#), [setPolygon\(\)](#), [shape\(\)](#)

12.89.4.15 void QwtPlotShapeltem::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

<i>tolerance</i>	Accepted error when reducing the number of points A value <= 0.0 disables weeding.
------------------	--

## See Also

[renderTolerance\(\)](#), [QwtWeedingCurveFitter](#)

12.89.4.16 void QwtPlotShapeltem::setShape ( const QPainterPath & *shape* )

Set the shape to be displayed.

## Parameters

<i>shape</i>	Shape
--------------	-------

## See Also

[setShape\(\)](#), [shape\(\)](#)

## 12.89.4.17 QPainterPath QwtPlotShapeltem::shape ( ) const

## Returns

Shape to be displayed

## See Also

[setShape\(\)](#)

12.89.4.18 `bool QwtPlotShapeltem::testPaintAttribute ( PaintAttribute attribute ) const`

#### Returns

True, when attribute is enabled

#### See Also

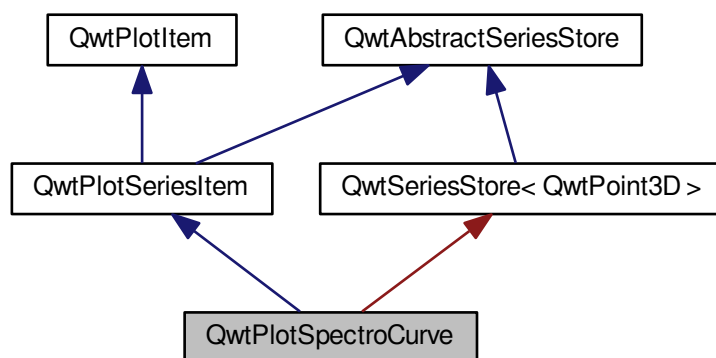
[setPaintAttribute\(\)](#)

## 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 }
- typedef `QFlags< PaintAttribute >` `PaintAttributes`

*Paint attributes.*

*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

<i>title</i>	Title of the curve
--------------	--------------------

##### 12.90.3.2 QwtPlotSpectroCurve::QwtPlotSpectroCurve ( const QwtText & *title* ) [explicit]

Constructor

Parameters

<i>title</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first sample to be painted
<i>to</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first sample to be painted
<i>to</i>	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

<i>colorMap</i>	Color Map
-----------------	-----------

See Also

[colorMap\(\)](#), [setColorRange\(\)](#), [QwtColorMap::color\(\)](#), [QwtScaleWidget::setColorBarEnabled\(\)](#), [QwtScaleWidget::setColorMap\(\)](#)

12.90.4.8 `void QwtPlotSpectroCurve::setColorRange ( const QwtInterval & interval )`

Set the value interval, that corresponds to the color map

Parameters

<i>interval</i>	<code>interval.minValue()</code> corresponds to 0.0, <code>interval.maxValue()</code> 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

<i>attribute</i>	Paint attribute
<i>on</i>	On/Off /sa PaintAttribute, <a href="#">testPaintAttribute()</a>

12.90.4.10 `void QwtPlotSpectroCurve::setPenWidth ( double penWidth )`

Assign a pen width

Parameters

<i>penWidth</i>	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

<i>samples</i>	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

<i>data</i>	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

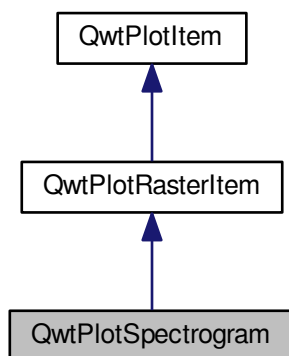
[PaintAttribute](#), [setPaintAttribute\(\)](#)

## 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

<i>title</i>	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

<i>level</i>	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

<i>area</i>	Rectangle, where to calculate the contour lines
<i>rect</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>contourLines</i>	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

<i>axis</i>	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 calculate the resolution and alignment of the rendered image.

The default implementation returns [data\(\)->pixelHint\( rect \);](#)

## Parameters

<i>area</i>	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

<i>rect</i>	Rectangle, where to calculate the contour lines
<i>raster</i>	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**

<i>xMap</i>	X-Scale Map
<i>yMap</i>	Y-Scale Map
<i>area</i>	Requested area for the image in scale coordinates
<i>imageSize</i>	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**

<i>xMap</i>	X-Scale Map
<i>yMap</i>	Y-Scale Map
<i>tile</i>	Geometry of the tile in image coordinates
<i>image</i>	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

<i>colorMap</i>	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

<i>flag</i>	CONREC flag
<i>on</i>	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

<i>levels</i>	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

<i>data</i>	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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	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

<i>mode</i>	Display mode
<i>on</i>	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

<i>flag</i>	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

<i>mode</i>	Display mode
-------------	--------------

## Returns

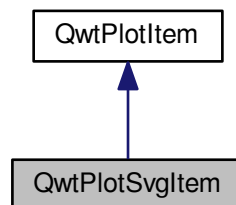
true if mode is enabled

## 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

<i>title</i>	Title
--------------	-------

#### 12.92.2.2 `QwtPlotSvgItem::QwtPlotSvgItem ( const QwtText & title ) [explicit]`

Constructor.

Sets the following item attributes:

- [QwtPlotItem::AutoScale](#): true
- [QwtPlotItem::Legend](#): false

#### Parameters

<i>title</i>	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

<i>painter</i>	Painter
<i>xMap</i>	X-Scale Map
<i>yMap</i>	Y-Scale Map
<i>canvasRect</i>	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

<i>rect</i>	Bounding rectangle
<i>data</i>	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

<i>rect</i>	Bounding rectangle
<i>fileName</i>	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

<i>painter</i>	Painter
<i>viewBox</i>	View Box, see <code>QSvgRenderer::viewBox()</code>
<i>rect</i>	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

<i>rect</i>	Rectangle in scale coordinates
-------------	--------------------------------

## Returns

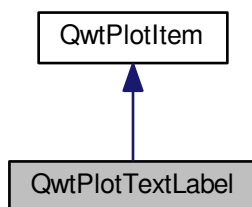
View box, see `QSvgRenderer::viewBox()`

## 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 *titleLabel = new QwtPlotTextLabel();
titleLabel->setText( title );
titleLabel->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

<i>painter</i>	Painter
<i>xMap</i>	x Scale Map
<i>yMap</i>	y Scale Map

<i>canvasRect</i>	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

<i>margin</i>	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

<i>text</i>	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

<i>rect</i>	Canvas rectangle with margins subtracted
<i>textSize</i>	Size required to draw the text

## Returns

A rectangle aligned according the the alignment flags of the text.

## See Also

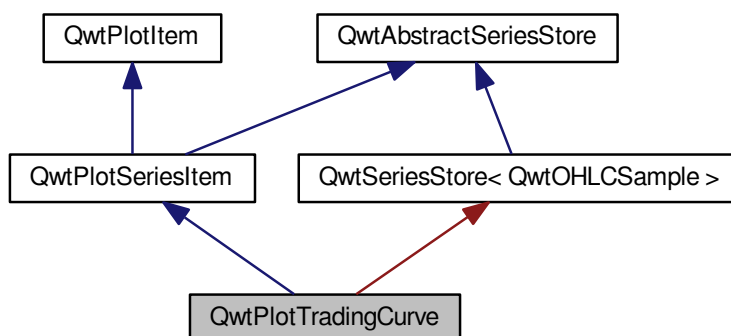
[setMargin\(\)](#), [QwtText::renderFlags\(\)](#), [QwtText::textSize\(\)](#)

## 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 QRectF &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  $\geq$  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

<i>title</i>	Title of the curve
--------------	--------------------

12.94.3.2 **QwtPlotTradingCurve::QwtPlotTradingCurve ( const QwtText & *title* )** `[explicit]`

## Constructor

## Parameters

<i>title</i>	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

<i>painter</i>	Qt painter, initialized with pen/brush
<i>sample</i>	Sample, already translated into paint device coordinates
<i>orientation</i>	Vertical or horizontal
<i>inverted</i>	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.
<i>width</i>	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

<i>painter</i>	Qt painter, initialized with pen/brush
<i>sample</i>	Samples already translated into paint device coordinates
<i>orientation</i>	Vertical or horizontal
<i>width</i>	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

<i>painter</i>	Painter
<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first point to be painted
<i>to</i>	Index of the last point to be painted. If <i>to</i> < 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

<i>painter</i>	Painter
<i>xMap</i>	x map
<i>yMap</i>	y map
<i>canvasRect</i>	Contents rectangle of the canvas
<i>from</i>	Index of the first point to be painted
<i>to</i>	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  $\geq$  UserSymbol.

The implementation does nothing and is intended to be overloaded

## Parameters

<i>painter</i>	Qt painter, initialized with pen/brush
<i>symbolStyle</i>	Symbol style
<i>sample</i>	Samples already translated into paint device coordinates
<i>orientation</i>	Vertical or horizontal
<i>inverted</i>	True, when the opposite scale ( Qt::Vertical: x, Qt::Horizontal: y ) is increasing in the opposite direction as QPainter coordinates.
<i>symbolWidth</i>	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

<i>index</i>	Index of the legend entry ( usually there is only one )
<i>size</i>	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

<i>xMap</i>	Maps x-values into pixel coordinates.
<i>yMap</i>	Maps y-values into pixel coordinates.
<i>canvasRect</i>	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  $\leq 0.0$  means an unlimited width

## Parameters

<i>width</i>	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

<i>width</i>	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

<i>attribute</i>	Paint attribute
<i>on</i>	On/Off

## See Also

[testPaintAttribute\(\)](#)

12.94.4.15 void QwtPlotTradingCurve::setSamples ( const QVector< QwtOHLCSample > & *samples* )

Initialize data with an array of samples.

## Parameters

<i>samples</i>	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

<i>data</i>	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

<i>direction</i>	Direction type
<i>brush</i>	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

<i>extent</i>	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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	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

<i>style</i>	Symbol style
--------------	--------------

## See Also

[symbolStyle\(\)](#), [setSymbolExtent\(\)](#), [setSymbolPen\(\)](#), [setSymbolBrush\(\)](#)

12.94.4.22 QBrush QwtPlotTradingCurve::symbolBrush ( *Direction direction* ) const

## Parameters

<i>direction</i>	
------------------	--

## 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\(\)](#)

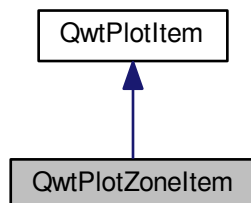


## 12.95 QwtPlotZoneItem Class Reference

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 [QwtPlotShapelItem](#)

## 12.95.2 Constructor &amp; Destructor Documentation

## 12.95.2.1 QwtPlotZonelItem::QwtPlotZonelItem ( ) [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 QwtPlotZonelItem::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 &amp; QwtPlotZonelItem::brush ( ) const

Returns

Brush used to fill the zone

See Also

[setPen\(\)](#), [brush\(\)](#)

## 12.95.3.3 void QwtPlotZonelItem::draw ( QPainter \* painter, const QwtScaleMap &amp; xMap, const QwtScaleMap &amp; yMap, const QRectF &amp; canvasRect ) const [virtual]

Draw the zone

Parameters

<i>painter</i>	Painter
<i>xMap</i>	x Scale Map
<i>yMap</i>	y Scale Map
<i>canvasRect</i>	Contents rectangle of the canvas in painter coordinates

Implements [QwtPlotItem](#).

## 12.95.3.4 QwtInterval QwtPlotZonelItem::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

<i>brush</i>	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

<i>min</i>	Minimum of the interval
<i>max</i>	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

<i>interval</i>	Zone interval
-----------------	---------------

## See Also

[interval\(\)](#), [setOrientation\(\)](#)

12.95.3.11 void QwtPlotZonItem::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 QwtPlotZonItem::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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	Pen style

## See Also

[pen\(\)](#), [brush\(\)](#)

12.95.3.13 void QwtPlotZonItem::setPen ( const QPen & *pen* )

Assign a pen.

The pen is used to draw the border lines of the zone

## Parameters

<i>pen</i>	Pen
------------	-----

## See Also

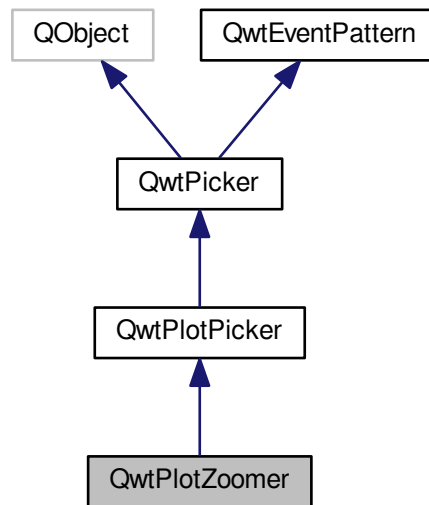
[pen\(\)](#), [setBrush\(\)](#)

## 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 [widgetMouseEvent](#) (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

<i>canvas</i>	Plot canvas to observe, also the parent object
<i>doReplot</i>	Call <a href="#">QwtPlot::replot()</a> 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

<i>xAxis</i>	X axis of the zoomer
<i>yAxis</i>	Y axis of the zoomer
<i>canvas</i>	Plot canvas to observe, also the parent object
<i>doReplot</i>	Call <a href="#">QwtPlot::replot()</a> 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

<i>ok</i>	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

<i>dx</i>	X offset
<i>dy</i>	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

<i>pos</i>	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

<i>xAxis</i>	X axis
<i>yAxis</i>	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

<i>depth</i>	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

<i>doReplot</i>	Call <a href="#">QwtPlot::replot()</a> 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

<i>base</i>	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

<i>zoomStack</i>	New zoom stack
<i>zoomRectIndex</i>	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**

<i>offset</i>	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**

<i>rect</i>	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

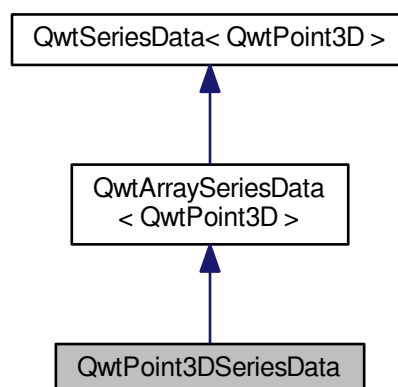
The z-coordinate of the point.

## 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 &amp; Destructor Documentation

12.98.2.1 `QwtPoint3DSeriesData::QwtPoint3DSeriesData ( const QVector< QwtPoint3D > & samples = QVector<QwtPoint3D>() )`

Constructor

Parameters

<i>samples</i>	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

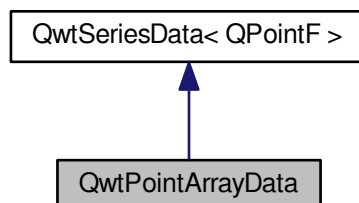
Implements [QwtSeriesData< QwtPoint3D >](#).

## 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

<i>x</i>	Array of x values
<i>y</i>	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

<i>x</i>	Array of x values
<i>y</i>	Array of y values
<i>size</i>	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

<i>index</i>	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 QPolygonF.*

- QPolygonF [toPointsF](#) (const [QwtScaleMap](#) &xMap, const [QwtScaleMap](#) &yMap, const [QwtSeriesData](#)< QPointF > \*series, int from, int to) const

*Translate a series into a QImage.*

- 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**

<i>rect</i>	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**

<i>flag</i>	Flag type
<i>on</i>	Value

**See Also**

[flag\(\)](#), [setFlags\(\)](#)

**12.100.4.5 void QwtPointMapper::setFlags ( TransformationFlags flags )**

Set the flags affecting the transformation process

**Parameters**

<i>flags</i>	Flags
--------------	-------

**See Also**

[flags\(\)](#), [setFlag\(\)](#)

**12.100.4.6 bool QwtPointMapper::testFlag ( TransformationFlag flag ) const****Returns**

True, when the flag is set

## Parameters

<i>flag</i>	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

<i>xMap</i>	x map
<i>yMap</i>	y map
<i>series</i>	Series of points to be mapped
<i>from</i>	Index of the first point to be painted
<i>to</i>	Index of the last point to be painted
<i>pen</i>	Pen used for drawing a point of the image, where a point is mapped to
<i>antialiased</i>	True, when the dots should be displayed antialiased
<i>numThreads</i>	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

<i>xMap</i>	x map
<i>yMap</i>	y map
<i>series</i>	Series of points to be mapped
<i>from</i>	Index of the first point to be painted
<i>to</i>	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

<i>xMap</i>	x map
<i>yMap</i>	y map
<i>series</i>	Series of points to be mapped
<i>from</i>	Index of the first point to be painted
<i>to</i>	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

<i>xMap</i>	x map
<i>yMap</i>	y map
<i>series</i>	Series of points to be mapped
<i>from</i>	Index of the first point to be painted
<i>to</i>	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

<i>xMap</i>	x map
<i>yMap</i>	y map
<i>series</i>	Series of points to be mapped
<i>from</i>	Index of the first point to be painted
<i>to</i>	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](http://en.wikipedia.org/wiki/Polar_coordinate_system)

## 12.101.2 Constructor &amp; 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

<i>azimuth</i>	Azimuth
<i>radius</i>	Radius

12.101.2.3 QwtPointPolar::QwtPointPolar ( const QwtPointPolar & *other* ) [inline]

Constructs a point using the values of the point specified.

## Parameters

<i>other</i>	Other point
--------------	-------------

12.101.2.4 QwtPointPolar::QwtPointPolar ( const QPointF & *p* )

Convert and assign values from a point in Cartesian coordinates

## Parameters

<i>p</i>	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  $\geq 0.0$  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

<i>p</i>	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

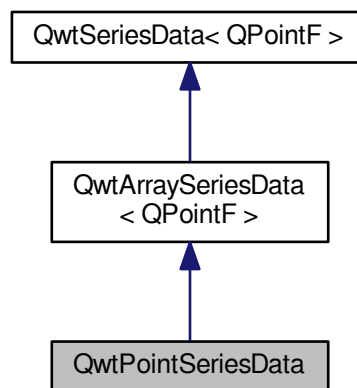
[isValid\(\)](#), [isNull\(\)](#)

## 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

<i>samples</i>	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

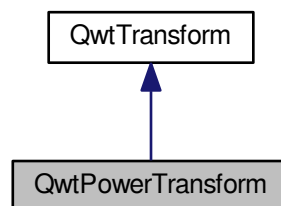
Implements [QwtSeriesData< QPointF >](#).

### 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 &amp; Destructor Documentation

12.103.2.1 QwtPowerTransform::QwtPowerTransform ( double *exponent* )

## Constructor

## Parameters

<i>exponent</i>	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

<i>value</i>	Value to be transformed
--------------	-------------------------

## Returns

Inverse exponentiation preserving the sign

Implements [QwtTransform](#).

12.103.3.3 **double QwtPowerTransform::transform ( double *value* ) const** [virtual]

## Parameters

<i>value</i>	Value to be transformed
--------------	-------------------------

## Returns

Exponentiation preserving the sign

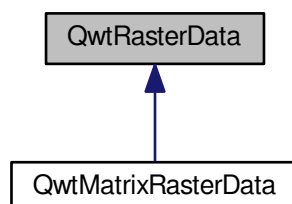
Implements [QwtTransform](#).

## 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

<i>rect</i>	Bounding rectangle for the contour lines
<i>raster</i>	Number of data pixels of the raster data
<i>levels</i>	List of limits, where to insert contour lines
<i>flags</i>	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 be 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 a good idea to reimplement `initRaster()`, where the data is resampled and loaded into memory.

## Parameters

<i>area</i>	Area of the raster
<i>raster</i>	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 an 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

<i>area</i>	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

<i>axis</i>	Axis
<i>interval</i>	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

<i>x</i>	X value in plot coordinates
<i>y</i>	Y value in plot coordinates

Implemented in [QwtMatrixRasterData](#).

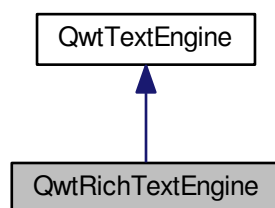
## 12.105 QwtRichTextEngine Class Reference

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

<i>painter</i>	Painter
<i>rect</i>	Clipping rectangle
<i>flags</i>	Bitwise OR of the flags like in for QPainter::drawText()
<i>text</i>	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

<i>font</i>	Font of the text
<i>flags</i>	Bitwise OR of the flags used like in QPainter::drawText()
<i>text</i>	Text to be rendered
<i>width</i>	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

<i>text</i>	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

<i>left</i>	Return 0
<i>right</i>	Return 0
<i>top</i>	Return 0
<i>bottom</i>	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

<i>font</i>	Font of the text
<i>flags</i>	Bitwise OR of the flags used like in QPainter::drawText()
<i>text</i>	Text to be rendered

## Returns

Calculated size

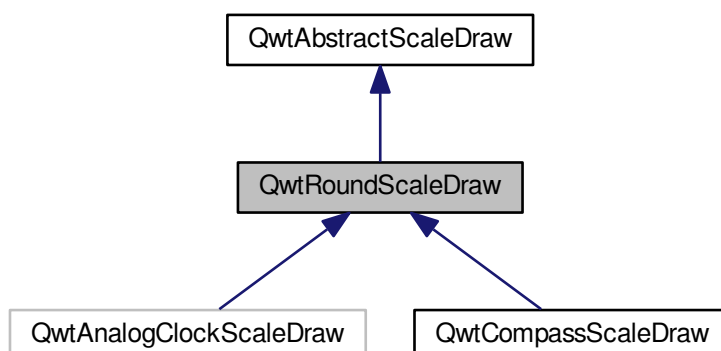
Implements [QwtTextEngine](#).

## 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 &amp; 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

<i>painter</i>	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

<i>painter</i>	Painter
<i>value</i>	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

<i>painter</i>	Painter
<i>value</i>	Value of the tick
<i>len</i>	Length 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**

<i>font</i>	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**

<i>center</i>	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**

<i>angle1</i>	boundaries of the angle interval in degrees.
<i>angle2</i>	

**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

<i>radius</i>	New Radius
---------------	------------

See Also

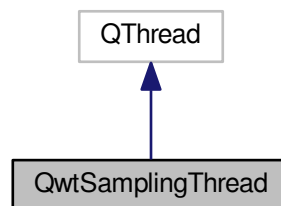
[moveCenter\(\)](#)

## 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

<i>elapsed</i>	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

<i>interval</i>	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

<i>value</i>	Value to be ceiled
<i>intervalSize</i>	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**

<i>intervalSize</i>	Interval size
<i>numSteps</i>	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**

<i>intervalSize</i>	Interval size
<i>numSteps</i>	Number of steps
<i>base</i>	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**

<i>value</i>	Value to be floored
<i>intervalSize</i>	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

<i>lowerBound</i>	First boundary
<i>upperBound</i>	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

<i>interval</i>	Interval
<i>ticks</i>	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

<i>lowerBound</i>	First boundary
<i>upperBound</i>	Second boundary
<i>ticks</i>	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

<i>lowerBound</i>	First boundary
<i>upperBound</i>	Second boundary
<i>minorTicks</i>	List of minor ticks
<i>mediumTicks</i>	List medium ticks
<i>majorTicks</i>	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**

<i>lowerBound</i>	Lower bound
<i>upperBound</i>	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**

<i>value</i>	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

<i>lowerBound</i>	First boundary
<i>upperBound</i>	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

<i>interval</i>	Interval
-----------------	----------

12.109.4.12 `void QwtScaleDiv::setLowerBound ( double lowerBound )`

Set the first boundary

Parameters

<i>lowerBound</i>	First boundary
-------------------	----------------

See Also

[lowerBound\(\)](#), [setUpperBound\(\)](#)

12.109.4.13 `void QwtScaleDiv::setTicks ( int type, const QList< double > & ticks )`

Assign ticks

**Parameters**

<i>type</i>	MinorTick, MediumTick or MajorTick
<i>ticks</i>	Values of the tick positions

12.109.4.14 `void QwtScaleDiv::setUpperBound ( double upperBound )`

Set the second boundary

**Parameters**

<i>upperBound</i>	Second boundary
-------------------	-----------------

**See Also**

[upperBound\(\)](#), [setLowerBound\(\)](#)

12.109.4.15 `QList< double > QwtScaleDiv::ticks ( int type ) const`

Return a list of ticks

**Parameters**

<i>type</i>	MinorTick, MediumTick or MajorTick
-------------	------------------------------------

**Returns**

Tick list

12.109.4.16 `double QwtScaleDiv::upperBound ( ) const`

**Returns**

upper bound

**See Also**

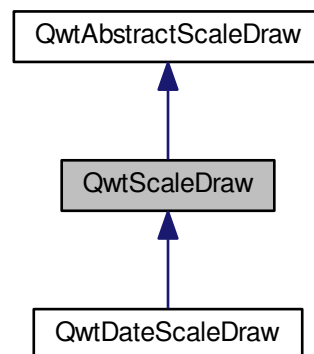
[lowerBound\(\)](#)

## 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 [setLabelAlignment\(\)](#).

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

<i>font</i>	Font used for painting
<i>value</i>	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

<i>painter</i>	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

<i>painter</i>	Painter
<i>value</i>	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

<i>painter</i>	Painter
<i>value</i>	Value of the tick
<i>len</i>	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

<i>font</i>	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

<i>font</i>	Font
<i>start</i>	Start border distance
<i>end</i>	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

<i>value</i>	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

<i>font</i>	Font used for painting
<i>value</i>	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

<i>font</i>	Label font
<i>value</i>	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

<i>pos</i>	Position where to paint the label
<i>size</i>	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

<i>font</i>	Font
-------------	------

Returns

the maximum height of a label

12.110.4.16 `int QwtScaleDraw::maxLabelWidth ( const QFont & font ) const`

Parameters

<i>font</i>	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

<i>font</i>	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

<i>font</i>	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

<i>x</i>	X coordinate
<i>y</i>	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

<i>pos</i>	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

<i>align</i>	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

<i>alignment</i>	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

<i>rotation</i>	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

<i>length</i>	Length of the backbone
---------------	------------------------

## See Also

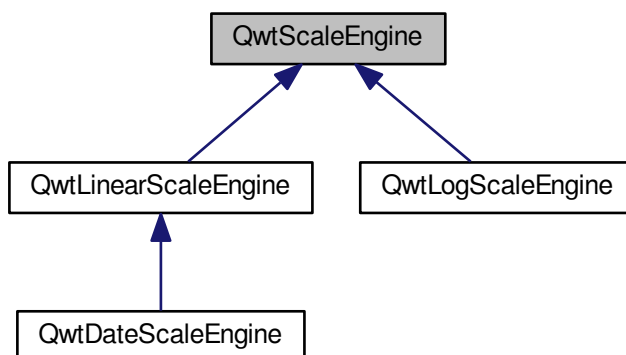
[move\(\)](#), [minLabelDist\(\)](#)

## 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

<i>base</i>	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

<i>maxNumSteps</i>	Max. number of steps
<i>x1</i>	First limit of the interval (In/Out)
<i>x2</i>	Second limit of the interval (In/Out)
<i>stepSize</i>	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  $[-0.5, 0.5]$ , otherwise it is  $[0.5 * v, 1.5 * v]$

## Parameters

<i>value</i>	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

<i>interval</i>	Interval
<i>value</i>	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

<i>intervalSize</i>	Interval size
<i>numSteps</i>	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

<i>x1</i>	First interval limit
<i>x2</i>	Second interval limit
<i>maxMajorSteps</i>	Maximum for the number of major steps
<i>maxMinorSteps</i>	Maximum number of minor steps
<i>stepSize</i>	Step size. If <i>stepSize</i> == 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

<i>attribute</i>	Attribute to change
<i>on</i>	On/Off

## See Also

[Attribute](#), [testAttribute\(\)](#)

12.111.4.11 void `QwtScaleEngine::setAttributes ( Attributes attributes )`

Change the scale attribute

## Parameters

<i>attributes</i>	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

<i>base</i>	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

<i>lower</i>	minimum distance between the scale's lower boundary and the smallest enclosed value
<i>upper</i>	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

<i>r</i>	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

<i>transform</i>	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

<i>ticks</i>	Tick list
<i>interval</i>	Interval

## Returns

Stripped tick list

12.111.4.17 bool QwtScaleEngine::testAttribute ( Attribute *attribute* ) const

## Returns

True, if attribute is enabled.

## Parameters

<i>attribute</i>	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 transformation

## 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 &amp; 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

<i>p</i>	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

<i>xMap</i>	X map
<i>yMap</i>	Y map
<i>rect</i>	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



<i>xMap</i>	X map
<i>yMap</i>	Y map
<i>pos</i>	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

<i>p1</i>	first border
<i>p2</i>	second border

12.112.3.12 `void QwtScaleMap::setScaleInterval ( double s1, double s2 )`

Specify the borders of the scale interval.

## Parameters

<i>s1</i>	first border
<i>s2</i>	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

<i>s</i>	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

<i>xMap</i>	X map
<i>yMap</i>	Y map
<i>rect</i>	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

<i>xMap</i>	X map
<i>yMap</i>	Y map
<i>pos</i>	Position in scale coordinates

## Returns

Position in paint coordinates

## See Also

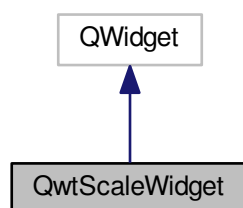
[invTransform\(\)](#)

### 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

<i>parent</i>	Parent widget
---------------	---------------

#### 12.113.3.2 QwtScaleWidget::QwtScaleWidget ( QwtScaleDraw::Alignment *align*, QWidget \* *parent* = NULL ) [explicit]

Constructor.

## Parameters

<i>align</i>	Alignment.
<i>parent</i>	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

<i>rect</i>	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

<i>length</i>	width for horizontal, height for vertical scales
<i>scaleFont</i>	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

<i>painter</i>	Painter
<i>rect</i>	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

<i>painter</i>	Painter
<i>align</i>	Alignment
<i>rect</i>	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 and the minimum border distance is returned.

## Parameters

<i>start</i>	Return parameter for the border width at the beginning of the scale
<i>end</i>	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

<i>start</i>	Return parameter for the border width at the beginning of the scale
<i>end</i>	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

<i>update_ - geometry</i>	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

<i>event</i>	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

<i>alignment</i>	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

<i>dist1</i>	Left or top Distance
<i>dist2</i>	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

<i>width</i>	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

<i>interval</i>	Value interval
<i>colorMap</i>	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

<i>rotation</i>	Rotation
-----------------	----------

## See Also

[QwtScaleDraw::setLabelRotation\(\)](#), [setLabelFlags\(\)](#)

12.113.4.27 void QwtScaleWidget::setLayoutFlag ( LayoutFlag *flag*, bool *on* )

Toggle an layout flag

## Parameters

<i>flag</i>	Layout flag
<i>on</i>	true/false

## See Also

[testLayoutFlag\(\)](#), [LayoutFlag](#)

12.113.4.28 void QwtScaleWidget::setMargin ( int *margin* )

Specify the margin to the colorBar/base line.

## Parameters

<i>margin</i>	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

<i>start</i>	Minimum for the start border
<i>end</i>	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

<i>scaleDiv</i>	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

<i>scaleDraw</i>	ScaleDraw object
------------------	------------------

## See Also

[scaleDraw\(\)](#)

12.113.4.32 void QwtScaleWidget::setSpacing ( int *spacing* )

Specify the distance between color bar, scale and title.

## Parameters

<i>spacing</i>	Spacing
----------------	---------

See Also

[spacing\(\)](#)

12.113.4.33 void QwtScaleWidget::setTitle ( const QString & *title* )

Give title new text contents

Parameters

<i>title</i>	New title
--------------	-----------

See Also

[title\(\)](#), [setTitle\(const QwtText &\);](#)

12.113.4.34 void QwtScaleWidget::setTitle ( const QwtText & *title* )

Give title new text contents

Parameters

<i>title</i>	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

<i>transformation</i>	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

<i>flag</i>	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

<i>width</i>	Width
--------------	-------

#### Returns

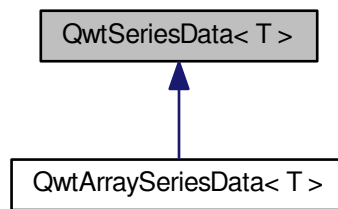
height Height

## 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>i</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

<i>rect</i>	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

<i>index</i>	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

<i>series</i>	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

<i>rect</i>	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

<i>series</i>	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 &amp; 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

<i>v</i>	Value
<i>s</i>	Set of values

## 12.116.3 Member Function Documentation

12.116.3.1 `double QwtSetSample::added ( ) const` `[inline]`

## Returns

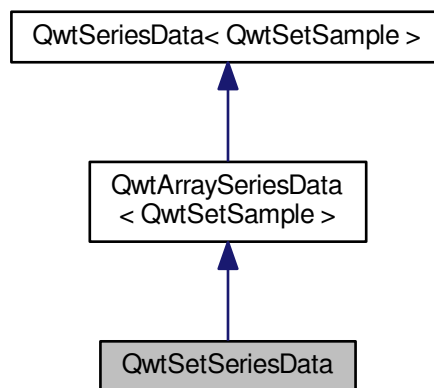
All values of the set added

## 12.117 QwtSetSeriesData Class Reference

Interface for iterating over an array of samples.

```
#include <qwt_series_data.h>
```

Inheritance diagram for QwtSetSeriesData:



## 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 &amp; Destructor Documentation

12.117.2.1 **QwtSetSeriesData::QwtSetSeriesData** ( const QVector< **QwtSetSample** > & *samples* =  
QVector<**QwtSetSample**> () )

Constructor

## Parameters

<i>samples</i>	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

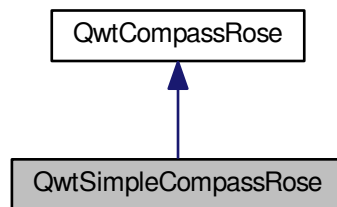
Implements [QwtSeriesData< QwtSetSample >](#).

## 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

<i>numThorns</i>	Number of thorns
<i>numThornLevels</i>	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

<i>painter</i>	Painter
<i>center</i>	Center point
<i>radius</i>	Radius of the rose
<i>north</i>	Position
<i>cg</i>	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

<i>painter</i>	Painter
<i>palette</i>	Palette
<i>center</i>	Center of the rose
<i>radius</i>	Radius of the rose
<i>north</i>	Position pointing to north
<i>width</i>	Width of the rose
<i>numThorns</i>	Number of thorns
<i>numThornLevels</i>	Number of thorn levels
<i>shrinkFactor</i>	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

<i>numThornLevels</i>	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

<i>numThorns</i>	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

<i>factor</i>	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

<i>width</i>	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

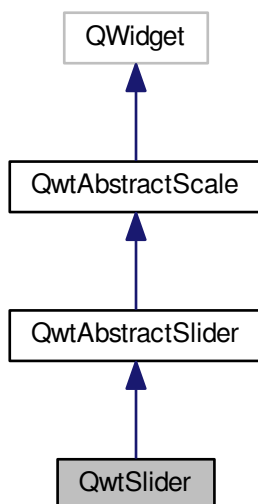
[setWidth\(\)](#)

## 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
- virtual bool [isScrollPosition](#) (const QPoint &) const
- 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

<i>parent</i>	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

<i>parent</i>	Parent widget
<i>orientation</i>	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

<i>event</i>	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

<i>painter</i>	Painter
<i>handleRect</i>	Bounding rectangle of the handle
<i>pos</i>	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

<i>painter</i>	Painter
<i>sliderRect</i>	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 visible

#### 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

<i>pos</i>	Mouse position
------------	----------------

#### Return values

<i>True, when</i>	<a href="#">handleRect()</a> 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

<i>event</i>	Mouse event
--------------	-------------

Reimplemented from [QwtAbstractSlider](#).

12.119.4.12 `void QwtSlider::mouseReleaseEvent ( QMouseEvent * event )` `[protected]`, `[virtual]`

Mouse release event handler

#### Parameters

<i>event</i>	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

<i>event</i>	Paint event
--------------	-------------

12.119.4.15 `void QwtSlider::resizeEvent ( QResizeEvent * event )` `[protected]`, `[virtual]`

Qt resize event handler

Parameters

<i>event</i>	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

<i>pos</i>	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

<i>width</i>	Border width
--------------	--------------

## See Also

[borderWidth\(\)](#)

12.119.4.20 void QwtSlider::setGroove ( bool *on* )

En/Disable the groove

The slider can be customized by showing a groove for the handle.

## Parameters

<i>on</i>	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

<i>size</i>	New size
-------------	----------

## See Also

[handleSize\(\)](#)

12.119.4.22 void QwtSlider::setOrientation ( Qt::Orientation *orientation* )

Set the orientation.

## Parameters

<i>orientation</i>	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

---

<i>scaleDraw</i>	ScaleDraw object, that has to be created with new and will be deleted in <code>~QwtSlider()</code> or the next call of <code>setScaleDraw()</code> .
------------------	--

See Also

`scaleDraw()`

#### 12.119.4.24 void QwtSlider::setScalePosition ( **ScalePosition** *scalePosition* )

Change the position of the scale.

Parameters

<i>scalePosition</i>	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

<i>spacing</i>	Number of pixels
----------------	------------------

See Also

[spacing\(\)](#);

#### 12.119.4.26 void QwtSlider::setTrough ( **bool** *on* )

En/Disable the trough

The slider can be customized by showing a trough for the handle.

Parameters

<i>on</i>	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



<i>interval</i>	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

<i>event</i>	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 &amp; Destructor Documentation

12.120.3.1 QwtSpline::QwtSpline ( const QwtSpline & *other* )

Copy constructor

## Parameters

<i>other</i>	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&lt; double &gt; &amp; QwtSpline::coefficientsA ( ) const

## Returns

A coefficients

## 12.120.4.4 const QVector&lt; double &gt; &amp; QwtSpline::coefficientsB ( ) const

## Returns

B coefficients

## 12.120.4.5 const QVector&lt; double &gt; &amp; QwtSpline::coefficientsC ( ) const

## Returns

C coefficients

12.120.4.6 QwtSpline & QwtSpline::operator= ( const QwtSpline & *other* )

Assignment operator

## Parameters

<i>other</i>	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 &amp; 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

<i>points</i>	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

<i>splineType</i>	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

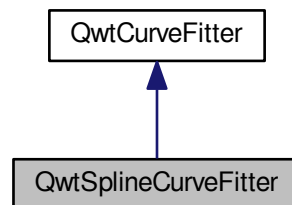
Interpolated coordinate

## 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

<i>points</i>	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

<i>mode</i>	Mode representing a spline algorithm
-------------	--------------------------------------

See Also

[fitMode\(\)](#)

12.121.3.4 void QwtSplineCurveFitter::setSpline ( const QwtSpline & *spline* )

Assign a spline

## Parameters

<i>spline</i>	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

<i>splineSize</i>	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 ( QPainterEngine::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  $\geq$  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

<i>style</i>	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

<i>style</i>	Symbol Style
<i>brush</i>	brush to fill the interior
<i>pen</i>	outline pen
<i>size</i>	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

<i>path</i>	painter path
<i>brush</i>	brush to fill the interior
<i>pen</i>	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 &amp; 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

<i>painter</i>	Painter
<i>rect</i>	Target rectangle for the symbol

## 12.122.4.5 void QwtSymbol::drawSymbol ( QPainter \* painter, const QPointF &amp; pos ) const [inline]

Draw the symbol at a specified position.

## Parameters

<i>painter</i>	Painter
<i>pos</i>	Position of the symbol in screen coordinates

## 12.122.4.6 void QwtSymbol::drawSymbols ( QPainter \* painter, const QPolygonF &amp; points ) const [inline]

Draw symbols at the specified points.

## Parameters

<i>painter</i>	Painter
<i>points</i>	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

<i>painter</i>	Painter
<i>points</i>	Array of points
<i>numPoints</i>	Number of points

## 12.122.4.8 const QwtGraphic &amp; 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 on 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

<i>painter</i>	Qt painter
<i>points</i>	Positions of the symbols
<i>numPoints</i>	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

<i>brush</i>	Brush
--------------	-------

See Also

[brush\(\)](#)

12.122.4.17 `void QwtSymbol::setCachePolicy ( QwtSymbol::CachePolicy policy )`

Change the cache policy

The default policy is AutoCache

Parameters

<i>policy</i>	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

<i>color</i>	Color
--------------	-------

**See Also**

[setBrush\(\)](#), [setPen\(\)](#), [brush\(\)](#), [pen\(\)](#)

**12.122.4.19 void QwtSymbol::setGraphic ( const QwtGraphic & *graphic* )**

Set a graphic as symbol

**Parameters**

<i>graphic</i>	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

<i>path</i>	Painter path
-------------	--------------

## Note

The style is implicitly 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

<i>color</i>	Pen color
<i>width</i>	Pen width
<i>style</i>	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

<i>pen</i>	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 QPixmap, Graphic, SvgDocument or PainterPath symbol where the represented point has to be aligned to.

## Parameters

<i>pos</i>	Position
<i>enable</i>	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

<i>on</i>	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

<i>pixmap</i>	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

<i>size</i>	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

<i>width</i>	Width
<i>height</i>	Height (defaults to -1)

## See Also

[size\(\)](#)

12.122.4.28 void QwtSymbol::setStyle ( QwtSymbol::Style *style* )

Specify the symbol style

## Parameters

<i>style</i>	Style
--------------	-------

## See Also

[style\(\)](#)

12.122.4.29 void QwtSymbol::setSvgDocument ( const QByteArray & *svgDocument* )

Set a SVG icon as symbol

## Parameters

<i>svgDocument</i>	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

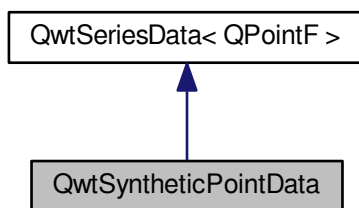
[setStyle\(\)](#)

## 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

<i>size</i>	Number of points
<i>interval</i>	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

<i>index</i>	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

<i>interval</i>	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::updateScaleDiv\(\)](#) ).

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

<i>size</i>	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

<i>index</i>	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

<i>x</i>	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 &amp; Destructor Documentation

12.125.3.1 **QwtText::QwtText ( const QString & text = QString::null, QwtText::TextFormat textFormat = AutoText )**

Constructor

Parameters

<i>text</i>	Text content
<i>textFormat</i>	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

<i>painter</i>	Painter
<i>rect</i>	Rectangle

12.125.4.5 `double QwtText::heightForWidth ( double width, const QFont & defaultFont = QFont ( ) ) const`

Find the height for a given width

Parameters

<i>defaultFont</i>	Font, used for the calculation if the text has no font
<i>width</i>	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

<i>brush</i>	Background brush
--------------	------------------

## See Also

[backgroundBrush\(\)](#), [setBorderPen\(\)](#)

12.125.4.10 void QwtText::setBorderPen ( const QPen & *pen* )

Set the background pen

## Parameters

<i>pen</i>	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

<i>radius</i>	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

<i>color</i>	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

<i>font</i>	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

<i>attribute</i>	Layout attribute
<i>on</i>	On/Off

## See Also

[testLayoutAttribute\(\)](#)

12.125.4.15 `void QwtText::setPaintAttribute ( PaintAttribute attribute, bool on = true )`

Change a paint attribute

## Parameters

<i>attribute</i>	Paint attribute
<i>on</i>	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

<i>renderFlags</i>	Bitwise OR of the flags used like in <code>QPainter::drawText()</code>
--------------------	--

## 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

<i>text</i>	Text content
<i>textFormat</i>	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

<i>format</i>	Text format
<i>engine</i>	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

<i>attribute</i>	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

<i>attribute</i>	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 returned.

## Parameters

<i>text</i>	Text, needed in case of AutoText
<i>format</i>	Text format

## Returns

Corresponding text engine

**12.125.4.23** `const QTextEngine * QText::textEngine ( QText::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

<i>format</i>	Text format
---------------	-------------

## Returns

The text engine, or NULL if no engine is available.

**12.125.4.24** `QSizeF QText::textSize ( const QFont & defaultFont = QFont () ) const`

Find the height for a given width

## Parameters

<i>defaultFont</i>	Font, used for the calculation if the text has no font
--------------------	--

## Returns

Calculated height

Returns the size, that is needed to render text

## Parameters

<i>defaultFont</i>	Font of the text
--------------------	------------------

## Returns

Caluclated size

**12.125.4.25** `QColor QText::usedColor ( const QColor & defaultColor ) const`

Return the color of the text, if it has one. Otherwise return defaultColor.

## Parameters

<i>defaultColor</i>	Default color
---------------------	---------------

## Returns

Color used for drawing the text

## See Also

[setColor\(\)](#), [color\(\)](#), [PaintAttributes](#)

**12.125.4.26** `QFont QText::usedFont ( const QFont & defaultFont ) const`

Return the font of the text, if it has one. Otherwise return defaultFont.

## Parameters

<i>defaultFont</i>	Default font
--------------------	--------------

## Returns

Font used for drawing the text

## See Also

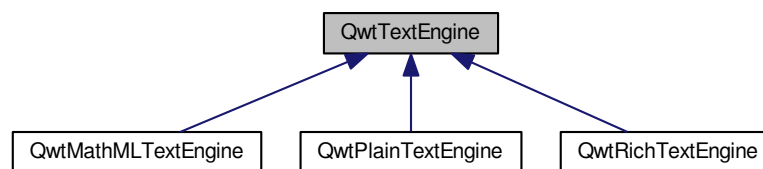
[setFont\(\)](#), [font\(\)](#), [PaintAttributes](#)

## 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 [QwtMathMLTextEngine](#) 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

<i>painter</i>	Painter
<i>rect</i>	Clipping rectangle
<i>flags</i>	Bitwise OR of the flags like in for QPainter::drawText()
<i>text</i>	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

<i>font</i>	Font of the text
<i>flags</i>	Bitwise OR of the flags used like in QPainter::drawText
<i>text</i>	Text to be rendered
<i>width</i>	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

<i>text</i>	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

<i>font</i>	Font of the text
<i>text</i>	Text to be rendered
<i>left</i>	Return value for the left margin
<i>right</i>	Return value for the right margin
<i>top</i>	Return value for the top margin
<i>bottom</i>	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

<i>font</i>	Font of the text
<i>flags</i>	Bitwise OR of the flags like in for QPainter::drawText
<i>text</i>	Text to be rendered

## Returns

Calculated size

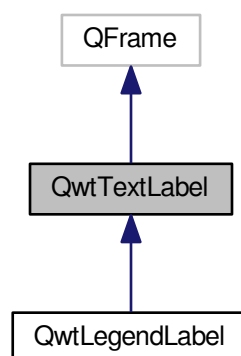
Implemented in [QwtRichTextEngine](#), [QwtPlainTextEngine](#), and [QwtMathMLTextEngine](#).

## 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

<i>parent</i>	Parent widget
---------------	---------------

##### 12.127.2.2 `QwtTextLabel::QwtTextLabel ( const QwtText & text, QWidget * parent = NULL )` [explicit]

Constructs a label that displays the text, text

## Parameters

<i>parent</i>	Parent widget
<i>text</i>	Text

## 12.127.3 Member Function Documentation

12.127.3.1 `int QwtTextLabel::heightForWidth ( int width ) const` [virtual]

## Parameters

<i>width</i>	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

<i>event</i>	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

<i>indent</i>	Indentation in pixels
---------------	-----------------------

12.127.3.5 `void QwtTextLabel::setMargin ( int margin )`

Set label's margin in pixels

## Parameters

<i>margin</i>	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

<i>text</i>	New text
<i>textFormat</i>	Format of text

## See Also

[QwtText](#)

**12.127.3.8** void QwtTextLabel::setText ( const QwtText & *text* ) [virtual],[slot]

Change the label's text

## Parameters

<i>text</i>	New text
-------------	----------

Reimplemented in [QwtLegendLabel](#).

**12.127.3.9** QRect QwtTextLabel::textRect ( ) const

Calculate geometry for the text in widget coordinates

## Returns

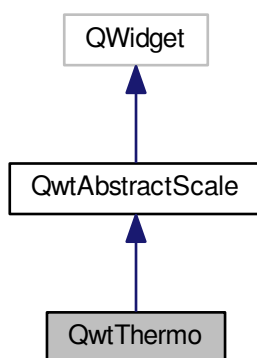
Geometry for the text

## 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 &amp; Destructor Documentation

12.128.3.1 `QwtThermo::QwtThermo ( QWidget * parent = NULL ) [explicit]`

Constructor

Parameters

<i>parent</i>	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

<i>fillRect</i>	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

<i>event</i>	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

<i>painter</i>	Painter
<i>pipeRect</i>	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

<i>pipeRect</i>	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

<i>event</i>	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

<i>event</i>	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

<i>brush</i>	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**

<i>on</i>	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**

<i>level</i>	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**

<i>width</i>	Border width
--------------	--------------

**See Also**

[borderWidth\(\)](#)

**12.128.4.28** void QwtThermo::setColorMap ( QwtColorMap \* *colorMap* )

Assign a color map for the fill color.

**Parameters**

<i>colorMap</i>	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**

<i>brush</i>	New brush.
--------------	------------

See Also

[fillBrush\(\)](#), [QWidget::setPalette\(\)](#)

12.128.4.30 void QwtThermo::setOrientation ( Qt::Orientation *orientation* )

Set the orientation.

Parameters

<i>orientation</i>	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

<i>origin</i>	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

<i>width</i>	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

<i>flags</i>	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

<i>scaleDraw</i>	ScaleDraw object, that has to be created with new and will be deleted in <a href="#">~QwtThermo()</a> or the next call of <a href="#">setScaleDraw()</a> .
------------------	--

12.128.4.36 void QwtThermo::setScalePosition ( ScalePosition *scalePosition* )

Change the position of the scale.

## Parameters

<i>scalePosition</i>	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

<i>spacing</i>	Number of pixels
----------------	------------------

## See Also

[spacing\(\)](#);

12.128.4.38 void QwtThermo::setValue ( double *value* ) [virtual],[slot]

Set the current value.

## Parameters

<i>value</i>	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

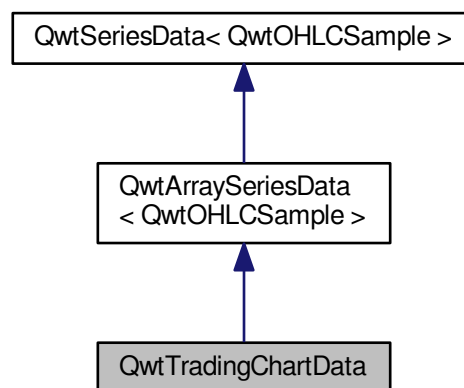
See Also

[setSpacing\(\)](#)

## 12.129 QwtTradingChartData Class Reference

```
#include <qwt_series_data.h>
```

Inheritance diagram for QwtTradingChartData:



### 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

<i>samples</i>	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

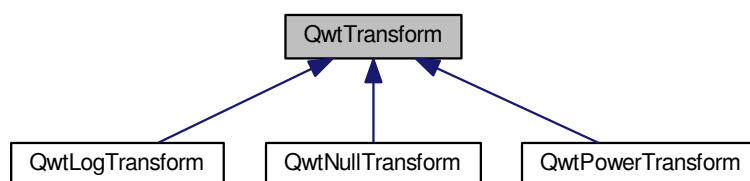
Implements [QwtSeriesData< QwtOHLCSample >](#).

## 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 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, [QwtScaleMap](#) uses the following calculations:

- $p = p1 + (p2 - p1) * (T(s) - T(s1)) / (T(s2) - T(s1))$ ;
- $s = \text{invT}(T(s1) + (T(s2) - T(s1)) * (p - p1) / (p2 - p1))$ ;

## 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

<i>value</i>	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

<i>value</i>	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

<i>value</i>	Value
--------------	-------

## Returns

Modified value

## See Also

[invTransform\(\)](#)

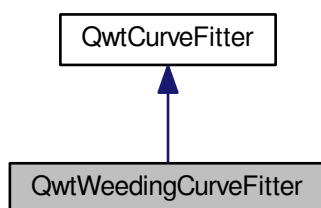
Implemented in [QwtPowerTransform](#), [QwtLogTransform](#), and [QwtNullTransform](#).

### 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  $O(n \cdot n)$  ) 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

<i>tolerance</i>	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

<i>points</i>	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

<i>numPoints</i>	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

<i>tolerance</i>	Tolerance
------------------	-----------

See Also

[tolerance\(\)](#)

12.131.3.5 double QwtWeedingCurveFitter::tolerance ( ) const

Returns

Tolerance

See Also

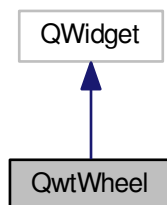
[setTolerance\(\)](#)

## 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

<i>painter</i>	Painter
<i>rect</i>	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

<i>painter</i>	Painter
<i>rect</i>	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

<i>event</i>	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

<i>event</i>	Mouse event
--------------	-------------

12.132.2.12 `void QwtWheel::mousePressEvent ( QMouseEvent * event )` [protected],[virtual]

Mouse press event handler.

Start movement of the wheel.

## Parameters

<i>event</i>	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

<i>event</i>	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

<i>event</i>	Paint event
--------------	-------------

12.132.2.17 `void QwtWheel::setBorderWidth ( int width )`

Set the border width.

The border defaults to 2.

## Parameters

<i>width</i>	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

<i>on</i>	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

<i>mass</i>	New mass in kg
-------------	----------------

## See Also

[mass\(\)](#)

12.132.2.20 `void QwtWheel::setMaximum ( double value )`

Set the maximum value of the range

## Parameters

<i>value</i>	Maximum value
--------------	---------------

## See Also

[setRange\(\)](#), [setMinimum\(\)](#), [maximum\(\)](#)

12.132.2.21 `void QwtWheel::setMinimum ( double value )`

Set the minimum value of the range

## Parameters

<i>value</i>	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

<i>orientation</i>	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

<i>count</i>	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

<i>min</i>	Minimum value
<i>max</i>	Maximum value

## See Also

[minimum\(\)](#), [maximum\(\)](#)

**12.132.2.25 void QwtWheel::setSingleStep ( double *stepSize* )**

Set the step size of the counter.

A value  $\leq 0.0$  disables stepping

## Parameters

<i>stepSize</i>	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

<i>on</i>	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  $6 \leq \text{count} \leq 50$ . Values outside this range will be clipped. The default value is 10.

## Parameters

<i>count</i>	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  $n \times 360$  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

<i>angle</i>	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 if tracking is enabled or not.

## Parameters

<i>enable</i>	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

<i>interval</i>	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

<i>value</i>	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

<i>angle</i>	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

<i>borderWidth</i>	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

<i>width</i>	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

<i>on</i>	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

<i>event</i>	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

<i>pos</i>	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

<i>value</i>	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

<i>event</i>	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

<i>value</i>	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

[setWidth\(\)](#)

12.132.2.54 bool QwtWheel::wrapping ( ) const

## Returns

True, when wrapping is set

## See Also

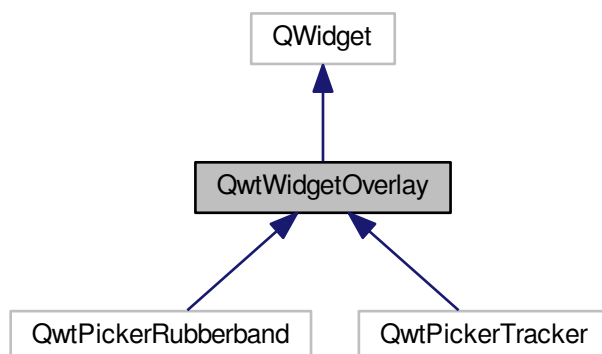
[setWrapping\(\)](#)

## 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 &amp; Destructor Documentation

12.133.3.1 QwtWidgetOverlay::QwtWidgetOverlay ( QWidget \* *widget* )

Constructor.

## Parameters

<i>widget</i>	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

<i>painter</i>	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

<i>object</i>	Object to be filtered
<i>event</i>	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

<i>event</i>	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

<i>event</i>	Resize event
--------------	--------------

12.133.4.8 **void** QwtWidgetOverlay::setMaskMode ( **MaskMode** *mode* )

Specify how to find the mask for the overlay.

Parameters

<i>mode</i>	New mode
-------------	----------

See Also

[maskMode\(\)](#)

12.133.4.9 **void** QwtWidgetOverlay::setRenderMode ( **RenderMode** *mode* )

Set the render mode



## Parameters

<i>mode</i>	Render mode
-------------	-------------

## See Also

[RenderMode](#), [renderMode\(\)](#)

12.133.4.10 void QwtWidgetOverlay::updateOverlay ( )

Recalculate the mask and repaint the overlay

## Index

- ~QwtPlotDict
  - QwtPlotDict, [317](#)
- ~QwtScaleMap
  - QwtScaleMap, [537](#)
- abstractScaleDraw
  - QwtAbstractScale, [37](#)
- accept
  - QwtPicker, [239](#)
  - QwtPlotZoomer, [480](#)
- activate
  - QwtPlotLayout, [365](#)
- activated
  - QwtPicker, [239](#)
- ActiveOnly
  - QwtPicker, [237](#)
- addColorStop
  - QwtLinearColorMap, [191](#)
- addItem
  - QwtDynGridLayout, [130](#)
- added
  - QwtSetSample, [557](#)
- adjustedPoints
  - QwtPicker, [239](#)
- alarmBrush
  - QwtThermo, [610](#)
- alarmEnabled
  - QwtThermo, [610](#)
- alarmLevel
  - QwtThermo, [610](#)
- alarmRect
  - QwtThermo, [611](#)
- align
  - QwtLinearScaleEngine, [194](#)
  - QwtLogScaleEngine, [197](#)
- AlignScales
  - QwtPlotLayout, [365](#)
- alignCanvasToScale
  - QwtPlotLayout, [365](#)
- alignDate
  - QwtDateScaleEngine, [111](#)
- alignLegend
  - QwtPlotLayout, [365](#)
- alignScales
  - QwtPlotLayout, [366](#)
- Alignment
  - QwtScaleDraw, [522](#)
- alignment
  - QwtKnob, [169](#)
  - QwtPlotLegendItem, [375](#)
  - QwtScaleDraw, [522](#)
  - QwtScaleWidget, [542](#)
- alpha
  - QwtPlotRasterItem, [409](#)
- AlphaMask
  - QwtWidgetOverlay, [639](#)
- AlwaysOff
  - QwtPicker, [237](#)
- AlwaysOn
  - QwtPicker, [237](#)
- append
  - QwtPicker, [240](#)
  - QwtPlotPicker, [403](#)
- appended
  - QwtPicker, [240](#)
  - QwtPlotPicker, [403](#)
- applyProperties
  - QwtPlot, [268](#)
- Arrow
  - QwtDialSimpleNeedle, [127](#)
- arrowSize
  - QwtArrowButton, [70](#)
- aspectRatio
  - QwtPlotRescaler, [423](#)
- AtomicPainter
  - QwtPlotDirectPainter, [320](#)
- attach
  - QwtPlotItem, [353](#)
- Attribute
  - QwtPlotDirectPainter, [319](#)
  - QwtScaleEngine, [531](#)
- attributes
  - QwtScaleEngine, [532](#)
- Auto
  - QwtSplineCurveFitter, [575](#)
- AutoAdjustSamples
  - QwtPlotAbstractBarChart, [286](#)
- AutoCache
  - QwtSymbol, [578](#)
- AutoRenderMode
  - QwtWidgetOverlay, [640](#)
- AutoScale
  - QwtPlotItem, [351](#)
- AutoText
  - QwtText, [595](#)
- autoDelete
  - QwtPlotDict, [317](#)
- autoReplot
  - QwtPlot, [268](#)
- autoScale
  - QwtDateScaleEngine, [111](#)
  - QwtLinearScaleEngine, [194](#)
  - QwtLogScaleEngine, [197](#)
  - QwtScaleEngine, [532](#)
- Axis
  - QwtPlot, [267](#)
- axisCnt
  - QwtPlot, [267](#)
- axisAutoScale
  - QwtPlot, [268](#)

- axisEnabled
  - QwtPlot, [269](#)
- axisFont
  - QwtPlot, [269](#)
- axisInterval
  - QwtPlot, [269](#)
- axisMaxMajor
  - QwtPlot, [269](#)
- axisMaxMinor
  - QwtPlot, [269](#)
- axisScaleDiv
  - QwtPlot, [270](#)
- axisScaleDraw
  - QwtPlot, [270](#)
- axisScaleEngine
  - QwtPlot, [270](#)
- axisStepSize
  - QwtPlot, [271](#)
- axisTitle
  - QwtPlot, [271](#)
- axisValid
  - QwtPlot, [271](#)
- axisWidget
  - QwtPlot, [271](#)
- Backbone
  - QwtAbstractScaleDraw, [44](#)
- backgroundBrush
  - QwtPlotLegendItem, [375](#)
  - QwtText, [595](#)
- BackgroundMode
  - QwtPlotLegendItem, [374](#)
- backgroundMode
  - QwtPlotLegendItem, [375](#)
- BackingStore
  - QwtPlotCanvas, [298](#)
- backingStore
  - QwtPainter, [222](#)
  - QwtPlotCanvas, [299](#)
- Bar
  - QwtIntervalSymbol, [164](#)
  - QwtPlotTradingCurve, [466](#)
- barTitle
  - QwtPlotBarChart, [292](#)
- barTitles
  - QwtPlotMultiBarChart, [392](#)
- base
  - QwtScaleEngine, [532](#)
- baseline
  - QwtPlotAbstractBarChart, [286](#)
  - QwtPlotCurve, [307](#)
  - QwtPlotHistogram, [335](#)
- begin
  - QwtPicker, [240](#)
  - QwtPlotZoomer, [481](#)
- BilinearInterpolation
  - QwtMatrixRasterData, [212](#)
- borderDistance
  - QwtPlotLegendItem, [375](#)
- QwtPlotScaleItem, [431](#)
- BorderFlag
  - QwtInterval, [153](#)
- borderFlags
  - QwtInterval, [154](#)
- borderPath
  - QwtPlotCanvas, [299](#)
  - QwtPlotGLCanvas, [324](#)
- borderPen
  - QwtPlotLegendItem, [375](#)
  - QwtText, [595](#)
- borderRadius
  - QwtPlotCanvas, [299](#)
  - QwtPlotLegendItem, [375](#)
  - QwtText, [595](#)
- borderWidth
  - QwtSlider, [564](#)
  - QwtThermo, [611](#)
  - QwtWheel, [627](#)
- BottomLegend
  - QwtPlot, [268](#)
- BottomScale
  - QwtScaleDraw, [522](#)
- BottomToTop
  - QwtColumnRect, [76](#)
- bounded
  - QwtLogTransform, [200](#)
  - QwtScaleDiv, [517](#)
  - QwtTransform, [621](#)
- boundingInterval
  - QwtOHLCSample, [219](#)
- boundingLabelRect
  - QwtScaleDraw, [523](#)
- boundingRect
  - QwtCPointerData, [98](#)
  - QwtDial, [117](#)
  - QwtGraphic, [144](#)
  - QwtIntervalSeriesData, [163](#)
  - QwtPlotBarChart, [292](#)
  - QwtPlotHistogram, [335](#)
  - QwtPlotIntervalCurve, [343](#)
  - QwtPlotItem, [353](#)
  - QwtPlotMarker, [386](#)
  - QwtPlotMultiBarChart, [392](#)
  - QwtPlotRasterItem, [409](#)
  - QwtPlotSeriesItem, [436](#)
  - QwtPlotTradingCurve, [467](#)
  - QwtPlotZonItem, [475](#)
  - QwtPoint3DSeriesData, [489](#)
  - QwtPointArrayData, [490](#)
  - QwtPointMapper, [492](#)
  - QwtPointSeriesData, [500](#)
  - QwtSeriesData, [552](#)
  - QwtSetSeriesData, [559](#)
  - QwtSymbol, [580](#)
  - QwtSyntheticPointData, [589](#)
  - QwtTradingChartData, [620](#)
- Box

- QwtColumnSymbol, [77](#)
- QwtIntervalSymbol, [164](#)
- brush
  - QwtIntervalSymbol, [164](#)
  - QwtPlotCurve, [307](#)
  - QwtPlotHistogram, [335](#)
  - QwtPlotIntervalCurve, [343](#)
  - QwtPlotShapelItem, [440](#)
  - QwtPlotZonelItem, [475](#)
  - QwtSymbol, [580](#)
- buildInterval
  - QwtScaleEngine, [532](#)
- buildMajorTicks
  - QwtLinearScaleEngine, [195](#)
  - QwtLogScaleEngine, [198](#)
- buildMinorTicks
  - QwtLinearScaleEngine, [195](#)
  - QwtLogScaleEngine, [198](#)
- buildNaturalSpline
  - QwtSpline, [572](#)
- buildPeriodicSpline
  - QwtSpline, [572](#)
- buildTicks
  - QwtLinearScaleEngine, [195](#)
  - QwtLogScaleEngine, [198](#)
- Button
  - QwtCounter, [90](#)
- Button1
  - QwtCounter, [90](#)
- Button2
  - QwtCounter, [90](#)
- Button3
  - QwtCounter, [91](#)
- ButtonCnt
  - QwtCounter, [91](#)
- buttonReleased
  - QwtCounter, [91](#)
- Cache
  - QwtSymbol, [578](#)
- CachePolicy
  - QwtPlotRasterItem, [408](#)
  - QwtSymbol, [578](#)
- cachePolicy
  - QwtPlotRasterItem, [409](#)
  - QwtSymbol, [580](#)
- CandleStick
  - QwtPlotTradingCurve, [466](#)
- canvas
  - QwtPlot, [272](#)
  - QwtPlotPicker, [403](#)
  - QwtPlotRescaler, [423](#)
- CanvasFocusIndicator
  - QwtPlotCanvas, [298](#)
- canvasBackground
  - QwtPlot, [272](#)
- canvasMap
  - QwtPlot, [272](#)
- canvasMargin
  - QwtPlotLayout, [366](#)
- canvasRect
  - QwtPlotLayout, [366](#)
- canvasResizeEvent
  - QwtPlotRescaler, [423](#)
- ceil
  - QwtDate, [101](#)
- ceilEps
  - QwtScaleArithmetic, [513](#)
- changeEvent
  - QwtDial, [118](#)
  - QwtKnob, [170](#)
  - QwtSlider, [565](#)
  - QwtThermo, [611](#)
- changed
  - QwtPicker, [240](#)
- ChartStyle
  - QwtPlotMultiBarChart, [392](#)
- Checkable
  - QwtLegendData, [183](#)
- checked
  - QwtLegend, [177](#)
- chunkSize
  - QwtWeedingCurveFitter, [623](#)
- Clickable
  - QwtLegendData, [183](#)
- clicked
  - QwtLegend, [178](#)
- ClipPoints
  - QwtPlotSpectroCurve, [445](#)
- ClipPolygons
  - QwtPlotCurve, [305](#)
  - QwtPlotIntervalCurve, [343](#)
  - QwtPlotShapelItem, [439](#)
- ClipSymbol
  - QwtPlotIntervalCurve, [343](#)
- ClipSymbols
  - QwtPlotTradingCurve, [466](#)
- clipCircle
  - QwtClipper, [71](#)
- clipPolygon
  - QwtClipper, [72](#)
- clipPolygonF
  - QwtClipper, [72](#)
- clipRegion
  - QwtPlotDirectPainter, [320](#)
- closePolyline
  - QwtPlotCurve, [307](#)
- closestPoint
  - QwtPlotCurve, [307](#)
- coefficientsA
  - QwtSpline, [572](#)
- coefficientsB
  - QwtSpline, [572](#)
- coefficientsC
  - QwtSpline, [572](#)
- color
  - QwtAlphaColorMap, [62](#)

- QwtColorMap, 74
- color1
  - QwtLinearColorMap, 191
- color2
  - QwtLinearColorMap, 191
- colorBarInterval
  - QwtScaleWidget, 543
- colorBarRect
  - QwtScaleWidget, 543
- colorBarWidth
  - QwtScaleWidget, 543
- colorIndex
  - QwtColorMap, 74
  - QwtLinearColorMap, 192
- colorMap
  - QwtPlotSpectroCurve, 445
  - QwtPlotSpectrogram, 450
  - QwtScaleWidget, 543
  - QwtThermo, 611
- colorRange
  - QwtPlotSpectroCurve, 445
- colorStops
  - QwtLinearColorMap, 192
- colorTable
  - QwtColorMap, 74
- columnRect
  - QwtPlotHistogram, 335
- Columns
  - QwtPlotHistogram, 334
- columnsForWidth
  - QwtDynGridLayout, 130
- commands
  - QwtGraphic, 144
- ConrecFlag
  - QwtRasterData, 503
- contains
  - QwtInterval, 154
  - QwtScaleDiv, 518
  - QwtScaleEngine, 532
- contentsMask
  - QwtPanner, 230
  - QwtPlotPanner, 399
- contentsWidget
  - QwtLegend, 178
- ContourMode
  - QwtPlotSpectrogram, 450
- contourLevels
  - QwtPlotSpectrogram, 450
- contourLines
  - QwtRasterData, 503
- contourPen
  - QwtPlotSpectrogram, 451
- contourRasterSize
  - QwtPlotSpectrogram, 451
- controlPointRect
  - QwtGraphic, 144
- copy
  - QwtLogTransform, 200
- QwtNullTransform, 218
- QwtPowerTransform, 502
- CopyAlphaMask
  - QwtWidgetOverlay, 640
- CopyBackingStore
  - QwtPlotDirectPainter, 320
- count
  - QwtDynGridLayout, 130
- createWidget
  - QwtLegend, 178
- Cross
  - QwtPlotMarker, 385
  - QwtSymbol, 579
- CrossRubberBand
  - QwtPicker, 238
- cursor
  - QwtPanner, 230
- CurveAttribute
  - QwtPlotCurve, 304
- curveFitter
  - QwtPlotCurve, 308
- CurveStyle
  - QwtPlotCurve, 304
  - QwtPlotIntervalCurve, 342
- DTriangle
  - QwtSymbol, 579
- data
  - QwtLegendLabel, 188
  - QwtPlotSpectrogram, 451, 452
  - QwtSeriesStore, 553
- dataRect
  - QwtAbstractSeriesStore, 51
  - QwtSeriesStore, 554
- dataSize
  - QwtAbstractSeriesStore, 51
  - QwtSeriesStore, 554
- dateFormat
  - QwtDateScaleDraw, 107
- dateFormatOfDate
  - QwtDateScaleDraw, 107
- dateOfWeek0
  - QwtDate, 101
- Day
  - QwtDate, 101
- Decreasing
  - QwtPlotTradingCurve, 466
- DefaultLayout
  - QwtPlotRenderer, 414
- defaultContourPen
  - QwtPlotSpectrogram, 452
- defaultIcon
  - QwtPlotItem, 353
- defaultItemMode
  - QwtLegend, 179
- defaultSize
  - QwtGraphic, 144
- detach
  - QwtPlotItem, 354

- detachItems
  - QwtPlotDict, 317
- Diamond
  - QwtSymbol, 579
- dimForLength
  - QwtScaleWidget, 543
- Direction
  - QwtColumnRect, 76
  - QwtPlotTradingCurve, 466
- DiscardBackground
  - QwtPlotRenderer, 413
- DiscardCanvasBackground
  - QwtPlotRenderer, 413
- DiscardCanvasFrame
  - QwtPlotRenderer, 413
- DiscardFooter
  - QwtPlotRenderer, 413
- DiscardLegend
  - QwtPlotRenderer, 413
- DiscardNone
  - QwtPlotRenderer, 413
- DiscardTitle
  - QwtPlotRenderer, 413
- DiscardFlag
  - QwtPlotRenderer, 413
- discardFlags
  - QwtPlotRenderer, 414
- discardRaster
  - QwtRasterData, 504
- DisplayMode
  - QwtPicker, 237
  - QwtPlotSpectrogram, 450
- divideEps
  - QwtScaleArithmetic, 513
- divideInterval
  - QwtScaleArithmetic, 514
  - QwtScaleEngine, 533
- divideScale
  - QwtDateScaleEngine, 112
  - QwtLinearScaleEngine, 195
  - QwtLogScaleEngine, 198
  - QwtScaleEngine, 533
- Dot
  - QwtKnob, 169
- Dots
  - QwtPlotCurve, 305
- draw
  - QwtAbstractScaleDraw, 44
  - QwtColumnSymbol, 77
  - QwtCompassRose, 84
  - QwtDialNeedle, 125
  - QwtIntervalSymbol, 164
  - QwtMathMLTextEngine, 209
  - QwtPlainTextEngine, 262
  - QwtPlotGrid, 328
  - QwtPlotItem, 354
  - QwtPlotLegendItem, 376
  - QwtPlotMarker, 386
  - QwtPlotRasterItem, 409
  - QwtPlotSeriesItem, 436
  - QwtPlotShapelItem, 440
  - QwtPlotSpectrogram, 452
  - QwtPlotSvgItem, 458
  - QwtPlotTextLabel, 461
  - QwtPlotZonItem, 475
  - QwtRichTextEngine, 506
  - QwtSimpleCompassRose, 560
  - QwtText, 596
  - QwtTextEngine, 602
- DrawOverlay
  - QwtWidgetOverlay, 640
- drawArrow
  - QwtArrowButton, 70
- drawBackbone
  - QwtAbstractScaleDraw, 44
  - QwtRoundScaleDraw, 509
  - QwtScaleDraw, 523
- drawBackground
  - QwtPainter, 222
- drawBackground
  - QwtPlotGLCanvas, 324
  - QwtPlotLegendItem, 376
- drawBar
  - QwtPlotBarChart, 292
  - QwtPlotMultiBarChart, 392
  - QwtPlotTradingCurve, 467
- drawBorder
  - QwtPlotCanvas, 299
  - QwtPlotGLCanvas, 324
- drawBox
  - QwtColumnSymbol, 78
- drawButtonLabel
  - QwtArrowButton, 70
- drawCandleStick
  - QwtPlotTradingCurve, 467
- drawCanvas
  - QwtPlot, 272
- drawColorBar
  - QwtPainter, 222
  - QwtScaleWidget, 543
- drawColumn
  - QwtPlotHistogram, 335
- drawColumns
  - QwtPlotHistogram, 337
- drawContents
  - QwtDial, 118
- drawContourLines
  - QwtPlotSpectrogram, 452
- drawCurve
  - QwtPlotCurve, 308
- drawDots
  - QwtPlotCurve, 308
  - QwtPlotSpectroCurve, 446
- drawFocusIndicator
  - QwtDial, 118
  - QwtKnob, 170

- QwtPlotCanvas, 299
- drawFrame
  - QwtDial, 118
  - QwtPainter, 222
- drawGroupedBars
  - QwtPlotMultiBarChart, 393
- drawHand
  - QwtAnalogClock, 66
- drawHandle
  - QwtSlider, 565
- drawImage
  - QwtGraphic, 144
- drawItems
  - QwtPlot, 272
  - QwtPlotGLCanvas, 324
- drawKnob
  - QwtKnob, 170
- drawLabel
  - QwtAbstractScaleDraw, 44
  - QwtPlotMarker, 386
  - QwtRoundScaleDraw, 509
  - QwtScaleDraw, 523
- drawLegendData
  - QwtPlotLegendItem, 376
- drawLines
  - QwtPlotCurve, 308
  - QwtPlotHistogram, 337
  - QwtPlotMarker, 386
- drawLiquid
  - QwtThermo, 611
- drawMarker
  - QwtKnob, 170
- drawNeedle
  - QwtAnalogClock, 66
  - QwtCompassMagnetNeedle, 83
  - QwtCompassWindArrow, 88
  - QwtDial, 118
  - QwtDialNeedle, 125
  - QwtDialSimpleNeedle, 127
- drawOutline
  - QwtPlotHistogram, 337
- drawOverlay
  - QwtWidgetOverlay, 640
- drawPath
  - QwtGraphic, 146
- drawPixmap
  - QwtGraphic, 146
- drawRose
  - QwtCompass, 81
  - QwtSimpleCompassRose, 560
- drawRoundFrame
  - QwtPainter, 223
- drawRoundedFrame
  - QwtPainter, 223
- drawRubberBand
  - QwtPicker, 240
- drawSample
  - QwtPlotBarChart, 293
- QwtPlotMultiBarChart, 393
- drawScale
  - QwtDial, 119
- drawScaleContents
  - QwtCompass, 81
  - QwtDial, 119
- drawSeries
  - QwtPlotBarChart, 293
  - QwtPlotCurve, 309
  - QwtPlotDirectPainter, 320
  - QwtPlotHistogram, 338
  - QwtPlotIntervalCurve, 344
  - QwtPlotMultiBarChart, 393
  - QwtPlotSeriesItem, 436
  - QwtPlotSpectroCurve, 446
  - QwtPlotTradingCurve, 467
- drawSimpleRichText
  - QwtPainter, 223
- drawSlider
  - QwtSlider, 565
- drawStackedBars
  - QwtPlotMultiBarChart, 394
- drawSteps
  - QwtPlotCurve, 309
- drawSticks
  - QwtPlotCurve, 309
- drawSymbol
  - QwtSymbol, 581
- drawSymbols
  - QwtPlotCurve, 310
  - QwtPlotIntervalCurve, 344
  - QwtPlotTradingCurve, 468
  - QwtSymbol, 581
- drawTick
  - QwtAbstractScaleDraw, 44
  - QwtRoundScaleDraw, 509
  - QwtScaleDraw, 523
- drawTicks
  - QwtWheel, 627
- drawTitle
  - QwtScaleWidget, 544
- drawTracker
  - QwtPicker, 241
- drawTube
  - QwtPlotIntervalCurve, 344
- drawUserSymbol
  - QwtPlotTradingCurve, 468
- drawWheelBackground
  - QwtWheel, 627
- elapsed
  - QwtSamplingThread, 512
  - QwtSystemClock, 592
- Ellipse
  - QwtSymbol, 579
- EllipseRubberBand
  - QwtPicker, 238
- enableAxis
  - QwtPlot, 274

- enableComponent
  - QwtAbstractScaleDraw, 46
- enableX
  - QwtPlotGrid, 328
- enableXMin
  - QwtPlotGrid, 328
- enableY
  - QwtPlotGrid, 329
- enableYMin
  - QwtPlotGrid, 329
- end
  - QwtPicker, 241
  - QwtPlotPicker, 403
  - QwtPlotZoomer, 481
- endBorderDist
  - QwtScaleWidget, 544
- event
  - QwtCounter, 91
  - QwtPlot, 274
  - QwtPlotCanvas, 300
  - QwtPlotGLCanvas, 324
- eventFilter
  - QwtLegend, 179
  - QwtMagnifier, 202
  - QwtPanner, 231
  - QwtPicker, 241
  - QwtPlot, 274
  - QwtWidgetOverlay, 640
- ExcludeBorders
  - QwtInterval, 153
- ExcludeMaximum
  - QwtInterval, 153
- ExcludeMinimum
  - QwtInterval, 153
- ExpandBoth
  - QwtPlotRescaler, 421
- ExpandDown
  - QwtPlotRescaler, 421
- ExpandUp
  - QwtPlotRescaler, 421
- expandInterval
  - QwtPlotRescaler, 424
- expandLineBreaks
  - QwtPlotLayout, 366
- expandScale
  - QwtPlotRescaler, 424
- Expanding
  - QwtPlotRescaler, 421
- ExpandingDirection
  - QwtPlotRescaler, 421
- expandingDirection
  - QwtPlotRescaler, 423
- expandingDirections
  - QwtDynGridLayout, 130
- exportTo
  - QwtPlotRenderer, 414
- extend
  - QwtInterval, 154
- extent
  - QwtAbstractScaleDraw, 46
  - QwtRoundScaleDraw, 509
  - QwtScaleDraw, 524
- fillBrush
  - QwtThermo, 613
- fillCurve
  - QwtPlotCurve, 310
- fillPixmap
  - QwtPainter, 223
- fillRect
  - QwtThermo, 613
- FilterPoints
  - QwtPlotCurve, 305
- FirstDay
  - QwtDate, 101
- FirstThursday
  - QwtDate, 101
- fitCurve
  - QwtCurveFitter, 99
  - QwtSplineCurveFitter, 575
  - QwtWeedingCurveFitter, 623
- FitMode
  - QwtSplineCurveFitter, 575
- fitMode
  - QwtSplineCurveFitter, 575
- Fitted
  - QwtPlotCurve, 304
- Fitting
  - QwtPlotRescaler, 421
- Fixed
  - QwtPlotRescaler, 421
- FixedColors
  - QwtLinearColorMap, 191
- FixedSampleSize
  - QwtPlotAbstractBarChart, 286
- flags
  - QwtPointMapper, 492
- Flat
  - QwtKnob, 169
- Floating
  - QwtScaleEngine, 531
- floor
  - QwtDate, 102
- floorEps
  - QwtScaleArithmetic, 514
- FocusIndicator
  - QwtPlotCanvas, 297
- focusIndicator
  - QwtPlotCanvas, 300
- font
  - QwtPlotLegendItem, 376
  - QwtPlotScaleItem, 431
- footer
  - QwtPlot, 274
- footerLabel
  - QwtPlot, 275
- footerRect



- QwtPlotLayout, [367](#)
- Format
  - QwtColorMap, [73](#)
- format
  - QwtColorMap, [74](#)
- FrameWithScales
  - QwtPlotRenderer, [414](#)
- frameRect
  - QwtPlotGLCanvas, [324](#)
- frameShadow
  - QwtDial, [119](#)
  - QwtPlotGLCanvas, [324](#)
- frameShape
  - QwtPlotGLCanvas, [325](#)
- FrameStyle
  - QwtColumnSymbol, [77](#)
- frameStyle
  - QwtColumnSymbol, [78](#)
  - QwtPlotGLCanvas, [325](#)
- frameWidth
  - QwtPlotGLCanvas, [325](#)
- FullRepaint
  - QwtPlotDirectPainter, [320](#)
- geometry
  - QwtPlotLegendItem, [376](#)
- getBorderDistHint
  - QwtScaleDraw, [524](#)
  - QwtScaleWidget, [544](#)
- getCanvasMarginHint
  - QwtPlotAbstractBarChart, [287](#)
  - QwtPlotItem, [354](#)
- getCanvasMarginsHint
  - QwtPlot, [275](#)
- getMinBorderDist
  - QwtScaleWidget, [544](#)
- getMouseButton
  - QwtMagnifier, [202](#)
- getZoomInKey
  - QwtMagnifier, [202](#)
- getZoomOutKey
  - QwtMagnifier, [203](#)
- grab
  - QwtPanner, [231](#)
  - QwtPlotPanner, [399](#)
- grabProperties
  - QwtPlot, [275](#)
- Graphic
  - QwtSymbol, [579](#)
- graphic
  - QwtSymbol, [581](#)
- Grouped
  - QwtPlotMultiBarChart, [392](#)
- HLine
  - QwtPlotMarker, [385](#)
  - QwtSymbol, [579](#)
- HLineRubberBand
  - QwtPicker, [238](#)
- HackStyledBackground
  - QwtPlotCanvas, [298](#)
- Hand
  - QwtAnalogClock, [64](#)
- hand
  - QwtAnalogClock, [66](#)
- handleRect
  - QwtSlider, [565](#)
- handleSize
  - QwtSlider, [565](#)
- hasClipping
  - QwtPlotDirectPainter, [320](#)
- hasComponent
  - QwtAbstractScaleDraw, [46](#)
- hasGroove
  - QwtSlider, [565](#)
- hasHeightForWidth
  - QwtDynGridLayout, [130](#)
- hasRole
  - QwtLegendData, [184](#)
- hasTrough
  - QwtSlider, [565](#)
- heightForWidth
  - QwtDynGridLayout, [130](#)
  - QwtLegend, [179](#)
  - QwtMathMLTextEngine, [209](#)
  - QwtPlainTextEngine, [263](#)
  - QwtPlotLegendItem, [377](#)
  - QwtRichTextEngine, [506](#)
  - QwtText, [596](#)
  - QwtTextEngine, [602](#)
  - QwtTextLabel, [605](#)
- Hexagon
  - QwtSymbol, [579](#)
- HistogramStyle
  - QwtPlotHistogram, [334](#)
- horizontalScrollBar
  - QwtLegend, [179](#)
- Hour
  - QwtDate, [101](#)
- HourHand
  - QwtAnalogClock, [64](#)
- icon
  - QwtLegendData, [184](#)
  - QwtLegendLabel, [188](#)
- IgnoreAllVerticesOnLevel
  - QwtRasterData, [503](#)
- IgnoreFooter
  - QwtPlotLayout, [365](#)
- IgnoreFrames
  - QwtPlotLayout, [365](#)
- IgnoreLegend
  - QwtPlotLayout, [365](#)
- IgnoreOutOfRange
  - QwtRasterData, [503](#)
- IgnoreScrollbars
  - QwtPlotLayout, [365](#)
- IgnoreTitle

- QwtPlotLayout, [365](#)
- Image
  - QwtPainterCommand, [226](#)
- ImageBuffer
  - QwtPlotCurve, [305](#)
- ImageMode
  - QwtPlotSpectrogram, [450](#)
- imageData
  - QwtPainterCommand, [227](#)
- imageMap
  - QwtPlotRasterItem, [409](#)
- ImmediatePaint
  - QwtPlotCanvas, [298](#)
- incSteps
  - QwtCounter, [91](#)
- IncludeBorders
  - QwtInterval, [153](#)
- IncludeReference
  - QwtScaleEngine, [531](#)
- Increasing
  - QwtPlotTradingCurve, [466](#)
- incrementValue
  - QwtAbstractSlider, [54](#)
- incrementedValue
  - QwtAbstractSlider, [54](#)
- index
  - QwtPixelMatrix, [260](#)
- Indexed
  - QwtColorMap, [74](#)
- infoToItem
  - QwtPlot, [275](#)
- initKeyPattern
  - QwtEventPattern, [137](#)
- initMousePattern
  - QwtEventPattern, [137](#)
- initRaster
  - QwtRasterData, [504](#)
- innerRect
  - QwtDial, [119](#)
- insertItem
  - QwtPlotDict, [317](#)
- insertLegend
  - QwtPlot, [276](#)
- intersect
  - QwtInterval, [154](#)
- intersects
  - QwtInterval, [155](#)
- interval
  - QwtPlotRasterItem, [410](#)
  - QwtPlotRescaler, [424](#)
  - QwtPlotSpectrogram, [453](#)
  - QwtPlotZonItem, [475](#)
  - QwtRasterData, [504](#)
  - QwtSamplingThread, [512](#)
  - QwtScaleDiv, [518](#)
  - QwtSyntheticPointData, [589](#)
- intervalHint
  - QwtPlotRescaler, [424](#)
- IntervalType
  - QwtDate, [100](#)
- intervalType
  - QwtDateScaleDraw, [107](#)
  - QwtDateScaleEngine, [112](#)
- invTransform
  - QwtAbstractScale, [37](#)
  - QwtLogTransform, [200](#)
  - QwtNullTransform, [218](#)
  - QwtPlot, [276](#)
  - QwtPlotPicker, [404](#)
  - QwtPowerTransform, [502](#)
  - QwtScaleMap, [537](#)
  - QwtTransform, [621](#)
- Invalid
  - QwtPainterCommand, [226](#)
- invalidate
  - QwtInterval, [155](#)
  - QwtPlotLayout, [367](#)
- invalidateCache
  - QwtAbstractScaleDraw, [46](#)
  - QwtDial, [119](#)
  - QwtPlotRasterItem, [410](#)
  - QwtSymbol, [582](#)
- invert
  - QwtScaleDiv, [518](#)
- Inverted
  - QwtPlotCurve, [304](#)
  - QwtScaleEngine, [531](#)
- inverted
  - QwtInterval, [155](#)
  - QwtScaleDiv, [518](#)
- invertedControls
  - QwtAbstractSlider, [54](#)
- isActive
  - QwtPicker, [241](#)
- isAligning
  - QwtPainter, [224](#)
- isAxisEnabled
  - QwtPlotMagnifier, [383](#)
  - QwtPlotPanner, [400](#)
- isColorBarEnabled
  - QwtScaleWidget, [545](#)
- isEmpty
  - QwtAbstractLegend, [33](#)
  - QwtDynGridLayout, [131](#)
  - QwtGraphic, [146](#)
  - QwtLegend, [179](#)
  - QwtText, [596](#)
- isEnabled
  - QwtMagnifier, [203](#)
  - QwtPanner, [231](#)
  - QwtPicker, [242](#)
  - QwtPlotRescaler, [424](#)
- isInverted
  - QwtAbstractScale, [37](#)
  - QwtWheel, [627](#)
- isInverting

- QwtScaleMap, 538
- isNull
  - QwtGraphic, 146
  - QwtInterval, 155
  - QwtPoint3D, 487
  - QwtSystemClock, 592
  - QwtText, 596
- isOrientationEnabled
  - QwtPanner, 231
- isPinPointEnabled
  - QwtSymbol, 582
- isReadOnly
  - QwtAbstractSlider, 55
  - QwtCounter, 91
- isScaleDivFromAxis
  - QwtPlotScaleItem, 431
- isScrollPosition
  - QwtAbstractSlider, 55
  - QwtDial, 119
  - QwtKnob, 170
  - QwtSlider, 566
- isTracking
  - QwtAbstractSlider, 55
  - QwtWheel, 627
- isValid
  - QwtAbstractSlider, 55
  - QwtCounter, 92
  - QwtInterval, 155
  - QwtLegendData, 184
  - QwtOHLCSample, 219
- isVisible
  - QwtPlotItem, 354
- isX11GraphicsSystem
  - QwtPainter, 224
- ItemBackground
  - QwtPlotLegendItem, 375
- ItemFocusIndicator
  - QwtPlotCanvas, 298
- itemAt
  - QwtDynGridLayout, 131
- itemAttached
  - QwtPlot, 276
- ItemAttribute
  - QwtPlotItem, 351
- itemChanged
  - QwtPlotItem, 355
- itemChecked
  - QwtLegend, 179
- itemClicked
  - QwtLegend, 180
- itemCount
  - QwtDynGridLayout, 131
- itemInfo
  - QwtLegend, 180
- ItemInterest
  - QwtPlotItem, 352
- itemList
  - QwtPlotDict, 317
- itemMargin
  - QwtPlotLegendItem, 377
- itemMode
  - QwtLegendLabel, 188
- itemSpacing
  - QwtPlotLegendItem, 377
- itemToInfo
  - QwtPlot, 277
- JulianDayForEpoch
  - QwtDate, 100
- KeepSize
  - QwtPicker, 238
- KeyAbort
  - QwtEventPattern, 136
- KeyDown
  - QwtEventPattern, 136
- KeyHome
  - QwtEventPattern, 136
- KeyLeft
  - QwtEventPattern, 136
- KeyPatternCount
  - QwtEventPattern, 136
- KeyRedo
  - QwtEventPattern, 136
- KeyRight
  - QwtEventPattern, 136
- KeySelect1
  - QwtEventPattern, 136
- KeySelect2
  - QwtEventPattern, 136
- KeyUndo
  - QwtEventPattern, 136
- KeyUp
  - QwtEventPattern, 136
- keyFactor
  - QwtMagnifier, 203
- keyMatch
  - QwtEventPattern, 137
- keyPattern
  - QwtEventPattern, 138
- KeyPatternCode
  - QwtEventPattern, 135
- keyPressEvent
  - QwtAbstractSlider, 55
  - QwtCompass, 81
  - QwtCounter, 92
  - QwtWheel, 627
- knobRect
  - QwtKnob, 170
- KnobStyle
  - QwtKnob, 169
- knobStyle
  - QwtKnob, 171
- LTriangle
  - QwtSymbol, 579
- label

- QwtAbstractScaleDraw, [47](#)
  - QwtCompassScaleDraw, [86](#)
  - QwtDateScaleDraw, [107](#)
  - QwtPlotMarker, [386](#)
- labelAlignment
  - QwtPlotMarker, [387](#)
  - QwtScaleDraw, [524](#)
- labelMap
  - QwtCompassScaleDraw, [86](#)
- labelOrientation
  - QwtPlotMarker, [387](#)
- labelPosition
  - QwtScaleDraw, [524](#)
- labelRect
  - QwtArrowButton, [71](#)
  - QwtScaleDraw, [525](#)
- labelRotation
  - QwtScaleDraw, [525](#)
- labelSize
  - QwtScaleDraw, [525](#)
- labelTransformation
  - QwtScaleDraw, [525](#)
- Labels
  - QwtAbstractScaleDraw, [44](#)
- LayoutAttribute
  - QwtText, [594](#)
- LayoutFlag
  - QwtPlotRenderer, [413](#)
  - QwtScaleWidget, [542](#)
- layoutFlags
  - QwtPlotRenderer, [414](#)
- layoutGrid
  - QwtDynGridLayout, [131](#)
- layoutHint
  - QwtPlotAbstractBarChart, [287](#)
- layoutItems
  - QwtDynGridLayout, [131](#)
- layoutLegend
  - QwtPlotLayout, [367](#)
- LayoutPolicy
  - QwtPlotAbstractBarChart, [286](#)
- layoutPolicy
  - QwtPlotAbstractBarChart, [287](#)
- layoutScale
  - QwtScaleWidget, [545](#)
- LeadingScale
  - QwtSlider, [564](#)
  - QwtThermo, [610](#)
- LeftLegend
  - QwtPlot, [268](#)
- LeftScale
  - QwtScaleDraw, [522](#)
- LeftToRight
  - QwtColumnRect, [76](#)
- Legend
  - QwtPlotItem, [351](#)
- legend
  - QwtPlot, [277](#)
- LegendBackground
  - QwtPlotLegendItem, [375](#)
- LegendBarTitles
  - QwtPlotBarChart, [291](#)
- LegendChartTitle
  - QwtPlotBarChart, [291](#)
- LegendColor
  - QwtPlotShapelItem, [439](#)
- LegendInterest
  - QwtPlotItem, [352](#)
- LegendNoAttribute
  - QwtPlotCurve, [305](#)
- LegendShape
  - QwtPlotShapelItem, [439](#)
- LegendShowBrush
  - QwtPlotCurve, [305](#)
- LegendShowLine
  - QwtPlotCurve, [305](#)
- LegendShowSymbol
  - QwtPlotCurve, [305](#)
- LegendAttribute
  - QwtPlotCurve, [305](#)
- legendChanged
  - QwtPlotItem, [355](#)
- legendData
  - QwtPlotBarChart, [293](#)
  - QwtPlotItem, [355](#)
  - QwtPlotMultiBarChart, [394](#)
- legendDataChanged
  - QwtPlot, [277](#)
- legendGeometries
  - QwtPlotLegendItem, [377](#)
- legendIcon
  - QwtPlotBarChart, [293](#)
  - QwtPlotCurve, [310](#)
  - QwtPlotHistogram, [338](#)
  - QwtPlotIntervalCurve, [345](#)
  - QwtPlotItem, [355](#)
  - QwtPlotMarker, [387](#)
  - QwtPlotMultiBarChart, [394](#)
  - QwtPlotShapelItem, [440](#)
  - QwtPlotTradingCurve, [468](#)
- legendIconSize
  - QwtPlotItem, [356](#)
- LegendMode
  - QwtPlotBarChart, [291](#)
  - QwtPlotShapelItem, [439](#)
- legendMode
  - QwtPlotBarChart, [294](#)
  - QwtPlotShapelItem, [440](#)
- LegendPosition
  - QwtPlot, [267](#)
- legendPosition
  - QwtPlotLayout, [367](#)
- legendRatio
  - QwtPlotLayout, [367](#)
- legendRect
  - QwtPlotLayout, [368](#)

- legendWidget
  - QwtLegend, 180
- legendWidgets
  - QwtLegend, 180
- length
  - QwtScaleDraw, 525
- limited
  - QwtInterval, 155
- linePen
  - QwtPlotMarker, 387
- LineStyle
  - QwtPlotMarker, 385
- lineStyle
  - QwtPlotMarker, 387
- lineWidth
  - QwtColumnSymbol, 78
  - QwtDial, 120
  - QwtPlotGLCanvas, 325
- Lines
  - QwtPlotCurve, 305
  - QwtPlotHistogram, 334
- loadData
  - QwtPlotSvgItem, 458
- loadFile
  - QwtPlotSvgItem, 459
- lowerBound
  - QwtAbstractScale, 37
  - QwtScaleDiv, 518
- lowerMargin
  - QwtScaleEngine, 533
- MajorTick
  - QwtScaleDiv, 515
- majorPen
  - QwtPlotGrid, 329
- margin
  - QwtPlotAbstractBarChart, 287
  - QwtPlotLegendItem, 377
  - QwtPlotTextLabel, 462
  - QwtScaleWidget, 545
- Margins
  - QwtPlotItem, 351
- markerSize
  - QwtKnob, 171
- MarkerStyle
  - QwtKnob, 169
- markerStyle
  - QwtKnob, 171
- MaskHint
  - QwtWidgetOverlay, 639
- maskHint
  - QwtWidgetOverlay, 640
- MaskMode
  - QwtWidgetOverlay, 639
- maskMode
  - QwtWidgetOverlay, 640
- mass
  - QwtWheel, 628
- MathMLText
  - QwtText, 595
- maxColumns
  - QwtDynGridLayout, 132
  - QwtLegend, 180
  - QwtPlotLegendItem, 377
- maxDate
  - QwtDate, 102
- maxItemWidth
  - QwtDynGridLayout, 132
- maxLabelHeight
  - QwtScaleDraw, 526
- maxLabelWidth
  - QwtScaleDraw, 526
- maxScaleArc
  - QwtDial, 120
- maxStackDepth
  - QwtPlotZoomer, 481
- maxSymbolWidth
  - QwtPlotTradingCurve, 469
- maxTickLength
  - QwtAbstractScaleDraw, 47
- maxValue
  - QwtInterval, 156
- maxWeeks
  - QwtDateScaleEngine, 112
- maximum
  - QwtAbstractScale, 37
  - QwtCounter, 92
  - QwtWheel, 628
- MediumTick
  - QwtScaleDiv, 515
- metric
  - QwtNullPaintDevice, 216
- midLineWidth
  - QwtPlotGLCanvas, 325
- mightRender
  - QwtMathMLTextEngine, 210
  - QwtPlainTextEngine, 263
  - QwtRichTextEngine, 507
  - QwtTextEngine, 602
- Millisecond
  - QwtDate, 101
- minDate
  - QwtDate, 102
- minLabelDist
  - QwtScaleDraw, 526
- minLength
  - QwtScaleDraw, 526
- minScaleArc
  - QwtDial, 120
- minSymbolWidth
  - QwtPlotTradingCurve, 469
- minValue
  - QwtInterval, 156
- minZoomSize
  - QwtPlotZoomer, 481
- MinimizeMemory
  - QwtPlotCurve, 305

- minimum
  - QwtAbstractScale, 38
  - QwtCounter, 92
  - QwtWheel, 628
- MinimumLayout
  - QwtText, 594
- minimumExtent
  - QwtAbstractScaleDraw, 47
- minimumSize
  - QwtPlotLegendItem, 378
- minimumSizeHint
  - QwtDial, 120
  - QwtKnob, 171
  - QwtPlotLayout, 368
  - QwtScaleWidget, 545
  - QwtSlider, 566
  - QwtThermo, 613
  - QwtWheel, 628
- MinorTick
  - QwtScaleDiv, 515
- minorPen
  - QwtPlotGrid, 329
- Minute
  - QwtDate, 101
- MinuteHand
  - QwtAnalogClock, 64
- Mode
  - QwtDial, 117
  - QwtLegendData, 183
  - QwtLinearColorMap, 190
  - QwtNullPaintDevice, 216
- mode
  - QwtDial, 120
  - QwtLegendData, 184
  - QwtLinearColorMap, 192
  - QwtNullPaintDevice, 216
- Month
  - QwtDate, 101
- MousePatternCount
  - QwtEventPattern, 137
- MouseSelect1
  - QwtEventPattern, 136
- MouseSelect2
  - QwtEventPattern, 136
- MouseSelect3
  - QwtEventPattern, 136
- MouseSelect4
  - QwtEventPattern, 136
- MouseSelect5
  - QwtEventPattern, 136
- MouseSelect6
  - QwtEventPattern, 137
- mouseFactor
  - QwtMagnifier, 203
- mouseMatch
  - QwtEventPattern, 138
- mouseMoveEvent
  - QwtAbstractSlider, 56
  - QwtWheel, 628
- mousePattern
  - QwtEventPattern, 139
- MousePatternCode
  - QwtEventPattern, 136
- mousePressEvent
  - QwtAbstractSlider, 56
  - QwtSlider, 566
  - QwtWheel, 629
- mouseReleaseEvent
  - QwtAbstractSlider, 56
  - QwtSlider, 566
  - QwtWheel, 629
- move
  - QwtPicker, 242
  - QwtPlotPicker, 404
  - QwtScaleDraw, 526, 528
- moveBy
  - QwtPlotZoomer, 481
- moveCanvas
  - QwtPlotPanner, 400
- moveCenter
  - QwtRoundScaleDraw, 510
- moveTo
  - QwtPlotZoomer, 482
- moved
  - QwtPanner, 231
  - QwtPicker, 242
  - QwtPlotPicker, 404
- NHands
  - QwtAnalogClock, 64
- NTickTypes
  - QwtScaleDiv, 515
- Natural
  - QwtSpline, 572
- NearestNeighbour
  - QwtMatrixRasterData, 212
- needle
  - QwtDial, 120, 121
- NoAttribute
  - QwtScaleEngine, 531
- NoCache
  - QwtPlotRasterItem, 408
  - QwtSymbol, 578
- NoCurve
  - QwtPlotCurve, 305
  - QwtPlotIntervalCurve, 343
- NoFocusIndicator
  - QwtPlotCanvas, 298
- NoFrame
  - QwtColumnSymbol, 77
- NoLine
  - QwtPlotMarker, 385
- NoMarker
  - QwtKnob, 169
- NoMask
  - QwtWidgetOverlay, 639
- NoRubberBand

- QwtPicker, 238
- NoScale
  - QwtSlider, 564
  - QwtThermo, 610
- NoSelection
  - QwtPickerMachine, 257
- NoStyle
  - QwtColumnSymbol, 77
- NoSymbol
  - QwtIntervalSymbol, 164
  - QwtPlotTradingCurve, 466
  - QwtSymbol, 579
- NoTick
  - QwtScaleDiv, 515
- NormalMode
  - QwtNullPaintDevice, 216
- normalized
  - QwtInterval, 156
  - QwtPointPolar, 497
- Notch
  - QwtKnob, 169
- Nub
  - QwtKnob, 169
- numButtons
  - QwtCounter, 93
- numColumns
  - QwtDynGridLayout, 132
  - QwtMatrixRasterData, 212
- numRows
  - QwtDynGridLayout, 132
  - QwtMatrixRasterData, 212
- numThornLevels
  - QwtSimpleCompassRose, 560
- numThorns
  - QwtSimpleCompassRose, 561
- numTurns
  - QwtKnob, 171
- Opaque
  - QwtPlotCanvas, 298
- operator=
  - QwtGraphic, 146
  - QwtPainterCommand, 227
  - QwtSpline, 572
- operator==
  - QwtInterval, 158
  - QwtPoint3D, 487
  - QwtPointPolar, 498
  - QwtScaleDiv, 519
- operator&
  - QwtInterval, 156
- operator&=
  - QwtInterval, 156
- Option
  - QwtPlotLayout, 364
- orientation
  - QwtColumnRect, 76
  - QwtPlotRescaler, 425
  - QwtPlotSeriesItem, 437
- QwtPlotZonItem, 476
- QwtScaleDraw, 528
- QwtSlider, 566
- QwtThermo, 613
- QwtWheel, 629
- origin
  - QwtDial, 121
  - QwtThermo, 613
- OriginCustom
  - QwtThermo, 609
- OriginMaximum
  - QwtThermo, 609
- OriginMinimum
  - QwtThermo, 609
- OriginMode
  - QwtThermo, 609
- originMode
  - QwtThermo, 614
- OtherFormat
  - QwtText, 595
- Outline
  - QwtPlotHistogram, 334
- p1
  - QwtScaleMap, 538
- p2
  - QwtScaleMap, 538
- pDist
  - QwtScaleMap, 538
- pageStepCount
  - QwtWheel, 629
- pageSteps
  - QwtAbstractSlider, 56
- PaintBackground
  - QwtText, 594
- PaintCache
  - QwtPlotRasterItem, 408
- PaintInDeviceResolution
  - QwtPlotRasterItem, 408
- PaintUsingTextColor
  - QwtText, 594
- PaintUsingTextFont
  - QwtText, 594
- PaintAttribute
  - QwtPlotCanvas, 298
  - QwtPlotCurve, 305
  - QwtPlotIntervalCurve, 343
  - QwtPlotRasterItem, 408
  - QwtPlotShapelItem, 439
  - QwtPlotSpectroCurve, 445
  - QwtPlotTradingCurve, 466
  - QwtText, 594
- paintEvent
  - QwtArrowButton, 71
  - QwtDial, 121
  - QwtKnob, 171
  - QwtPanner, 232
  - QwtPlotCanvas, 300
  - QwtPlotGLCanvas, 325



- QwtSlider, [567](#)
- QwtTextLabel, [605](#)
- QwtThermo, [614](#)
- QwtWheel, [629](#)
- QwtWidgetOverlay, [641](#)
- paintRect
  - QwtPlotItem, [356](#)
- palette
  - QwtColumnSymbol, [78](#)
  - QwtCompassRose, [85](#)
  - QwtDialNeedle, [126](#)
  - QwtPlotScaleItem, [432](#)
- panned
  - QwtPanner, [232](#)
- ParametricSpline
  - QwtSplineCurveFitter, [575](#)
- parentWidget
  - QwtMagnifier, [203](#)
- Path
  - QwtPainterCommand, [226](#)
  - QwtSymbol, [579](#)
- path
  - QwtPainterCommand, [228](#)
  - QwtSymbol, [582](#)
- PathMode
  - QwtNullPaintDevice, [216](#)
- pen
  - QwtIntervalSymbol, [165](#)
  - QwtPlotCurve, [311](#)
  - QwtPlotHistogram, [338](#)
  - QwtPlotIntervalCurve, [345](#)
  - QwtPlotShapelItem, [441](#)
  - QwtPlotZoneItem, [476](#)
  - QwtSymbol, [582](#)
- penWidth
  - QwtAbstractScaleDraw, [47](#)
  - QwtPlotSpectroCurve, [446](#)
- Periodic
  - QwtSpline, [572](#)
- pickArea
  - QwtPicker, [242](#)
- pickedPoints
  - QwtPicker, [242](#)
- pinPoint
  - QwtSymbol, [582](#)
- pipeRect
  - QwtThermo, [614](#)
- pipeWidth
  - QwtThermo, [614](#)
- pixelHint
  - QwtMatrixRasterData, [212](#)
  - QwtPlotRasterItem, [410](#)
  - QwtPlotSpectrogram, [453](#)
  - QwtRasterData, [504](#)
- Pixmap
  - QwtPainterCommand, [226](#)
  - QwtSymbol, [579](#)
- pixmap
  - QwtSymbol, [582](#)
- pixmapData
  - QwtPainterCommand, [228](#)
- Plain
  - QwtColumnSymbol, [77](#)
  - QwtDial, [117](#)
  - QwtPlotGLCanvas, [323](#)
- PlainText
  - QwtText, [595](#)
- plainText
  - QwtTextLabel, [605](#)
- plot
  - QwtPlotPicker, [405](#)
  - QwtPlotRescaler, [425](#)
- plotItems
  - QwtPlotLegendItem, [378](#)
- plotLayout
  - QwtPlot, [278](#)
- PointSelection
  - QwtPickerMachine, [257](#)
- points
  - QwtSpline, [573](#)
- PolygonPathMode
  - QwtNullPaintDevice, [216](#)
- PolygonRubberBand
  - QwtPicker, [238](#)
- PolygonSelection
  - QwtPickerMachine, [257](#)
- polylineSplitting
  - QwtPainter, [224](#)
- pos
  - QwtScaleDraw, [528](#)
- position
  - QwtPlotScaleItem, [432](#)
- QwtAbstractScaleDraw
  - Backbone, [44](#)
  - Labels, [44](#)
  - Ticks, [44](#)
- QwtAnalogClock
  - HourHand, [64](#)
  - MinuteHand, [64](#)
  - NHands, [64](#)
  - SecondHand, [64](#)
- QwtColorMap
  - Indexed, [74](#)
  - RGB, [74](#)
- QwtColumnRect
  - BottomToTop, [76](#)
  - LeftToRight, [76](#)
  - RightToLeft, [76](#)
  - TopToBottom, [76](#)
- QwtColumnSymbol
  - Box, [77](#)
  - NoFrame, [77](#)
  - NoStyle, [77](#)
  - Plain, [77](#)
  - Raised, [77](#)
  - UserStyle, [77](#)



- QwtCompassMagnetNeedle
  - ThinStyle, [83](#)
  - TriangleStyle, [83](#)
- QwtCompassWindArrow
  - Style1, [88](#)
  - Style2, [88](#)
- QwtCounter
  - Button1, [90](#)
  - Button2, [90](#)
  - Button3, [91](#)
  - ButtonCnt, [91](#)
- QwtDate
  - Day, [101](#)
  - FirstDay, [101](#)
  - FirstThursday, [101](#)
  - Hour, [101](#)
  - JulianDayForEpoch, [100](#)
  - Millisecond, [101](#)
  - Minute, [101](#)
  - Month, [101](#)
  - Second, [101](#)
  - Week, [101](#)
  - Year, [101](#)
- QwtDial
  - Plain, [117](#)
  - Raised, [117](#)
  - RotateNeedle, [117](#)
  - RotateScale, [117](#)
  - Sunken, [117](#)
- QwtDialSimpleNeedle
  - Arrow, [127](#)
  - Ray, [127](#)
- QwtEventPattern
  - KeyAbort, [136](#)
  - KeyDown, [136](#)
  - KeyHome, [136](#)
  - KeyLeft, [136](#)
  - KeyPatternCount, [136](#)
  - KeyRedo, [136](#)
  - KeyRight, [136](#)
  - KeySelect1, [136](#)
  - KeySelect2, [136](#)
  - KeyUndo, [136](#)
  - KeyUp, [136](#)
  - MousePatternCount, [137](#)
  - MouseSelect1, [136](#)
  - MouseSelect2, [136](#)
  - MouseSelect3, [136](#)
  - MouseSelect4, [136](#)
  - MouseSelect5, [136](#)
  - MouseSelect6, [137](#)
- QwtGraphic
  - RenderPensUnscaled, [142](#)
- QwtInterval
  - ExcludeBorders, [153](#)
  - ExcludeMaximum, [153](#)
  - ExcludeMinimum, [153](#)
  - IncludeBorders, [153](#)
- QwtIntervalSymbol
  - Bar, [164](#)
  - Box, [164](#)
  - NoSymbol, [164](#)
  - UserSymbol, [164](#)
- QwtKnob
  - Dot, [169](#)
  - Flat, [169](#)
  - NoMarker, [169](#)
  - Notch, [169](#)
  - Nub, [169](#)
  - Raised, [169](#)
  - Styled, [169](#)
  - Sunken, [169](#)
  - Tick, [169](#)
  - Triangle, [169](#)
- QwtLegendData
  - Checkable, [183](#)
  - Clickable, [183](#)
  - ReadOnly, [183](#)
- QwtLinearColorMap
  - FixedColors, [191](#)
  - ScaledColors, [191](#)
- QwtMatrixRasterData
  - BilinearInterpolation, [212](#)
  - NearestNeighbour, [212](#)
- QwtNullPaintDevice
  - NormalMode, [216](#)
  - PathMode, [216](#)
  - PolygonPathMode, [216](#)
- QwtPainterCommand
  - Image, [226](#)
  - Invalid, [226](#)
  - Path, [226](#)
  - Pixmap, [226](#)
  - State, [226](#)
- QwtPicker
  - ActiveOnly, [237](#)
  - AlwaysOff, [237](#)
  - AlwaysOn, [237](#)
  - CrossRubberBand, [238](#)
  - EllipseRubberBand, [238](#)
  - HLineRubberBand, [238](#)
  - KeepSize, [238](#)
  - NoRubberBand, [238](#)
  - PolygonRubberBand, [238](#)
  - RectRubberBand, [238](#)
  - Stretch, [238](#)
  - UserRubberBand, [238](#)
  - VLineRubberBand, [238](#)
- QwtPickerMachine
  - NoSelection, [257](#)
  - PointSelection, [257](#)
  - PolygonSelection, [257](#)
  - RectSelection, [257](#)
- QwtPlot
  - axisCnt, [267](#)
  - BottomLegend, [268](#)

- LeftLegend, 268
- RightLegend, 268
- TopLegend, 268
- xBottom, 267
- xTop, 267
- yLeft, 267
- yRight, 267
- QwtPlotAbstractBarChart
  - AutoAdjustSamples, 286
  - FixedSampleSize, 286
  - ScaleSampleToCanvas, 286
  - ScaleSamplesToAxes, 286
- QwtPlotBarChart
  - LegendBarTitles, 291
  - LegendChartTitle, 291
- QwtPlotCanvas
  - BackingStore, 298
  - CanvasFocusIndicator, 298
  - HackStyledBackground, 298
  - ImmediatePaint, 298
  - ItemFocusIndicator, 298
  - NoFocusIndicator, 298
  - Opaque, 298
- QwtPlotCurve
  - ClipPolygons, 305
  - Dots, 305
  - FilterPoints, 305
  - Fitted, 304
  - ImageBuffer, 305
  - Inverted, 304
  - LegendNoAttribute, 305
  - LegendShowBrush, 305
  - LegendShowLine, 305
  - LegendShowSymbol, 305
  - Lines, 305
  - MinimizeMemory, 305
  - NoCurve, 305
  - Steps, 305
  - Sticks, 305
  - UserCurve, 305
- QwtPlotDirectPainter
  - AtomicPainter, 320
  - CopyBackingStore, 320
  - FullRepaint, 320
- QwtPlotGLCanvas
  - Plain, 323
  - Raised, 323
  - Sunken, 323
- QwtPlotHistogram
  - Columns, 334
  - Lines, 334
  - Outline, 334
  - UserStyle, 334
- QwtPlotIntervalCurve
  - ClipPolygons, 343
  - ClipSymbol, 343
  - NoCurve, 343
  - Tube, 343
  - UserCurve, 343
- QwtPlotItem
  - AutoScale, 351
  - Legend, 351
  - LegendInterest, 352
  - Margins, 351
  - RenderAntialiased, 352
  - Rtti\_PlotBarChart, 352
  - Rtti\_PlotCurve, 352
  - Rtti\_PlotGrid, 352
  - Rtti\_PlotHistogram, 352
  - Rtti\_PlotIntervalCurve, 352
  - Rtti\_PlotItem, 352
  - Rtti\_PlotLegend, 352
  - Rtti\_PlotMarker, 352
  - Rtti\_PlotMultiBarChart, 353
  - Rtti\_PlotSVG, 352
  - Rtti\_PlotScale, 352
  - Rtti\_PlotShape, 353
  - Rtti\_PlotSpectroCurve, 352
  - Rtti\_PlotSpectrogram, 352
  - Rtti\_PlotTextLabel, 353
  - Rtti\_PlotTradingCurve, 352
  - Rtti\_PlotUserItem, 353
  - Rtti\_PlotZone, 353
  - ScaleInterest, 352
- QwtPlotLayout
  - AlignScales, 365
  - IgnoreFooter, 365
  - IgnoreFrames, 365
  - IgnoreLegend, 365
  - IgnoreScrollbars, 365
  - IgnoreTitle, 365
- QwtPlotLegendItem
  - ItemBackground, 375
  - LegendBackground, 375
- QwtPlotMarker
  - Cross, 385
  - HLine, 385
  - NoLine, 385
  - VLine, 385
- QwtPlotMultiBarChart
  - Grouped, 392
  - Stacked, 392
- QwtPlotRasterItem
  - NoCache, 408
  - PaintCache, 408
  - PaintInDeviceResolution, 408
- QwtPlotRenderer
  - DefaultLayout, 414
  - DiscardBackground, 413
  - DiscardCanvasBackground, 413
  - DiscardCanvasFrame, 413
  - DiscardFooter, 413
  - DiscardLegend, 413
  - DiscardNone, 413
  - DiscardTitle, 413
  - FrameWithScales, 414

- QwtPlotRescaler
  - ExpandBoth, [421](#)
  - ExpandDown, [421](#)
  - ExpandUp, [421](#)
  - Expanding, [421](#)
  - Fitting, [421](#)
  - Fixed, [421](#)
- QwtPlotShapeltem
  - ClipPolygons, [439](#)
  - LegendColor, [439](#)
  - LegendShape, [439](#)
- QwtPlotSpectroCurve
  - ClipPoints, [445](#)
- QwtPlotSpectrogram
  - ContourMode, [450](#)
  - ImageMode, [450](#)
- QwtPlotTradingCurve
  - Bar, [466](#)
  - CandleStick, [466](#)
  - ClipSymbols, [466](#)
  - Decreasing, [466](#)
  - Increasing, [466](#)
  - NoSymbol, [466](#)
  - UserSymbol, [466](#)
- QwtPointMapper
  - RoundPoints, [492](#)
  - WeedOutPoints, [492](#)
- QwtRasterData
  - IgnoreAllVerticesOnLevel, [503](#)
  - IgnoreOutOfRange, [503](#)
- QwtScaleDiv
  - MajorTick, [515](#)
  - MediumTick, [515](#)
  - MinorTick, [515](#)
  - NTickTypes, [515](#)
  - NoTick, [515](#)
- QwtScaleDraw
  - BottomScale, [522](#)
  - LeftScale, [522](#)
  - RightScale, [522](#)
  - TopScale, [522](#)
- QwtScaleEngine
  - Floating, [531](#)
  - IncludeReference, [531](#)
  - Inverted, [531](#)
  - NoAttribute, [531](#)
  - Symmetric, [531](#)
- QwtScaleWidget
  - TitleInverted, [542](#)
- QwtSlider
  - LeadingScale, [564](#)
  - NoScale, [564](#)
  - TrailingScale, [564](#)
- QwtSpline
  - Natural, [572](#)
  - Periodic, [572](#)
- QwtSplineCurveFitter
  - Auto, [575](#)
- ParametricSpline, [575](#)
- Spline, [575](#)
- QwtSymbol
  - AutoCache, [578](#)
  - Cache, [578](#)
  - Cross, [579](#)
  - DTriangle, [579](#)
  - Diamond, [579](#)
  - Ellipse, [579](#)
  - Graphic, [579](#)
  - HLine, [579](#)
  - Hexagon, [579](#)
  - LTriangle, [579](#)
  - NoCache, [578](#)
  - NoSymbol, [579](#)
  - Path, [579](#)
  - Pixmap, [579](#)
  - RTriangle, [579](#)
  - Rect, [579](#)
  - Star1, [579](#)
  - Star2, [579](#)
  - SvgDocument, [579](#)
  - Triangle, [579](#)
  - UTriangle, [579](#)
  - UserStyle, [579](#)
  - VLine, [579](#)
  - XCross, [579](#)
- QwtText
  - AutoText, [595](#)
  - MathMLText, [595](#)
  - MinimumLayout, [594](#)
  - OtherFormat, [595](#)
  - PaintBackground, [594](#)
  - PaintUsingTextColor, [594](#)
  - PaintUsingTextFont, [594](#)
  - PlainText, [595](#)
  - RichText, [595](#)
  - TeXText, [595](#)
- QwtThermo
  - LeadingScale, [610](#)
  - NoScale, [610](#)
  - OriginCustom, [609](#)
  - OriginMaximum, [609](#)
  - OriginMinimum, [609](#)
  - TrailingScale, [610](#)
- QwtWidgetOverlay
  - AlphaMask, [639](#)
  - AutoRenderMode, [640](#)
  - CopyAlphaMask, [640](#)
  - DrawOverlay, [640](#)
  - MaskHint, [639](#)
  - NoMask, [639](#)
- QwtAbstractLegend, [32](#)
  - isEmpty, [33](#)
  - QwtAbstractLegend, [33](#)
  - QwtAbstractLegend, [33](#)
  - renderLegend, [33](#)
  - scrollExtent, [33](#)

- updateLegend, 34
- QwtAbstractScale, 34
  - abstractScaleDraw, 37
  - invTransform, 37
  - isInverted, 37
  - lowerBound, 37
  - maximum, 37
  - minimum, 38
  - QwtAbstractScale, 36
  - QwtAbstractScale, 36
  - rescale, 38
  - scaleDiv, 38
  - scaleEngine, 38
  - scaleMap, 38
  - scaleMaxMajor, 39
  - scaleMaxMinor, 39
  - scaleStepSize, 39
  - setAbstractScaleDraw, 39
  - setLowerBound, 39
  - setScale, 39, 40
  - setScaleEngine, 40
  - setScaleMaxMajor, 40
  - setScaleMaxMinor, 41
  - setScaleStepSize, 41
  - setUpperBound, 41
  - transform, 41
  - upperBound, 42
- QwtAbstractScaleDraw, 42
  - draw, 44
  - drawBackbone, 44
  - drawLabel, 44
  - drawTick, 44
  - enableComponent, 46
  - extent, 46
  - hasComponent, 46
  - invalidateCache, 46
  - label, 47
  - maxTickLength, 47
  - minimumExtent, 47
  - penWidth, 47
  - QwtAbstractScaleDraw, 44
  - QwtAbstractScaleDraw, 44
  - ScaleComponent, 43
  - scaleDiv, 47
  - scaleMap, 47, 48
  - setMinimumExtent, 48
  - setPenWidth, 48
  - setScaleDiv, 48
  - setSpacing, 48
  - setTickLength, 48
  - setTransformation, 50
  - spacing, 50
  - tickLabel, 50
  - tickLength, 50
- QwtAbstractSeriesStore, 50
  - dataRect, 51
  - dataSize, 51
  - setRectOfInterest, 51
- QwtAbstractSlider, 52
  - incrementValue, 54
  - incrementedValue, 54
  - invertedControls, 54
  - isReadOnly, 55
  - isScrollPosition, 55
  - isTracking, 55
  - isValid, 55
  - keyPressEvent, 55
  - mouseMoveEvent, 56
  - mousePressEvent, 56
  - mouseReleaseEvent, 56
  - pageSteps, 56
  - QwtAbstractSlider, 54
  - QwtAbstractSlider, 54
  - scaleChange, 57
  - scrolledTo, 57
  - setInvertedControls, 57
  - setPageSteps, 57
  - setReadOnly, 58
  - setSingleSteps, 58
  - setStepAlignment, 58
  - setTotalSteps, 58
  - setTracking, 59
  - setValid, 59
  - setValue, 59
  - setWrapping, 59
  - singleSteps, 59
  - sliderMoved, 60
  - sliderPressed, 60
  - sliderReleased, 60
  - stepAlignment, 60
  - totalSteps, 60
  - valueChanged, 60
  - wheelEvent, 61
  - wrapping, 61
- QwtAlphaColorMap, 61
  - color, 62
  - QwtAlphaColorMap, 62
  - QwtAlphaColorMap, 62
  - rgb, 62
  - setColor, 62
- QwtAnalogClock, 63
  - drawHand, 66
  - drawNeedle, 66
  - Hand, 64
  - hand, 66
  - QwtAnalogClock, 65
  - QwtAnalogClock, 65
  - setHand, 67
  - setTime, 67
- QwtArraySeriesData
  - QwtArraySeriesData, 68
  - QwtArraySeriesData, 68
  - sample, 68
  - samples, 68
  - setSamples, 68
  - size, 69

- QwtArraySeriesData< T >, 67
- QwtArrowButton, 69
  - arrowSize, 70
  - drawArrow, 70
  - drawButtonLabel, 70
  - labelRect, 71
  - paintEvent, 71
  - QwtArrowButton, 70
  - QwtArrowButton, 70
  - sizeHint, 71
- QwtCPointerData, 97
  - boundingRect, 98
  - QwtCPointerData, 97
  - QwtCPointerData, 97
  - sample, 98
  - size, 98
  - xData, 98
  - yData, 98
- QwtClipper, 71
  - clipCircle, 71
  - clipPolygon, 72
  - clipPolygonF, 72
- QwtColorMap, 72
  - color, 74
  - colorIndex, 74
  - colorTable, 74
  - Format, 73
  - format, 74
  - rgb, 75
- QwtColumnRect, 75
  - Direction, 76
  - orientation, 76
  - toRect, 76
- QwtColumnSymbol, 76
  - draw, 77
  - drawBox, 78
  - FrameStyle, 77
  - frameStyle, 78
  - lineWidth, 78
  - palette, 78
  - QwtColumnSymbol, 77
  - QwtColumnSymbol, 77
  - setFrameStyle, 78
  - setLineWidth, 79
  - setPalette, 79
  - setStyle, 79
  - Style, 77
  - style, 79
- QwtCompass, 79
  - drawRose, 81
  - drawScaleContents, 81
  - keyPressEvent, 81
  - QwtCompass, 81
  - QwtCompass, 81
  - rose, 81, 82
  - setRose, 82
- QwtCompassMagnetNeedle, 82
  - drawNeedle, 83
  - Style, 83
- QwtCompassRose, 84
  - draw, 84
  - palette, 85
- QwtCompassScaleDraw, 85
  - label, 86
  - labelMap, 86
  - QwtCompassScaleDraw, 86
  - QwtCompassScaleDraw, 86
  - setLabelMap, 86
- QwtCompassWindArrow, 87
  - drawNeedle, 88
  - QwtCompassWindArrow, 88
  - QwtCompassWindArrow, 88
  - Style, 88
- QwtCounter, 88
  - Button, 90
  - buttonReleased, 91
  - event, 91
  - incSteps, 91
  - isReadOnly, 91
  - isValid, 92
  - keyPressEvent, 92
  - maximum, 92
  - minimum, 92
  - numButtons, 93
  - QwtCounter, 91
  - QwtCounter, 91
  - setIncSteps, 93
  - setMaximum, 93
  - setMinimum, 93
  - setNumButtons, 93
  - setRange, 94
  - setReadOnly, 94
  - setSingleStep, 94
  - setStepButton1, 94
  - setStepButton2, 94
  - setStepButton3, 95
  - setValid, 95
  - setValue, 95
  - setWrapping, 95
  - singleStep, 95
  - value, 96
  - valueChanged, 96
  - wheelEvent, 96
  - wrapping, 96
- QwtCurveFitter, 99
  - fitCurve, 99
- QwtDate, 100
  - ceil, 101
  - dateOfWeek0, 101
  - floor, 102
  - IntervalType, 100
  - maxDate, 102
  - minDate, 102
  - toDateTime, 103
  - toDouble, 103
  - toString, 103

- utcOffset, 104
- Week0Type, 101
- weekNumber, 104
- QwtDateScaleDraw, 105
  - dateFormat, 107
  - dateFormatOfDate, 107
  - intervalType, 107
  - label, 107
  - QwtDateScaleDraw, 106
  - QwtDateScaleDraw, 106
  - setDateFormat, 108
  - setTimeSpec, 108
  - setUtcOffset, 108
  - setWeek0Type, 108
  - timeSpec, 109
  - toDateTime, 109
  - utcOffset, 109
  - week0Type, 109
- QwtDateScaleEngine, 110
  - alignDate, 111
  - autoScale, 111
  - divideScale, 112
  - intervalType, 112
  - maxWeeks, 112
  - QwtDateScaleEngine, 111
  - QwtDateScaleEngine, 111
  - setMaxWeeks, 113
  - setTimeSpec, 113
  - setUtcOffset, 113
  - setWeek0Type, 113
  - timeSpec, 114
  - toDateTime, 114
  - utcOffset, 114
  - week0Type, 114
- QwtDial, 115
  - boundingRect, 117
  - changeEvent, 118
  - drawContents, 118
  - drawFocusIndicator, 118
  - drawFrame, 118
  - drawNeedle, 118
  - drawScale, 119
  - drawScaleContents, 119
  - frameShadow, 119
  - innerRect, 119
  - invalidateCache, 119
  - isScrollPosition, 119
  - lineWidth, 120
  - maxScaleArc, 120
  - minScaleArc, 120
  - minimumSizeHint, 120
  - Mode, 117
  - mode, 120
  - needle, 120, 121
  - origin, 121
  - paintEvent, 121
  - QwtDial, 117
  - QwtDial, 117
  - scaleChange, 121
  - scaleDraw, 121
  - scaleInnerRect, 121
  - scrolledTo, 122
  - setFrameShadow, 122
  - setLineWidth, 122
  - setMaxScaleArc, 122
  - setMinScaleArc, 123
  - setMode, 123
  - setNeedle, 123
  - setOrigin, 123
  - setScaleArc, 123
  - setScaleDraw, 124
  - Shadow, 117
  - sizeHint, 124
  - wheelEvent, 124
- QwtDialNeedle, 124
  - draw, 125
  - drawNeedle, 125
  - palette, 126
  - setPalette, 126
- QwtDialSimpleNeedle, 126
  - drawNeedle, 127
  - QwtDialSimpleNeedle, 127
  - QwtDialSimpleNeedle, 127
  - setWidth, 128
  - Style, 127
  - width, 128
- QwtDynGridLayout, 128
  - addItem, 130
  - columnsForWidth, 130
  - count, 130
  - expandingDirections, 130
  - hasHeightForWidth, 130
  - heightForWidth, 130
  - isEmpty, 131
  - itemAt, 131
  - itemCount, 131
  - layoutGrid, 131
  - layoutItems, 131
  - maxColumns, 132
  - maxItemWidth, 132
  - numColumns, 132
  - numRows, 132
  - QwtDynGridLayout, 129
  - QwtDynGridLayout, 129
  - setExpandingDirections, 132
  - setGeometry, 133
  - setMaxColumns, 133
  - sizeHint, 133
  - stretchGrid, 133
  - takeAt, 133
- QwtEventPattern, 134
  - initKeyPattern, 137
  - initMousePattern, 137
  - keyMatch, 137
  - keyPattern, 138
  - KeyPatternCode, 135

- mouseMatch, 138
- mousePattern, 139
- MousePatternCode, 136
- QwtEventPattern, 137
- QwtEventPattern, 137
- setKeyPattern, 139
- setMousePattern, 139
- QwtEventPattern::KeyPattern, 31
- QwtEventPattern::MousePattern, 31
- QwtGraphic, 139
  - boundingRect, 144
  - commands, 144
  - controlPointRect, 144
  - defaultSize, 144
  - drawImage, 144
  - drawPath, 146
  - drawPixmap, 146
  - isEmpty, 146
  - isNull, 146
  - operator=, 146
  - QwtGraphic, 142
  - QwtGraphic, 142
  - render, 148
  - RenderHint, 142
  - RenderHints, 142
  - reset, 148
  - scaledBoundingRect, 149
  - setCommands, 149
  - setDefaultSize, 149
  - setRenderHint, 149
  - sizeMetrics, 150
  - testRenderHint, 150
  - toImage, 150
  - toPixmap, 151
  - updateState, 151
- QwtInterval, 152
  - BorderFlag, 153
  - borderFlags, 154
  - contains, 154
  - extend, 154
  - intersect, 154
  - intersects, 155
  - invalidate, 155
  - inverted, 155
  - isNull, 155
  - isValid, 155
  - limited, 155
  - maxValue, 156
  - minValue, 156
  - normalized, 156
  - operator==, 158
  - operator&, 156
  - operator&=, 156
  - QwtInterval, 153
  - QwtInterval, 153
  - setBorderFlags, 159
  - setInterval, 159
  - setMaxValue, 159
  - setMinValue, 159
  - symmetrize, 160
  - width, 160
- QwtIntervalSample, 160
  - QwtIntervalSample, 161
  - QwtIntervalSample, 161
- QwtIntervalSeriesData, 161
  - boundingRect, 163
  - QwtIntervalSeriesData, 161
  - QwtIntervalSeriesData, 161
- QwtIntervalSymbol, 163
  - brush, 164
  - draw, 164
  - pen, 165
  - QwtIntervalSymbol, 164
  - QwtIntervalSymbol, 164
  - setBrush, 165
  - setPen, 165
  - setStyle, 166
  - setWidth, 166
  - Style, 164
  - style, 166
  - width, 166
- QwtKnob, 166
  - alignment, 169
  - changeEvent, 170
  - drawFocusIndicator, 170
  - drawKnob, 170
  - drawMarker, 170
  - isScrollPosition, 170
  - knobRect, 170
  - KnobStyle, 169
  - knobStyle, 171
  - markerSize, 171
  - MarkerStyle, 169
  - markerStyle, 171
  - minimumSizeHint, 171
  - numTurns, 171
  - paintEvent, 171
  - QwtKnob, 169
  - QwtKnob, 169
  - scaleDraw, 173
  - scrolledTo, 173
  - setAlignment, 173
  - setBorderWidth, 173
  - setKnobStyle, 174
  - setKnobWidth, 174
  - setMarkerSize, 174
  - setMarkerStyle, 174
  - setNumTurns, 174
  - setScaleDraw, 175
  - setTotalAngle, 175
  - sizeHint, 175
  - totalAngle, 175
- QwtLegend, 176
  - checked, 177
  - clicked, 178
  - contentsWidget, 178

- createWidget, 178
- defaultItemMode, 179
- eventFilter, 179
- heightForWidth, 179
- horizontalScrollBar, 179
- isEmpty, 179
- itemChecked, 179
- itemClicked, 180
- itemInfo, 180
- legendWidget, 180
- legendWidgets, 180
- maxColumns, 180
- QwtLegend, 177
- QwtLegend, 177
- renderItem, 181
- renderLegend, 181
- scrollExtent, 181
- setDefaultItemMode, 181
- setMaxColumns, 182
- updateLegend, 182
- updateWidget, 182
- verticalScrollBar, 182
- QwtLegendData, 183
  - hasRole, 184
  - icon, 184
  - isValid, 184
  - Mode, 183
  - mode, 184
  - setValue, 184
  - setValues, 184
  - title, 184
  - value, 184
  - values, 186
- QwtLegendLabel, 186
  - data, 188
  - icon, 188
  - itemMode, 188
  - QwtLegendLabel, 187
  - QwtLegendLabel, 187
  - setChecked, 188
  - setData, 188
  - setIcon, 188
  - setItemMode, 189
  - setSpacing, 189
  - setText, 189
  - spacing, 189
- QwtLinearColorMap, 189
  - addColorStop, 191
  - color1, 191
  - color2, 191
  - colorIndex, 192
  - colorStops, 192
  - Mode, 190
  - mode, 192
  - QwtLinearColorMap, 191
  - QwtLinearColorMap, 191
  - rgb, 192
  - setColorInterval, 192
  - setMode, 193
- QwtLinearScaleEngine, 193
  - align, 194
  - autoScale, 194
  - buildMajorTicks, 195
  - buildMinorTicks, 195
  - buildTicks, 195
  - divideScale, 195
  - QwtLinearScaleEngine, 194
  - QwtLinearScaleEngine, 194
- QwtLogScaleEngine, 196
  - align, 197
  - autoScale, 197
  - buildMajorTicks, 198
  - buildMinorTicks, 198
  - buildTicks, 198
  - divideScale, 198
  - QwtLogScaleEngine, 197
  - QwtLogScaleEngine, 197
- QwtLogTransform, 199
  - bounded, 200
  - copy, 200
  - invTransform, 200
  - transform, 200
- QwtMagnifier, 200
  - eventFilter, 202
  - getMouseButton, 202
  - getZoomInKey, 202
  - getZoomOutKey, 203
  - isEnabled, 203
  - keyFactor, 203
  - mouseFactor, 203
  - parentWidget, 203
  - QwtMagnifier, 202
  - QwtMagnifier, 202
  - rescale, 204
  - setEnabled, 205
  - setKeyFactor, 205
  - setMouseButton, 205
  - setMouseFactor, 205
  - setWheelFactor, 205
  - setWheelModifiers, 206
  - setZoomInKey, 206
  - setZoomOutKey, 206
  - wheelFactor, 206
  - wheelModifiers, 207
  - widgetKeyPressEvent, 207
  - widgetKeyReleaseEvent, 207
  - widgetMouseMoveEvent, 207
  - widgetMousePressEvent, 207
  - widgetMouseReleaseEvent, 208
  - widgetWheelEvent, 208
- QwtMathMLTextEngine, 208
  - draw, 209
  - heightForWidth, 209
  - mightRender, 210
  - textMargins, 210
  - textSize, 210



- QwtMatrixRasterData, 210
  - numColumns, 212
  - numRows, 212
  - pixelHint, 212
  - ResampleMode, 212
  - resampleMode, 212
  - setInterval, 213
  - setResampleMode, 213
  - setValue, 213
  - setValueMatrix, 213
  - value, 214
  - valueMatrix, 214
- QwtNullPaintDevice, 214
  - metric, 216
  - Mode, 216
  - mode, 216
  - setMode, 217
  - sizeMetrics, 217
- QwtNullTransform, 217
  - copy, 218
  - invTransform, 218
  - transform, 218
- QwtOHLCSample, 218
  - boundingInterval, 219
  - isValid, 219
  - QwtOHLCSample, 219
  - QwtOHLCSample, 219
  - time, 220
- QwtPainter, 220
  - backingStore, 222
  - drawBackground, 222
  - drawColorBar, 222
  - drawFrame, 222
  - drawRoundFrame, 223
  - drawRoundedFrame, 223
  - drawSimpleRichText, 223
  - fillPixmap, 223
  - isAligning, 224
  - isX11GraphicsSystem, 224
  - polylineSplitting, 224
  - roundingAlignment, 224
  - setPolylineSplitting, 225
  - setRoundingAlignment, 225
- QwtPainterCommand, 225
  - imageData, 227
  - operator=, 227
  - path, 228
  - pixmapData, 228
  - QwtPainterCommand, 226, 227
  - QwtPainterCommand, 226, 227
  - stateData, 228
  - Type, 226
  - type, 228
- QwtPanner, 228
  - contentsMask, 230
  - cursor, 230
  - eventFilter, 231
  - grab, 231
  - isEnabled, 231
  - isOrientationEnabled, 231
  - moved, 231
  - paintEvent, 232
  - panned, 232
  - QwtPanner, 230
  - QwtPanner, 230
  - setAbortKey, 232
  - setCursor, 232
  - setEnabled, 232
  - setMouseButton, 232
  - setOrientations, 232
  - widgetKeyPressEvent, 233
  - widgetKeyReleaseEvent, 233
  - widgetMouseMoveEvent, 233
  - widgetMousePressEvent, 233
  - widgetMouseReleaseEvent, 233
- QwtPicker, 234
  - accept, 239
  - activated, 239
  - adjustedPoints, 239
  - append, 240
  - appended, 240
  - begin, 240
  - changed, 240
  - DisplayMode, 237
  - drawRubberBand, 240
  - drawTracker, 241
  - end, 241
  - eventFilter, 241
  - isActive, 241
  - isEnabled, 242
  - move, 242
  - moved, 242
  - pickArea, 242
  - pickedPoints, 242
  - QwtPicker, 238
  - QwtPicker, 238
  - remove, 242
  - removed, 243
  - reset, 243
  - ResizeMode, 237
  - resizeMode, 243
  - RubberBand, 238
  - rubberBand, 243
  - rubberBandMask, 243
  - rubberBandOverlay, 243
  - rubberBandPen, 243
  - selected, 244
  - selection, 244
  - setEnabled, 244
  - setResizeMode, 244
  - setRubberBand, 244
  - setRubberBandPen, 245
  - setStateMachine, 245
  - setTrackerFont, 245
  - setTrackerMode, 245
  - setTrackerPen, 245

- stateMachine, [247](#)
- stretchSelection, [247](#)
- trackerFont, [247](#)
- trackerMode, [247](#)
- trackerOverlay, [247](#)
- trackerPen, [248](#)
- trackerPosition, [248](#)
- trackerRect, [248](#)
- trackerText, [248](#)
- transition, [248](#)
- widgetEnterEvent, [249](#)
- widgetKeyPressEvent, [249](#)
- widgetKeyReleaseEvent, [249](#)
- widgetLeaveEvent, [249](#)
- widgetMouseDoubleClickEvent, [249](#)
- widgetMouseMoveEvent, [251](#)
- widgetMousePressEvent, [251](#)
- widgetMouseReleaseEvent, [251](#)
- widgetWheelEvent, [251](#)
- QwtPickerClickPointMachine, [252](#)
- QwtPickerClickRectMachine, [252](#)
- QwtPickerDragLineMachine, [254](#)
- QwtPickerDragPointMachine, [254](#)
- QwtPickerDragRectMachine, [255](#)
- QwtPickerMachine, [256](#)
  - SelectionType, [257](#)
- QwtPickerPolygonMachine, [258](#)
- QwtPickerTrackerMachine, [259](#)
- QwtPixelMatrix, [259](#)
  - index, [260](#)
  - QwtPixelMatrix, [260](#)
  - QwtPixelMatrix, [260](#)
  - rect, [261](#)
  - setRect, [261](#)
  - testAndSetPixel, [261](#)
  - testPixel, [261](#)
- QwtPlainTextEngine, [261](#)
  - draw, [262](#)
  - heightForWidth, [263](#)
  - mightRender, [263](#)
  - textMargins, [263](#)
  - textSize, [263](#)
- QwtPlot, [264](#)
  - applyProperties, [268](#)
  - autoReplot, [268](#)
  - Axis, [267](#)
  - axisAutoScale, [268](#)
  - axisEnabled, [269](#)
  - axisFont, [269](#)
  - axisInterval, [269](#)
  - axisMaxMajor, [269](#)
  - axisMaxMinor, [269](#)
  - axisScaleDiv, [270](#)
  - axisScaleDraw, [270](#)
  - axisScaleEngine, [270](#)
  - axisStepSize, [271](#)
  - axisTitle, [271](#)
  - axisValid, [271](#)
  - axisWidget, [271](#)
  - canvas, [272](#)
  - canvasBackground, [272](#)
  - canvasMap, [272](#)
  - drawCanvas, [272](#)
  - drawItems, [272](#)
  - enableAxis, [274](#)
  - event, [274](#)
  - eventFilter, [274](#)
  - footer, [274](#)
  - footerLabel, [275](#)
  - getCanvasMarginsHint, [275](#)
  - grabProperties, [275](#)
  - infoToItem, [275](#)
  - insertLegend, [276](#)
  - invTransform, [276](#)
  - itemAttached, [276](#)
  - itemToInfo, [277](#)
  - legend, [277](#)
  - legendDataChanged, [277](#)
  - LegendPosition, [267](#)
  - plotLayout, [278](#)
  - QwtPlot, [268](#)
  - QwtPlot, [268](#)
  - replot, [278](#)
  - resizeEvent, [278](#)
  - setAutoReplot, [278](#)
  - setAxisAutoScale, [278](#)
  - setAxisFont, [279](#)
  - setAxisLabelAlignment, [279](#)
  - setAxisLabelRotation, [279](#)
  - setAxisMaxMajor, [279](#)
  - setAxisMaxMinor, [280](#)
  - setAxisScale, [280](#)
  - setAxisScaleDiv, [280](#)
  - setAxisScaleDraw, [280](#)
  - setAxisScaleEngine, [281](#)
  - setAxisTitle, [281](#)
  - setCanvas, [281](#)
  - setCanvasBackground, [282](#)
  - setFooter, [282](#)
  - setPlotLayout, [282](#)
  - setTitle, [282](#), [283](#)
  - sizeHint, [283](#)
  - title, [283](#)
  - titleLabel, [283](#)
  - transform, [283](#)
  - updateAxes, [283](#)
  - updateCanvasMargins, [284](#)
  - updateLayout, [284](#)
  - updateLegend, [284](#)
- QwtPlotAbstractBarChart, [285](#)
  - baseline, [286](#)
  - getCanvasMarginHint, [287](#)
  - layoutHint, [287](#)
  - LayoutPolicy, [286](#)
  - layoutPolicy, [287](#)
  - margin, [287](#)

- QwtPlotAbstractBarChart, 286
- QwtPlotAbstractBarChart, 286
- sampleWidth, 288
- setBaseline, 288
- setLayoutHint, 288
- setLayoutPolicy, 288
- setMargin, 289
- setSpacing, 289
- spacing, 289
- QwtPlotBarChart, 290
  - barTitle, 292
  - boundingRect, 292
  - drawBar, 292
  - drawSample, 293
  - drawSeries, 293
  - legendData, 293
  - legendIcon, 293
  - LegendMode, 291
  - legendMode, 294
  - QwtPlotBarChart, 292
  - QwtPlotBarChart, 292
  - rtti, 294
  - setLegendMode, 294
  - setSamples, 294, 295
  - setSymbol, 295
  - specialSymbol, 295
  - symbol, 296
- QwtPlotCanvas, 296
  - backingStore, 299
  - borderPath, 299
  - borderRadius, 299
  - drawBorder, 299
  - drawFocusIndicator, 299
  - event, 300
  - FocusIndicator, 297
  - focusIndicator, 300
  - PaintAttribute, 298
  - paintEvent, 300
  - QwtPlotCanvas, 298
  - QwtPlotCanvas, 298
  - replot, 300
  - resizeEvent, 300
  - setBorderRadius, 300
  - setFocusIndicator, 301
  - setPaintAttribute, 301
  - testPaintAttribute, 301
- QwtPlotCurve, 302
  - baseline, 307
  - brush, 307
  - closePolyline, 307
  - closestPoint, 307
  - CurveAttribute, 304
  - curveFitter, 308
  - CurveStyle, 304
  - drawCurve, 308
  - drawDots, 308
  - drawLines, 308
  - drawSeries, 309
  - drawSteps, 309
  - drawSticks, 309
  - drawSymbols, 310
  - fillCurve, 310
  - LegendAttribute, 305
  - legendIcon, 310
  - PaintAttribute, 305
  - pen, 311
  - QwtPlotCurve, 306, 307
  - QwtPlotCurve, 306, 307
  - rtti, 311
  - setBaseline, 311
  - setBrush, 311
  - setCurveAttribute, 312
  - setCurveFitter, 312
  - setLegendAttribute, 312
  - setPaintAttribute, 312
  - setPen, 312, 313
  - setRawSamples, 313
  - setSamples, 313, 314
  - setStyle, 314
  - setSymbol, 314
  - style, 315
  - symbol, 315
  - testCurveAttribute, 315
  - testLegendAttribute, 315
  - testPaintAttribute, 315
- QwtPlotDict, 316
  - ~QwtPlotDict, 317
  - autoDelete, 317
  - detachItems, 317
  - insertItem, 317
  - itemList, 317
  - QwtPlotDict, 316
  - QwtPlotDict, 316
  - removeItem, 318
  - setAutoDelete, 318
- QwtPlotDirectPainter, 318
  - Attribute, 319
  - clipRegion, 320
  - drawSeries, 320
  - hasClipping, 320
  - setAttribute, 320
  - setClipRegion, 321
  - setClipping, 321
  - testAttribute, 321
- QwtPlotGLCanvas, 321
  - borderPath, 324
  - drawBackground, 324
  - drawBorder, 324
  - drawItems, 324
  - event, 324
  - frameRect, 324
  - frameShadow, 324
  - frameShape, 325
  - frameStyle, 325
  - frameWidth, 325
  - lineWidth, 325

- midLineWidth, 325
- paintEvent, 325
- QwtPlotGLCanvas, 323
- QwtPlotGLCanvas, 323
- setFrameShadow, 326
- setFrameShape, 326
- setFrameStyle, 326
- setLineWidth, 326
- setMidLineWidth, 326
- Shadow, 323
- Shape, 323
- QwtPlotGrid, 327
  - draw, 328
  - enableX, 328
  - enableXMin, 328
  - enableY, 329
  - enableYMin, 329
  - majorPen, 329
  - minorPen, 329
  - rtti, 329
  - setMajorPen, 329, 330
  - setMinorPen, 330
  - setPen, 330, 331
  - setXDiv, 331
  - setYDiv, 331
  - updateScaleDiv, 331
  - xEnabled, 331
  - xMinEnabled, 332
  - xScaleDiv, 332
  - yEnabled, 332
  - yMinEnabled, 332
  - yScaleDiv, 332
- QwtPlotHistogram, 332
  - baseline, 335
  - boundingRect, 335
  - brush, 335
  - columnRect, 335
  - drawColumn, 335
  - drawColumns, 337
  - drawLines, 337
  - drawOutline, 337
  - drawSeries, 338
  - HistogramStyle, 334
  - legendIcon, 338
  - pen, 338
  - QwtPlotHistogram, 334, 335
  - QwtPlotHistogram, 334, 335
  - rtti, 338
  - setBaseline, 339
  - setBrush, 339
  - setPen, 339
  - setSamples, 340
  - setStyle, 340
  - setSymbol, 340
  - style, 340
  - symbol, 341
- QwtPlotIntervalCurve, 341
  - boundingRect, 343
  - brush, 343
  - CurveStyle, 342
  - drawSeries, 344
  - drawSymbols, 344
  - drawTube, 344
  - legendIcon, 345
  - PaintAttribute, 343
  - pen, 345
  - QwtPlotIntervalCurve, 343
  - QwtPlotIntervalCurve, 343
  - rtti, 345
  - setBrush, 345
  - setPaintAttribute, 345
  - setPen, 346
  - setSamples, 346
  - setStyle, 346
  - setSymbol, 348
  - style, 348
  - symbol, 348
  - testPaintAttribute, 348
- QwtPlotItem, 348
  - attach, 353
  - boundingRect, 353
  - defaultIcon, 353
  - detach, 354
  - draw, 354
  - getCanvasMarginHint, 354
  - isVisible, 354
  - ItemAttribute, 351
  - itemChanged, 355
  - ItemInterest, 352
  - legendChanged, 355
  - legendData, 355
  - legendIcon, 355
  - legendIconSize, 356
  - paintRect, 356
  - QwtPlotItem, 353
  - QwtPlotItem, 353
  - RenderHint, 352
  - renderThreadCount, 356
  - rtti, 356
  - RttiValues, 352
  - scaleRect, 356
  - setAxes, 358
  - setItemAttribute, 358
  - setItemInterest, 358
  - setLegendIconSize, 358
  - setRenderHint, 359
  - setRenderThreadCount, 359
  - setTitle, 359
  - setVisible, 359
  - setXAxis, 360
  - setYAxis, 360
  - setZ, 360
  - testItemAttribute, 360
  - testItemInterest, 360
  - testRenderHint, 362
  - title, 362

- updateLegend, [362](#)
  - updateScaleDiv, [362](#)
  - z, [363](#)
- QwtPlotLayout, [363](#)
  - activate, [365](#)
  - alignCanvasToScale, [365](#)
  - alignLegend, [365](#)
  - alignScales, [366](#)
  - canvasMargin, [366](#)
  - canvasRect, [366](#)
  - expandLineBreaks, [366](#)
  - footerRect, [367](#)
  - invalidate, [367](#)
  - layoutLegend, [367](#)
  - legendPosition, [367](#)
  - legendRatio, [367](#)
  - legendRect, [368](#)
  - minimumSizeHint, [368](#)
  - Option, [364](#)
  - scaleRect, [368](#)
  - setAlignCanvasToScale, [368](#)
  - setAlignCanvasToScales, [369](#)
  - setCanvasMargin, [369](#)
  - setCanvasRect, [369](#)
  - setFooterRect, [369](#)
  - setLegendPosition, [369](#), [371](#)
  - setLegendRatio, [371](#)
  - setLegendRect, [371](#)
  - setScaleRect, [371](#)
  - setSpacing, [372](#)
  - setTitleRect, [372](#)
  - spacing, [372](#)
  - titleRect, [372](#)
- QwtPlotLegendItem, [372](#)
  - alignment, [375](#)
  - backgroundBrush, [375](#)
  - BackgroundMode, [374](#)
  - backgroundMode, [375](#)
  - borderDistance, [375](#)
  - borderPen, [375](#)
  - borderRadius, [375](#)
  - draw, [376](#)
  - drawBackground, [376](#)
  - drawLegendData, [376](#)
  - font, [376](#)
  - geometry, [376](#)
  - heightForWidth, [377](#)
  - itemMargin, [377](#)
  - itemSpacing, [377](#)
  - legendGeometries, [377](#)
  - margin, [377](#)
  - maxColumns, [377](#)
  - minimumSize, [378](#)
  - plotItems, [378](#)
  - rtti, [378](#)
  - setAlignment, [378](#)
  - setBackgroundBrush, [378](#)
  - setBackgroundMode, [379](#)
  - setBorderDistance, [379](#)
  - setBorderPen, [379](#)
  - setBorderRadius, [379](#)
  - setFont, [379](#)
  - setItemMargin, [380](#)
  - setItemSpacing, [380](#)
  - setMargin, [380](#)
  - setMaxColumns, [380](#)
  - setSpacing, [380](#)
  - setTextPen, [381](#)
  - spacing, [381](#)
  - textPen, [381](#)
  - updateLegend, [381](#)
- QwtPlotMagnifier, [381](#)
  - isAxisEnabled, [383](#)
  - QwtPlotMagnifier, [383](#)
  - QwtPlotMagnifier, [383](#)
  - rescale, [383](#)
  - setAxisEnabled, [383](#)
- QwtPlotMarker, [383](#)
  - boundingRect, [386](#)
  - draw, [386](#)
  - drawLabel, [386](#)
  - drawLines, [386](#)
  - label, [386](#)
  - labelAlignment, [387](#)
  - labelOrientation, [387](#)
  - legendIcon, [387](#)
  - linePen, [387](#)
  - LineStyle, [385](#)
  - lineStyle, [387](#)
  - rtti, [387](#)
  - setLabel, [388](#)
  - setLabelAlignment, [388](#)
  - setLabelOrientation, [388](#)
  - setLinePen, [388](#), [389](#)
  - setLineStyle, [389](#)
  - setSpacing, [389](#)
  - setSymbol, [389](#)
  - spacing, [389](#)
  - symbol, [390](#)
- QwtPlotMultiBarChart, [390](#)
  - barTitles, [392](#)
  - boundingRect, [392](#)
  - ChartStyle, [392](#)
  - drawBar, [392](#)
  - drawGroupedBars, [393](#)
  - drawSample, [393](#)
  - drawSeries, [393](#)
  - drawStackedBars, [394](#)
  - legendData, [394](#)
  - legendIcon, [394](#)
  - QwtPlotMultiBarChart, [392](#)
  - QwtPlotMultiBarChart, [392](#)
  - resetSymbolMap, [395](#)
  - rtti, [395](#)
  - setBarTitles, [395](#)
  - setSamples, [395](#)

- setStyle, 396
- setSymbol, 396
- specialSymbol, 396
- style, 396
- symbol, 397
- QwtPlotPanner, 398
  - contentsMask, 399
  - grab, 399
  - isAxisEnabled, 400
  - moveCanvas, 400
  - QwtPlotPanner, 399
  - QwtPlotPanner, 399
  - setAxisEnabled, 400
- QwtPlotPicker, 400
  - append, 403
  - appended, 403
  - canvas, 403
  - end, 403
  - invTransform, 404
  - move, 404
  - moved, 404
  - plot, 405
  - QwtPlotPicker, 402
  - QwtPlotPicker, 402
  - scaleRect, 405
  - selected, 405
  - setAxis, 405
  - trackerText, 406
  - trackerTextF, 406
  - transform, 406
- QwtPlotRasterItem, 407
  - alpha, 409
  - boundingRect, 409
  - CachePolicy, 408
  - cachePolicy, 409
  - draw, 409
  - imageMap, 409
  - interval, 410
  - invalidateCache, 410
  - PaintAttribute, 408
  - pixelHint, 410
  - renderImage, 410
  - setAlpha, 411
  - setCachePolicy, 411
  - setPaintAttribute, 411
  - testPaintAttribute, 412
- QwtPlotRenderer, 412
  - DiscardFlag, 413
  - discardFlags, 414
  - exportTo, 414
  - LayoutFlag, 413
  - layoutFlags, 414
  - QwtPlotRenderer, 414
  - QwtPlotRenderer, 414
  - render, 415
  - renderCanvas, 415
  - renderDocument, 415
  - renderFooter, 416
  - renderLegend, 416
  - renderScale, 416
  - renderTitle, 417
  - renderTo, 417
  - setDiscardFlag, 417
  - setDiscardFlags, 417
  - setLayoutFlag, 419
  - setLayoutFlags, 419
  - testDiscardFlag, 419
  - testLayoutFlag, 419
- QwtPlotRescaler, 420
  - aspectRatio, 423
  - canvas, 423
  - canvasResizeEvent, 423
  - expandInterval, 424
  - expandScale, 424
  - ExpandingDirection, 421
  - expandingDirection, 423
  - interval, 424
  - intervalHint, 424
  - isEnabled, 424
  - orientation, 425
  - plot, 425
  - QwtPlotRescaler, 422
  - QwtPlotRescaler, 422
  - referenceAxis, 425
  - rescale, 425
  - RescalePolicy, 421
  - rescalePolicy, 425
  - setAspectRatio, 425, 427
  - setEnabled, 427
  - setExpandingDirection, 427
  - setIntervalHint, 427
  - setReferenceAxis, 429
  - setRescalePolicy, 429
  - syncScale, 429
  - updateScales, 429
- QwtPlotScaleItem, 429
  - borderDistance, 431
  - font, 431
  - isScaleDivFromAxis, 431
  - palette, 432
  - position, 432
  - QwtPlotScaleItem, 431
  - QwtPlotScaleItem, 431
  - rtti, 432
  - scaleDiv, 432
  - scaleDraw, 432
  - setAlignment, 432
  - setBorderDistance, 433
  - setFont, 433
  - setPalette, 433
  - setPosition, 433
  - setScaleDiv, 434
  - setScaleDivFromAxis, 434
  - setScaleDraw, 434
  - updateScaleDiv, 434
- QwtPlotSeriesItem, 435

- boundingRect, 436
  - draw, 436
  - drawSeries, 436
  - orientation, 437
  - QwtPlotSeriesItem, 436
  - QwtPlotSeriesItem, 436
  - setOrientation, 437
  - updateScaleDiv, 437
- QwtPlotShapelItem, 437
  - brush, 440
  - draw, 440
  - legendIcon, 440
  - LegendMode, 439
  - legendMode, 440
  - PaintAttribute, 439
  - pen, 441
  - QwtPlotShapelItem, 439, 440
  - QwtPlotShapelItem, 439, 440
  - renderTolerance, 441
  - rtti, 441
  - setBrush, 441
  - setLegendMode, 441
  - setPaintAttribute, 442
  - setPen, 442
  - setPolygon, 442
  - setRect, 443
  - setRenderTolerance, 443
  - setShape, 443
  - shape, 443
  - testPaintAttribute, 443
- QwtPlotSpectroCurve, 444
  - colorMap, 445
  - colorRange, 445
  - drawDots, 446
  - drawSeries, 446
  - PaintAttribute, 445
  - penWidth, 446
  - QwtPlotSpectroCurve, 445
  - QwtPlotSpectroCurve, 445
  - rtti, 446
  - setColorMap, 447
  - setColorRange, 447
  - setPaintAttribute, 447
  - setPenWidth, 447
  - setSamples, 447, 448
  - testPaintAttribute, 448
- QwtPlotSpectrogram, 448
  - colorMap, 450
  - contourLevels, 450
  - contourPen, 451
  - contourRasterSize, 451
  - data, 451, 452
  - defaultContourPen, 452
  - DisplayMode, 450
  - draw, 452
  - drawContourLines, 452
  - interval, 453
  - pixelHint, 453
  - QwtPlotSpectrogram, 450
  - QwtPlotSpectrogram, 450
  - renderContourLines, 453
  - renderImage, 454
  - renderTile, 454
  - rtti, 454
  - setColorMap, 454
  - setConrecFlag, 455
  - setContourLevels, 455
  - setData, 455
  - setDefaultContourPen, 455, 456
  - setDisplayMode, 456
  - testConrecFlag, 456
  - testDisplayMode, 456
- QwtPlotSvgItem, 457
  - draw, 458
  - loadData, 458
  - loadFile, 459
  - QwtPlotSvgItem, 458
  - QwtPlotSvgItem, 458
  - render, 459
  - renderer, 459
  - rtti, 459
  - viewBox, 459
- QwtPlotTextLabel, 460
  - draw, 461
  - margin, 462
  - QwtPlotTextLabel, 461
  - QwtPlotTextLabel, 461
  - rtti, 462
  - setMargin, 462
  - setText, 462
  - text, 462
  - textRect, 462
- QwtPlotTradingCurve, 464
  - boundingRect, 467
  - Direction, 466
  - drawBar, 467
  - drawCandleStick, 467
  - drawSeries, 467
  - drawSymbols, 468
  - drawUserSymbol, 468
  - legendIcon, 468
  - maxSymbolWidth, 469
  - minSymbolWidth, 469
  - PaintAttribute, 466
  - QwtPlotTradingCurve, 466, 467
  - QwtPlotTradingCurve, 466, 467
  - rtti, 469
  - scaledSymbolWidth, 469
  - setMaxSymbolWidth, 469
  - setMinSymbolWidth, 471
  - setPaintAttribute, 471
  - setSamples, 471
  - setSymbolBrush, 471
  - setSymbolExtent, 472
  - setSymbolPen, 472
  - setSymbolStyle, 472



- symbolBrush, [473](#)
- symbolExtent, [473](#)
- symbolPen, [473](#)
- SymbolStyle, [466](#)
- symbolStyle, [473](#)
- testPaintAttribute, [473](#)
- QwtPlotZonItem, [474](#)
  - boundingRect, [475](#)
  - brush, [475](#)
  - draw, [475](#)
  - interval, [475](#)
  - orientation, [476](#)
  - pen, [476](#)
  - QwtPlotZonItem, [475](#)
  - QwtPlotZonItem, [475](#)
  - rtti, [476](#)
  - setBrush, [476](#)
  - setInterval, [476](#)
  - setOrientation, [477](#)
  - setPen, [477](#)
- QwtPlotZoomer, [477](#)
  - accept, [480](#)
  - begin, [481](#)
  - end, [481](#)
  - maxStackDepth, [481](#)
  - minZoomSize, [481](#)
  - moveBy, [481](#)
  - moveTo, [482](#)
  - QwtPlotZoomer, [480](#)
  - QwtPlotZoomer, [480](#)
  - rescale, [482](#)
  - setAxis, [482](#)
  - setMaxStackDepth, [482](#)
  - setZoomBase, [482](#), [484](#)
  - setZoomStack, [484](#)
  - widgetKeyPressEvent, [484](#)
  - widgetMouseReleaseEvent, [484](#)
  - zoom, [485](#)
  - zoomBase, [485](#)
  - zoomRect, [485](#)
  - zoomRectIndex, [485](#)
  - zoomStack, [486](#)
  - zoomed, [485](#)
- QwtPoint3D, [486](#)
  - isNull, [487](#)
  - operator==, [487](#)
  - QwtPoint3D, [487](#)
  - QwtPoint3D, [487](#)
  - rx, [487](#)
  - ry, [487](#)
  - rz, [487](#)
  - toPoint, [487](#)
  - x, [488](#)
  - y, [488](#)
  - z, [488](#)
- QwtPoint3DSeriesData, [488](#)
  - boundingRect, [489](#)
  - QwtPoint3DSeriesData, [489](#)
- QwtPointArrayData, [489](#)
  - boundingRect, [490](#)
  - QwtPointArrayData, [490](#)
  - QwtPointArrayData, [490](#)
  - sample, [490](#)
  - size, [491](#)
  - xData, [491](#)
  - yData, [491](#)
- QwtPointMapper, [491](#)
  - boundingRect, [492](#)
  - flags, [492](#)
  - setBoundingRect, [493](#)
  - setFlag, [493](#)
  - setFlags, [493](#)
  - testFlag, [493](#)
  - toImage, [494](#)
  - toPoints, [494](#)
  - toPointsF, [494](#)
  - toPolygon, [495](#)
  - toPolygonF, [495](#)
  - TransformationFlag, [492](#)
  - TransformationFlags, [492](#)
- QwtPointPolar, [496](#)
  - normalized, [497](#)
  - operator==, [498](#)
  - QwtPointPolar, [497](#)
  - QwtPointPolar, [497](#)
  - setPoint, [498](#)
  - toPoint, [498](#)
- QwtPointSeriesData, [499](#)
  - boundingRect, [500](#)
  - QwtPointSeriesData, [499](#)
  - QwtPointSeriesData, [499](#)
- QwtPowerTransform, [500](#)
  - copy, [502](#)
  - invTransform, [502](#)
  - QwtPowerTransform, [501](#)
  - QwtPowerTransform, [501](#)
  - transform, [502](#)
- QwtRasterData, [502](#)
  - ConrecFlag, [503](#)
  - contourLines, [503](#)
  - discardRaster, [504](#)
  - initRaster, [504](#)
  - interval, [504](#)
  - pixelHint, [504](#)
  - setInterval, [505](#)
  - value, [505](#)
- QwtRichTextEngine, [505](#)
  - draw, [506](#)
  - heightForWidth, [506](#)
  - mightRender, [507](#)
  - textMargins, [507](#)
  - textSize, [507](#)
- QwtRoundScaleDraw, [507](#)
  - drawBackbone, [509](#)
  - drawLabel, [509](#)



- drawTick, 509
- extent, 509
- moveCenter, 510
- QwtRoundScaleDraw, 509
- QwtRoundScaleDraw, 509
- radius, 510
- setAngleRange, 510
- setRadius, 510
- QwtSamplingThread, 511
  - elapsed, 512
  - interval, 512
  - run, 512
  - sample, 512
  - setInterval, 512
  - stop, 513
- QwtScaleArithmetic, 513
  - ceilEps, 513
  - divideEps, 513
  - divideInterval, 514
  - floorEps, 514
- QwtScaleDiv, 514
  - bounded, 517
  - contains, 518
  - interval, 518
  - invert, 518
  - inverted, 518
  - lowerBound, 518
  - operator==, 519
  - QwtScaleDiv, 516, 517
  - QwtScaleDiv, 516, 517
  - range, 519
  - setInterval, 519
  - setLowerBound, 519
  - setTicks, 519
  - setUpperBound, 520
  - TickType, 515
  - ticks, 520
  - upperBound, 520
- QwtScaleDraw, 520
  - Alignment, 522
  - alignment, 522
  - boundingLabelRect, 523
  - drawBackbone, 523
  - drawLabel, 523
  - drawTick, 523
  - extent, 524
  - getBorderDistHint, 524
  - labelAlignment, 524
  - labelPosition, 524
  - labelRect, 525
  - labelRotation, 525
  - labelSize, 525
  - labelTransformation, 525
  - length, 525
  - maxLabelHeight, 526
  - maxLabelWidth, 526
  - minLabelDist, 526
  - minLength, 526
  - move, 526, 528
  - orientation, 528
  - pos, 528
  - QwtScaleDraw, 522
  - QwtScaleDraw, 522
  - setAlignment, 528
  - setLabelAlignment, 529
  - setLabelRotation, 529
  - setLength, 529
- QwtScaleEngine, 530
  - Attribute, 531
  - attributes, 532
  - autoScale, 532
  - base, 532
  - buildInterval, 532
  - contains, 532
  - divideInterval, 533
  - divideScale, 533
  - lowerMargin, 533
  - QwtScaleEngine, 531
  - QwtScaleEngine, 531
  - reference, 533
  - setAttribute, 533
  - setAttributes, 534
  - setBase, 534
  - setMargins, 534
  - setReference, 534
  - setTransformation, 535
  - strip, 535
  - testAttribute, 535
  - transformation, 535
  - upperMargin, 535
- QwtScaleMap, 536
  - ~QwtScaleMap, 537
  - invTransform, 537
  - isInverting, 538
  - p1, 538
  - p2, 538
  - pDist, 538
  - QwtScaleMap, 537
  - QwtScaleMap, 537
  - s1, 538
  - s2, 538
  - sDist, 538
  - setPaintInterval, 538
  - setScaleInterval, 539
  - setTransformation, 539
  - transform, 539
- QwtScaleWidget, 540
  - alignment, 542
  - colorBarInterval, 543
  - colorBarRect, 543
  - colorBarWidth, 543
  - colorMap, 543
  - dimForLength, 543
  - drawColorBar, 543
  - drawTitle, 544
  - endBorderDist, 544

- getBorderDistHint, [544](#)
- getMinBorderDist, [544](#)
- isColorBarEnabled, [545](#)
- LayoutFlag, [542](#)
- layoutScale, [545](#)
- margin, [545](#)
- minimumSizeHint, [545](#)
- QwtScaleWidget, [542](#)
- QwtScaleWidget, [542](#)
- resizeEvent, [545](#)
- scaleChange, [545](#)
- scaleDraw, [545](#), [546](#)
- setAlignment, [546](#)
- setBorderDist, [546](#)
- setColorBarEnabled, [546](#)
- setColorBarWidth, [546](#)
- setColorMap, [547](#)
- setLabelAlignment, [547](#)
- setLabelRotation, [547](#)
- setLayoutFlag, [547](#)
- setMargin, [547](#)
- setMinBorderDist, [548](#)
- setScaleDiv, [548](#)
- setScaleDraw, [548](#)
- setSpacing, [548](#)
- setTitle, [549](#)
- setTransformation, [549](#)
- sizeHint, [549](#)
- spacing, [549](#)
- startBorderDist, [549](#)
- testLayoutFlag, [550](#)
- title, [550](#)
- titleHeightForWidth, [550](#)
- QwtSeriesData
  - boundingRect, [552](#)
  - sample, [552](#)
  - setRectOfInterest, [552](#)
  - size, [552](#)
- QwtSeriesData< T >, [550](#)
- QwtSeriesStore
  - data, [553](#)
  - dataRect, [554](#)
  - dataSize, [554](#)
  - sample, [554](#)
  - setData, [554](#)
  - setRectOfInterest, [554](#)
  - swapData, [555](#)
- QwtSeriesStore< T >, [552](#)
- QwtSetSample, [555](#)
  - added, [557](#)
  - QwtSetSample, [555](#)
  - QwtSetSample, [555](#)
- QwtSetSeriesData, [557](#)
  - boundingRect, [559](#)
  - QwtSetSeriesData, [557](#)
  - QwtSetSeriesData, [557](#)
- QwtSimpleCompassRose, [559](#)
  - draw, [560](#)
  - drawRose, [560](#)
  - numThornLevels, [560](#)
  - numThorns, [561](#)
  - QwtSimpleCompassRose, [560](#)
  - QwtSimpleCompassRose, [560](#)
  - setNumThornLevels, [561](#)
  - setNumThorns, [561](#)
  - setShrinkFactor, [561](#)
  - setWidth, [561](#)
  - shrinkFactor, [562](#)
  - width, [562](#)
- QwtSlider, [562](#)
  - borderWidth, [564](#)
  - changeEvent, [565](#)
  - drawHandle, [565](#)
  - drawSlider, [565](#)
  - handleRect, [565](#)
  - handleSize, [565](#)
  - hasGroove, [565](#)
  - hasTrough, [565](#)
  - isScrollPosition, [566](#)
  - minimumSizeHint, [566](#)
  - mousePressEvent, [566](#)
  - mouseReleaseEvent, [566](#)
  - orientation, [566](#)
  - paintEvent, [567](#)
  - QwtSlider, [564](#)
  - QwtSlider, [564](#)
  - resizeEvent, [567](#)
  - scaleDraw, [567](#)
  - ScalePosition, [564](#)
  - scalePosition, [567](#)
  - scrolledTo, [567](#)
  - setBorderWidth, [567](#)
  - setGroove, [568](#)
  - setHandleSize, [568](#)
  - setOrientation, [568](#)
  - setScaleDraw, [568](#)
  - setScalePosition, [569](#)
  - setSpacing, [569](#)
  - setTrough, [569](#)
  - setUpdateInterval, [569](#)
  - sizeHint, [570](#)
  - sliderRect, [570](#)
  - spacing, [570](#)
  - timerEvent, [570](#)
  - updateInterval, [570](#)
- QwtSpline, [570](#)
  - buildNaturalSpline, [572](#)
  - buildPeriodicSpline, [572](#)
  - coefficientsA, [572](#)
  - coefficientsB, [572](#)
  - coefficientsC, [572](#)
  - operator=, [572](#)
  - points, [573](#)
  - QwtSpline, [572](#)
  - QwtSpline, [572](#)
  - setPoints, [573](#)

- setSplineType, 573
  - SplineType, 572
  - splineType, 573
  - value, 573
- QwtSplineCurveFitter, 574
  - fitCurve, 575
  - FitMode, 575
  - fitMode, 575
  - setFitMode, 575
  - setSpline, 575
  - setSplineSize, 576
  - spline, 576
  - splineSize, 576
- QwtSymbol, 576
  - boundingRect, 580
  - brush, 580
  - CachePolicy, 578
  - cachePolicy, 580
  - drawSymbol, 581
  - drawSymbols, 581
  - graphic, 581
  - invalidateCache, 582
  - isPinPointEnabled, 582
  - path, 582
  - pen, 582
  - pinPoint, 582
  - pixmap, 582
  - QwtSymbol, 579, 580
  - QwtSymbol, 579, 580
  - renderSymbols, 583
  - setBrush, 583
  - setCachePolicy, 583
  - setColor, 583
  - setGraphic, 584
  - setPath, 584
  - setPen, 585
  - setPinPoint, 585
  - setPinPointEnabled, 585
  - setPixmap, 586
  - setSize, 586
  - setStyle, 586
  - setSvgDocument, 587
  - size, 587
  - Style, 578
  - style, 587
- QwtSyntheticPointData, 587
  - boundingRect, 589
  - interval, 589
  - QwtSyntheticPointData, 589
  - QwtSyntheticPointData, 589
  - rectOfInterest, 589
  - sample, 590
  - setInterval, 590
  - setRectOfInterest, 590
  - setSize, 590
  - size, 591
  - x, 591
  - y, 591
- QwtSystemClock, 591
  - elapsed, 592
  - isNull, 592
  - restart, 592
  - start, 592
- QwtText, 592
  - backgroundBrush, 595
  - borderPen, 595
  - borderRadius, 595
  - draw, 596
  - heightForWidth, 596
  - isEmpty, 596
  - isNull, 596
  - LayoutAttribute, 594
  - PaintAttribute, 594
  - QwtText, 595
  - QwtText, 595
  - renderFlags, 596
  - setBackgroundBrush, 596
  - setBorderPen, 597
  - setBorderRadius, 597
  - setColor, 597
  - setFont, 597
  - setLayoutAttribute, 597
  - setPaintAttribute, 598
  - setRenderFlags, 598
  - setText, 598
  - setTextEngine, 598
  - testLayoutAttribute, 599
  - testPaintAttribute, 599
  - text, 599
  - textEngine, 599, 600
  - TextFormat, 594
  - textSize, 600
  - usedColor, 600
  - usedFont, 600
- QwtTextEngine, 601
  - draw, 602
  - heightForWidth, 602
  - mightRender, 602
  - textMargins, 602
  - textSize, 603
- QwtTextLabel, 603
  - heightForWidth, 605
  - paintEvent, 605
  - plainText, 605
  - QwtTextLabel, 604
  - QwtTextLabel, 604
  - setIndent, 605
  - setMargin, 605
  - setPlainText, 605
  - setText, 605, 607
  - textRect, 607
- QwtThermo, 607
  - alarmBrush, 610
  - alarmEnabled, 610
  - alarmLevel, 610
  - alarmRect, 611

- borderWidth, 611
- changeEvent, 611
- colorMap, 611
- drawLiquid, 611
- fillBrush, 613
- fillRect, 613
- minimumSizeHint, 613
- orientation, 613
- origin, 613
- OriginMode, 609
- originMode, 614
- paintEvent, 614
- pipeRect, 614
- pipeWidth, 614
- QwtThermo, 610
- QwtThermo, 610
- rangeFlags, 614
- resizeEvent, 614
- scaleDraw, 615
- ScalePosition, 609
- scalePosition, 615
- setAlarmBrush, 615
- setAlarmEnabled, 615
- setAlarmLevel, 616
- setBorderWidth, 616
- setColorMap, 616
- setFillBrush, 616
- setOrientation, 617
- setOrigin, 617
- setOriginMode, 617
- setPipeWidth, 617
- setRangeFlags, 617
- setScaleDraw, 618
- setScalePosition, 618
- setSpacing, 618
- setValue, 618
- sizeHint, 618
- spacing, 619
- QwtTradingChartData, 619
  - boundingRect, 620
  - QwtTradingChartData, 620
  - QwtTradingChartData, 620
- QwtTransform, 620
  - bounded, 621
  - invTransform, 621
  - transform, 621
- QwtWeedingCurveFitter, 622
  - chunkSize, 623
  - fitCurve, 623
  - QwtWeedingCurveFitter, 623
  - QwtWeedingCurveFitter, 623
  - setChunkSize, 623
  - setTolerance, 624
  - tolerance, 624
- QwtWheel, 624
  - borderWidth, 627
  - drawTicks, 627
  - drawWheelBackground, 627
  - isInverted, 627
  - isTracking, 627
  - keyPressEvent, 627
  - mass, 628
  - maximum, 628
  - minimum, 628
  - minimumSizeHint, 628
  - mouseMoveEvent, 628
  - mousePressEvent, 629
  - mouseReleaseEvent, 629
  - orientation, 629
  - pageStepCount, 629
  - paintEvent, 629
  - setBorderWidth, 629
  - setInverted, 630
  - setMass, 630
  - setMaximum, 630
  - setMinimum, 630
  - setOrientation, 631
  - setPageStepCount, 631
  - setRange, 631
  - setSingleStep, 631
  - setStepAlignment, 632
  - setTickCount, 632
  - setTotalAngle, 632
  - setTracking, 632
  - setUpdateInterval, 633
  - setValue, 633
  - setViewAngle, 633
  - setWheelBorderWidth, 633
  - setWheelWidth, 634
  - setWrapping, 634
  - singleStep, 634
  - sizeHint, 634
  - stepAlignment, 634
  - tickCount, 634
  - timerEvent, 635
  - totalAngle, 635
  - updateInterval, 635
  - value, 635
  - valueAt, 635
  - valueChanged, 636
  - viewAngle, 636
  - wheelBorderWidth, 636
  - wheelEvent, 636
  - wheelMoved, 636
  - wheelPressed, 637
  - wheelRect, 637
  - wheelReleased, 637
  - wheelWidth, 637
  - wrapping, 637
- QwtWidgetOverlay, 637
  - drawOverlay, 640
  - eventFilter, 640
  - maskHint, 640
  - MaskMode, 639
  - maskMode, 640
  - paintEvent, 641

- QwtWidgetOverlay, [640](#)
- QwtWidgetOverlay, [640](#)
- RenderMode, [639](#)
- renderMode, [641](#)
- resizeEvent, [641](#)
- setMaskMode, [641](#)
- setRenderMode, [641](#)
- updateOverlay, [642](#)
- RGB
  - QwtColorMap, [74](#)
- RTriangle
  - QwtSymbol, [579](#)
- radius
  - QwtRoundScaleDraw, [510](#)
- Raised
  - QwtColumnSymbol, [77](#)
  - QwtDial, [117](#)
  - QwtKnob, [169](#)
  - QwtPlotGLCanvas, [323](#)
- range
  - QwtScaleDiv, [519](#)
- rangeFlags
  - QwtThermo, [614](#)
- Ray
  - QwtDialSimpleNeedle, [127](#)
- ReadOnly
  - QwtLegendData, [183](#)
- Rect
  - QwtSymbol, [579](#)
- rect
  - QwtPixelMatrix, [261](#)
- RectRubberBand
  - QwtPicker, [238](#)
- RectSelection
  - QwtPickerMachine, [257](#)
- rectOfInterest
  - QwtSyntheticPointData, [589](#)
- reference
  - QwtScaleEngine, [533](#)
- referenceAxis
  - QwtPlotRescaler, [425](#)
- remove
  - QwtPicker, [242](#)
- removeItem
  - QwtPlotDict, [318](#)
- removed
  - QwtPicker, [243](#)
- render
  - QwtGraphic, [148](#)
  - QwtPlotRenderer, [415](#)
  - QwtPlotSvgItem, [459](#)
- RenderAntialiased
  - QwtPlotItem, [352](#)
- RenderPensUnscaled
  - QwtGraphic, [142](#)
- renderCanvas
  - QwtPlotRenderer, [415](#)
- renderContourLines
  - QwtPlotSpectrogram, [453](#)
- renderDocument
  - QwtPlotRenderer, [415](#)
- renderFlags
  - QwtText, [596](#)
- renderFooter
  - QwtPlotRenderer, [416](#)
- RenderHint
  - QwtGraphic, [142](#)
  - QwtPlotItem, [352](#)
- RenderHints
  - QwtGraphic, [142](#)
- renderImage
  - QwtPlotRasterItem, [410](#)
  - QwtPlotSpectrogram, [454](#)
- renderItem
  - QwtLegend, [181](#)
- renderLegend
  - QwtAbstractLegend, [33](#)
  - QwtLegend, [181](#)
  - QwtPlotRenderer, [416](#)
- RenderMode
  - QwtWidgetOverlay, [639](#)
- renderMode
  - QwtWidgetOverlay, [641](#)
- renderScale
  - QwtPlotRenderer, [416](#)
- renderSymbols
  - QwtSymbol, [583](#)
- renderThreadCount
  - QwtPlotItem, [356](#)
- renderTile
  - QwtPlotSpectrogram, [454](#)
- renderTitle
  - QwtPlotRenderer, [417](#)
- renderTo
  - QwtPlotRenderer, [417](#)
- renderTolerance
  - QwtPlotShapeItem, [441](#)
- renderer
  - QwtPlotSvgItem, [459](#)
- replot
  - QwtPlot, [278](#)
  - QwtPlotCanvas, [300](#)
- ResampleMode
  - QwtMatrixRasterData, [212](#)
- resampleMode
  - QwtMatrixRasterData, [212](#)
- rescale
  - QwtAbstractScale, [38](#)
  - QwtMagnifier, [204](#)
  - QwtPlotMagnifier, [383](#)
  - QwtPlotRescaler, [425](#)
  - QwtPlotZoomer, [482](#)
- RescalePolicy
  - QwtPlotRescaler, [421](#)
- rescalePolicy
  - QwtPlotRescaler, [425](#)

- reset
  - QwtGraphic, [148](#)
  - QwtPicker, [243](#)
- resetSymbolMap
  - QwtPlotMultiBarChart, [395](#)
- resizeEvent
  - QwtPlot, [278](#)
  - QwtPlotCanvas, [300](#)
  - QwtScaleWidget, [545](#)
  - QwtSlider, [567](#)
  - QwtThermo, [614](#)
  - QwtWidgetOverlay, [641](#)
- SizeMode
  - QwtPicker, [237](#)
- resizeMode
  - QwtPicker, [243](#)
- restart
  - QwtSystemClock, [592](#)
- rgb
  - QwtAlphaColorMap, [62](#)
  - QwtColorMap, [75](#)
  - QwtLinearColorMap, [192](#)
- RichText
  - QwtText, [595](#)
- RightLegend
  - QwtPlot, [268](#)
- RightScale
  - QwtScaleDraw, [522](#)
- RightToLeft
  - QwtColumnRect, [76](#)
- rose
  - QwtCompass, [81](#), [82](#)
- RotateNeedle
  - QwtDial, [117](#)
- RotateScale
  - QwtDial, [117](#)
- RoundPoints
  - QwtPointMapper, [492](#)
- roundingAlignment
  - QwtPainter, [224](#)
- rtti
  - QwtPlotBarChart, [294](#)
  - QwtPlotCurve, [311](#)
  - QwtPlotGrid, [329](#)
  - QwtPlotHistogram, [338](#)
  - QwtPlotIntervalCurve, [345](#)
  - QwtPlotItem, [356](#)
  - QwtPlotLegendItem, [378](#)
  - QwtPlotMarker, [387](#)
  - QwtPlotMultiBarChart, [395](#)
  - QwtPlotScaleItem, [432](#)
  - QwtPlotShapelItem, [441](#)
  - QwtPlotSpectroCurve, [446](#)
  - QwtPlotSpectrogram, [454](#)
  - QwtPlotSvgItem, [459](#)
  - QwtPlotTextLabel, [462](#)
  - QwtPlotTradingCurve, [469](#)
  - QwtPlotZoneItem, [476](#)
  - Rtti\_PlotBarChart
    - QwtPlotItem, [352](#)
  - Rtti\_PlotCurve
    - QwtPlotItem, [352](#)
  - Rtti\_PlotGrid
    - QwtPlotItem, [352](#)
  - Rtti\_PlotHistogram
    - QwtPlotItem, [352](#)
  - Rtti\_PlotIntervalCurve
    - QwtPlotItem, [352](#)
  - Rtti\_PlotItem
    - QwtPlotItem, [352](#)
  - Rtti\_PlotLegend
    - QwtPlotItem, [352](#)
  - Rtti\_PlotMarker
    - QwtPlotItem, [352](#)
  - Rtti\_PlotMultiBarChart
    - QwtPlotItem, [353](#)
  - Rtti\_PlotSVG
    - QwtPlotItem, [352](#)
  - Rtti\_PlotScale
    - QwtPlotItem, [352](#)
  - Rtti\_PlotShape
    - QwtPlotItem, [353](#)
  - Rtti\_PlotSpectroCurve
    - QwtPlotItem, [352](#)
  - Rtti\_PlotSpectrogram
    - QwtPlotItem, [352](#)
  - Rtti\_PlotTextLabel
    - QwtPlotItem, [353](#)
  - Rtti\_PlotTradingCurve
    - QwtPlotItem, [352](#)
  - Rtti\_PlotUserItem
    - QwtPlotItem, [353](#)
  - Rtti\_PlotZone
    - QwtPlotItem, [353](#)
  - RttiValues
    - QwtPlotItem, [352](#)
- RubberBand
  - QwtPicker, [238](#)
- rubberBand
  - QwtPicker, [243](#)
- rubberBandMask
  - QwtPicker, [243](#)
- rubberBandOverlay
  - QwtPicker, [243](#)
- rubberBandPen
  - QwtPicker, [243](#)
- run
  - QwtSamplingThread, [512](#)
- rx
  - QwtPoint3D, [487](#)
- ry
  - QwtPoint3D, [487](#)
- rz
  - QwtPoint3D, [487](#)
- s1
  - QwtScaleMap, [538](#)

- s2
  - QwtScaleMap, 538
- sDist
  - QwtScaleMap, 538
- sample
  - QwtArraySeriesData, 68
  - QwtCPointerData, 98
  - QwtPointArrayData, 490
  - QwtSamplingThread, 512
  - QwtSeriesData, 552
  - QwtSeriesStore, 554
  - QwtSyntheticPointData, 590
- sampleWidth
  - QwtPlotAbstractBarChart, 288
- samples
  - QwtArraySeriesData, 68
- ScaleInterest
  - QwtPlotItem, 352
- ScaleSampleToCanvas
  - QwtPlotAbstractBarChart, 286
- ScaleSamplesToAxes
  - QwtPlotAbstractBarChart, 286
- scaleChange
  - QwtAbstractSlider, 57
  - QwtDial, 121
  - QwtScaleWidget, 545
- ScaleComponent
  - QwtAbstractScaleDraw, 43
- scaleDiv
  - QwtAbstractScale, 38
  - QwtAbstractScaleDraw, 47
  - QwtPlotScaleItem, 432
- scaleDraw
  - QwtDial, 121
  - QwtKnob, 173
  - QwtPlotScaleItem, 432
  - QwtScaleWidget, 545, 546
  - QwtSlider, 567
  - QwtThermo, 615
- scaleEngine
  - QwtAbstractScale, 38
- scaleInnerRect
  - QwtDial, 121
- scaleMap
  - QwtAbstractScale, 38
  - QwtAbstractScaleDraw, 47, 48
- scaleMaxMajor
  - QwtAbstractScale, 39
- scaleMaxMinor
  - QwtAbstractScale, 39
- ScalePosition
  - QwtSlider, 564
  - QwtThermo, 609
- scalePosition
  - QwtSlider, 567
  - QwtThermo, 615
- scaleRect
  - QwtPlotItem, 356
- QwtPlotLayout, 368
- QwtPlotPicker, 405
- scaleStepSize
  - QwtAbstractScale, 39
- ScaledColors
  - QwtLinearColorMap, 191
- scaledBoundingRect
  - QwtGraphic, 149
- scaledSymbolWidth
  - QwtPlotTradingCurve, 469
- scrollExtent
  - QwtAbstractLegend, 33
  - QwtLegend, 181
- scrolledTo
  - QwtAbstractSlider, 57
  - QwtDial, 122
  - QwtKnob, 173
  - QwtSlider, 567
- Second
  - QwtDate, 101
- SecondHand
  - QwtAnalogClock, 64
- selected
  - QwtPicker, 244
  - QwtPlotPicker, 405
- selection
  - QwtPicker, 244
- SelectionType
  - QwtPickerMachine, 257
- setAbortKey
  - QwtPanner, 232
- setAbstractScaleDraw
  - QwtAbstractScale, 39
- setAlarmBrush
  - QwtThermo, 615
- setAlarmEnabled
  - QwtThermo, 615
- setAlarmLevel
  - QwtThermo, 616
- setAlignCanvasToScale
  - QwtPlotLayout, 368
- setAlignCanvasToScales
  - QwtPlotLayout, 369
- setAlignment
  - QwtKnob, 173
  - QwtPlotLegendItem, 378
  - QwtPlotScaleItem, 432
  - QwtScaleDraw, 528
  - QwtScaleWidget, 546
- setAlpha
  - QwtPlotRasterItem, 411
- setAngleRange
  - QwtRoundScaleDraw, 510
- setAspectRatio
  - QwtPlotRescaler, 425, 427
- setAttribute
  - QwtPlotDirectPainter, 320
  - QwtScaleEngine, 533



- setAttributes
  - QwtScaleEngine, 534
- setAutoDelete
  - QwtPlotDict, 318
- setAutoReplot
  - QwtPlot, 278
- setAxes
  - QwtPlotItem, 358
- setAxis
  - QwtPlotPicker, 405
  - QwtPlotZoomer, 482
- setAxisAutoScale
  - QwtPlot, 278
- setAxisEnabled
  - QwtPlotMagnifier, 383
  - QwtPlotPanner, 400
- setAxisFont
  - QwtPlot, 279
- setAxisLabelAlignment
  - QwtPlot, 279
- setAxisLabelRotation
  - QwtPlot, 279
- setAxisMaxMajor
  - QwtPlot, 279
- setAxisMaxMinor
  - QwtPlot, 280
- setAxisScale
  - QwtPlot, 280
- setAxisScaleDiv
  - QwtPlot, 280
- setAxisScaleDraw
  - QwtPlot, 280
- setAxisScaleEngine
  - QwtPlot, 281
- setAxisTitle
  - QwtPlot, 281
- setBackgroundBrush
  - QwtPlotLegendItem, 378
  - QwtText, 596
- setBackgroundMode
  - QwtPlotLegendItem, 379
- setBarTitles
  - QwtPlotMultiBarChart, 395
- setBase
  - QwtScaleEngine, 534
- setBaseline
  - QwtPlotAbstractBarChart, 288
  - QwtPlotCurve, 311
  - QwtPlotHistogram, 339
- setBorderDist
  - QwtScaleWidget, 546
- setBorderDistance
  - QwtPlotLegendItem, 379
  - QwtPlotScaleItem, 433
- setBorderFlags
  - QwtInterval, 159
- setBorderPen
  - QwtPlotLegendItem, 379
- QwtText, 597
- setBorderRadius
  - QwtPlotCanvas, 300
  - QwtPlotLegendItem, 379
  - QwtText, 597
- setBorderWidth
  - QwtKnob, 173
  - QwtSlider, 567
  - QwtThermo, 616
  - QwtWheel, 629
- setBoundingRect
  - QwtPointMapper, 493
- setBrush
  - QwtIntervalSymbol, 165
  - QwtPlotCurve, 311
  - QwtPlotHistogram, 339
  - QwtPlotIntervalCurve, 345
  - QwtPlotShapelItem, 441
  - QwtPlotZonelItem, 476
  - QwtSymbol, 583
- setCachePolicy
  - QwtPlotRasterItem, 411
  - QwtSymbol, 583
- setCanvas
  - QwtPlot, 281
- setCanvasBackground
  - QwtPlot, 282
- setCanvasMargin
  - QwtPlotLayout, 369
- setCanvasRect
  - QwtPlotLayout, 369
- setChecked
  - QwtLegendLabel, 188
- setChunkSize
  - QwtWeedingCurveFitter, 623
- setClipRegion
  - QwtPlotDirectPainter, 321
- setClipping
  - QwtPlotDirectPainter, 321
- setColor
  - QwtAlphaColorMap, 62
  - QwtSymbol, 583
  - QwtText, 597
- setColorBarEnabled
  - QwtScaleWidget, 546
- setColorBarWidth
  - QwtScaleWidget, 546
- setColorInterval
  - QwtLinearColorMap, 192
- setColorMap
  - QwtPlotSpectroCurve, 447
  - QwtPlotSpectrogram, 454
  - QwtScaleWidget, 547
  - QwtThermo, 616
- setColorRange
  - QwtPlotSpectroCurve, 447
- setCommands
  - QwtGraphic, 149



- setConrecFlag
  - QwtPlotSpectrogram, [455](#)
- setContourLevels
  - QwtPlotSpectrogram, [455](#)
- setCursor
  - QwtPanner, [232](#)
- setCurveAttribute
  - QwtPlotCurve, [312](#)
- setCurveFitter
  - QwtPlotCurve, [312](#)
- setData
  - QwtLegendLabel, [188](#)
  - QwtPlotSpectrogram, [455](#)
  - QwtSeriesStore, [554](#)
- setDateFormat
  - QwtDateScaleDraw, [108](#)
- setDefaultContourPen
  - QwtPlotSpectrogram, [455](#), [456](#)
- setDefaultItemMode
  - QwtLegend, [181](#)
- setDefaultSize
  - QwtGraphic, [149](#)
- setDiscardFlag
  - QwtPlotRenderer, [417](#)
- setDiscardFlags
  - QwtPlotRenderer, [417](#)
- setDisplayMode
  - QwtPlotSpectrogram, [456](#)
- setEnabled
  - QwtMagnifier, [205](#)
  - QwtPanner, [232](#)
  - QwtPicker, [244](#)
  - QwtPlotRescaler, [427](#)
- setExpandingDirection
  - QwtPlotRescaler, [427](#)
- setExpandingDirections
  - QwtDynGridLayout, [132](#)
- setFillBrush
  - QwtThermo, [616](#)
- setFitMode
  - QwtSplineCurveFitter, [575](#)
- setFlag
  - QwtPointMapper, [493](#)
- setFlags
  - QwtPointMapper, [493](#)
- setFocusIndicator
  - QwtPlotCanvas, [301](#)
- setFont
  - QwtPlotLegendItem, [379](#)
  - QwtPlotScaleItem, [433](#)
  - QwtText, [597](#)
- setFooter
  - QwtPlot, [282](#)
- setFooterRect
  - QwtPlotLayout, [369](#)
- setFrameShadow
  - QwtDial, [122](#)
  - QwtPlotGLCanvas, [326](#)
- setFrameShape
  - QwtPlotGLCanvas, [326](#)
- setFrameStyle
  - QwtColumnSymbol, [78](#)
  - QwtPlotGLCanvas, [326](#)
- setGeometry
  - QwtDynGridLayout, [133](#)
- setGraphic
  - QwtSymbol, [584](#)
- setGroove
  - QwtSlider, [568](#)
- setHand
  - QwtAnalogClock, [67](#)
- setHandleSize
  - QwtSlider, [568](#)
- setIcon
  - QwtLegendLabel, [188](#)
- setIncSteps
  - QwtCounter, [93](#)
- setIndent
  - QwtTextLabel, [605](#)
- setInterval
  - QwtInterval, [159](#)
  - QwtMatrixRasterData, [213](#)
  - QwtPlotZonItem, [476](#)
  - QwtRasterData, [505](#)
  - QwtSamplingThread, [512](#)
  - QwtScaleDiv, [519](#)
  - QwtSyntheticPointData, [590](#)
- setIntervalHint
  - QwtPlotRescaler, [427](#)
- setInverted
  - QwtWheel, [630](#)
- setInvertedControls
  - QwtAbstractSlider, [57](#)
- setItemAttribute
  - QwtPlotItem, [358](#)
- setItemInterest
  - QwtPlotItem, [358](#)
- setItemMargin
  - QwtPlotLegendItem, [380](#)
- setItemMode
  - QwtLegendLabel, [189](#)
- setItemSpacing
  - QwtPlotLegendItem, [380](#)
- setKeyFactor
  - QwtMagnifier, [205](#)
- setKeyPattern
  - QwtEventPattern, [139](#)
- setKnobStyle
  - QwtKnob, [174](#)
- setKnobWidth
  - QwtKnob, [174](#)
- setLabel
  - QwtPlotMarker, [388](#)
- setLabelAlignment
  - QwtPlotMarker, [388](#)
  - QwtScaleDraw, [529](#)

- QwtScaleWidget, 547
- setLabelMap
  - QwtCompassScaleDraw, 86
- setLabelOrientation
  - QwtPlotMarker, 388
- setLabelRotation
  - QwtScaleDraw, 529
  - QwtScaleWidget, 547
- setLayoutAttribute
  - QwtText, 597
- setLayoutFlag
  - QwtPlotRenderer, 419
  - QwtScaleWidget, 547
- setLayoutFlags
  - QwtPlotRenderer, 419
- setLayoutHint
  - QwtPlotAbstractBarChart, 288
- setLayoutPolicy
  - QwtPlotAbstractBarChart, 288
- setLegendAttribute
  - QwtPlotCurve, 312
- setLegendIconSize
  - QwtPlotItem, 358
- setLegendMode
  - QwtPlotBarChart, 294
  - QwtPlotShapelItem, 441
- setLegendPosition
  - QwtPlotLayout, 369, 371
- setLegendRatio
  - QwtPlotLayout, 371
- setLegendRect
  - QwtPlotLayout, 371
- setLength
  - QwtScaleDraw, 529
- setLinePen
  - QwtPlotMarker, 388, 389
- setLineStyle
  - QwtPlotMarker, 389
- setLineWidth
  - QwtColumnSymbol, 79
  - QwtDial, 122
  - QwtPlotGLCanvas, 326
- setLowerBound
  - QwtAbstractScale, 39
  - QwtScaleDiv, 519
- setMajorPen
  - QwtPlotGrid, 329, 330
- setMargin
  - QwtPlotAbstractBarChart, 289
  - QwtPlotLegendItem, 380
  - QwtPlotTextLabel, 462
  - QwtScaleWidget, 547
  - QwtTextLabel, 605
- setMargins
  - QwtScaleEngine, 534
- setMarkerSize
  - QwtKnob, 174
- setMarkerStyle
  - QwtKnob, 174
- setMaskMode
  - QwtWidgetOverlay, 641
- setMass
  - QwtWheel, 630
- setMaxColumns
  - QwtDynGridLayout, 133
  - QwtLegend, 182
  - QwtPlotLegendItem, 380
- setMaxScaleArc
  - QwtDial, 122
- setMaxStackDepth
  - QwtPlotZoomer, 482
- setMaxSymbolWidth
  - QwtPlotTradingCurve, 469
- setMaxValue
  - QwtInterval, 159
- setMaxWeeks
  - QwtDateScaleEngine, 113
- setMaximum
  - QwtCounter, 93
  - QwtWheel, 630
- setMidLineWidth
  - QwtPlotGLCanvas, 326
- setMinBorderDist
  - QwtScaleWidget, 548
- setMinScaleArc
  - QwtDial, 123
- setMinSymbolWidth
  - QwtPlotTradingCurve, 471
- setMinValue
  - QwtInterval, 159
- setMinimum
  - QwtCounter, 93
  - QwtWheel, 630
- setMinimumExtent
  - QwtAbstractScaleDraw, 48
- setMinorPen
  - QwtPlotGrid, 330
- setMode
  - QwtDial, 123
  - QwtLinearColorMap, 193
  - QwtNullPaintDevice, 217
- setMouseButton
  - QwtMagnifier, 205
  - QwtPanner, 232
- setMouseFactor
  - QwtMagnifier, 205
- setMousePattern
  - QwtEventPattern, 139
- setNeedle
  - QwtDial, 123
- setNumButtons
  - QwtCounter, 93
- setNumThornLevels
  - QwtSimpleCompassRose, 561
- setNumThorns
  - QwtSimpleCompassRose, 561

- setNumTurns
  - QwtKnob, [174](#)
- setOrientation
  - QwtPlotSeriesItem, [437](#)
  - QwtPlotZonItem, [477](#)
  - QwtSlider, [568](#)
  - QwtThermo, [617](#)
  - QwtWheel, [631](#)
- setOrientations
  - QwtPanner, [232](#)
- setOrigin
  - QwtDial, [123](#)
  - QwtThermo, [617](#)
- setOriginMode
  - QwtThermo, [617](#)
- setPageStepCount
  - QwtWheel, [631](#)
- setPageSteps
  - QwtAbstractSlider, [57](#)
- setPaintAttribute
  - QwtPlotCanvas, [301](#)
  - QwtPlotCurve, [312](#)
  - QwtPlotIntervalCurve, [345](#)
  - QwtPlotRasterItem, [411](#)
  - QwtPlotShapelItem, [442](#)
  - QwtPlotSpectroCurve, [447](#)
  - QwtPlotTradingCurve, [471](#)
  - QwtText, [598](#)
- setPaintInterval
  - QwtScaleMap, [538](#)
- setPalette
  - QwtColumnSymbol, [79](#)
  - QwtDialNeedle, [126](#)
  - QwtPlotScaleItem, [433](#)
- setPath
  - QwtSymbol, [584](#)
- setPen
  - QwtIntervalSymbol, [165](#)
  - QwtPlotCurve, [312](#), [313](#)
  - QwtPlotGrid, [330](#), [331](#)
  - QwtPlotHistogram, [339](#)
  - QwtPlotIntervalCurve, [346](#)
  - QwtPlotShapelItem, [442](#)
  - QwtPlotZonItem, [477](#)
  - QwtSymbol, [585](#)
- setPenWidth
  - QwtAbstractScaleDraw, [48](#)
  - QwtPlotSpectroCurve, [447](#)
- setPinPoint
  - QwtSymbol, [585](#)
- setPinPointEnabled
  - QwtSymbol, [585](#)
- setPipeWidth
  - QwtThermo, [617](#)
- setPixmap
  - QwtSymbol, [586](#)
- setPlainText
  - QwtTextLabel, [605](#)
- setPlotLayout
  - QwtPlot, [282](#)
- setPoint
  - QwtPointPolar, [498](#)
- setPoints
  - QwtSpline, [573](#)
- setPolygon
  - QwtPlotShapelItem, [442](#)
- setPolylineSplitting
  - QwtPainter, [225](#)
- setPosition
  - QwtPlotScaleItem, [433](#)
- setRadius
  - QwtRoundScaleDraw, [510](#)
- setRange
  - QwtCounter, [94](#)
  - QwtWheel, [631](#)
- setRangeFlags
  - QwtThermo, [617](#)
- setRawSamples
  - QwtPlotCurve, [313](#)
- setReadOnly
  - QwtAbstractSlider, [58](#)
  - QwtCounter, [94](#)
- setRect
  - QwtPixelMatrix, [261](#)
  - QwtPlotShapelItem, [443](#)
- setRectOfInterest
  - QwtAbstractSeriesStore, [51](#)
  - QwtSeriesData, [552](#)
  - QwtSeriesStore, [554](#)
  - QwtSyntheticPointData, [590](#)
- setReference
  - QwtScaleEngine, [534](#)
- setReferenceAxis
  - QwtPlotRescaler, [429](#)
- setRenderFlags
  - QwtText, [598](#)
- setRenderHint
  - QwtGraphic, [149](#)
  - QwtPlotItem, [359](#)
- setRenderMode
  - QwtWidgetOverlay, [641](#)
- setRenderThreadCount
  - QwtPlotItem, [359](#)
- setRenderTolerance
  - QwtPlotShapelItem, [443](#)
- setResampleMode
  - QwtMatrixRasterData, [213](#)
- setRescalePolicy
  - QwtPlotRescaler, [429](#)
- setResizeMode
  - QwtPicker, [244](#)
- setRose
  - QwtCompass, [82](#)
- setRoundingAlignment
  - QwtPainter, [225](#)
- setRubberBand

- QwtPicker, 244
- setRubberBandPen
  - QwtPicker, 245
- setSamples
  - QwtArraySeriesData, 68
  - QwtPlotBarChart, 294, 295
  - QwtPlotCurve, 313, 314
  - QwtPlotHistogram, 340
  - QwtPlotIntervalCurve, 346
  - QwtPlotMultiBarChart, 395
  - QwtPlotSpectroCurve, 447, 448
  - QwtPlotTradingCurve, 471
- setScale
  - QwtAbstractScale, 39, 40
- setScaleArc
  - QwtDial, 123
- setScaleDiv
  - QwtAbstractScaleDraw, 48
  - QwtPlotScaleItem, 434
  - QwtScaleWidget, 548
- setScaleDivFromAxis
  - QwtPlotScaleItem, 434
- setScaleDraw
  - QwtDial, 124
  - QwtKnob, 175
  - QwtPlotScaleItem, 434
  - QwtScaleWidget, 548
  - QwtSlider, 568
  - QwtThermo, 618
- setScaleEngine
  - QwtAbstractScale, 40
- setScaleInterval
  - QwtScaleMap, 539
- setScaleMaxMajor
  - QwtAbstractScale, 40
- setScaleMaxMinor
  - QwtAbstractScale, 41
- setScalePosition
  - QwtSlider, 569
  - QwtThermo, 618
- setScaleRect
  - QwtPlotLayout, 371
- setScaleStepSize
  - QwtAbstractScale, 41
- setShape
  - QwtPlotShapelItem, 443
- setShrinkFactor
  - QwtSimpleCompassRose, 561
- setSingleStep
  - QwtCounter, 94
  - QwtWheel, 631
- setSingleSteps
  - QwtAbstractSlider, 58
- setSize
  - QwtSymbol, 586
  - QwtSyntheticPointData, 590
- setSpacing
  - QwtAbstractScaleDraw, 48
- QwtLegendLabel, 189
- QwtPlotAbstractBarChart, 289
- QwtPlotLayout, 372
- QwtPlotLegendItem, 380
- QwtPlotMarker, 389
- QwtScaleWidget, 548
- QwtSlider, 569
- QwtThermo, 618
- setSpline
  - QwtSplineCurveFitter, 575
- setSplineSize
  - QwtSplineCurveFitter, 576
- setSplineType
  - QwtSpline, 573
- setStateMachine
  - QwtPicker, 245
- setStepAlignment
  - QwtAbstractSlider, 58
  - QwtWheel, 632
- setStepButton1
  - QwtCounter, 94
- setStepButton2
  - QwtCounter, 94
- setStepButton3
  - QwtCounter, 95
- setStyle
  - QwtColumnSymbol, 79
  - QwtIntervalSymbol, 166
  - QwtPlotCurve, 314
  - QwtPlotHistogram, 340
  - QwtPlotIntervalCurve, 346
  - QwtPlotMultiBarChart, 396
  - QwtSymbol, 586
- setSvgDocument
  - QwtSymbol, 587
- setSymbol
  - QwtPlotBarChart, 295
  - QwtPlotCurve, 314
  - QwtPlotHistogram, 340
  - QwtPlotIntervalCurve, 348
  - QwtPlotMarker, 389
  - QwtPlotMultiBarChart, 396
- setSymbolBrush
  - QwtPlotTradingCurve, 471
- setSymbolExtent
  - QwtPlotTradingCurve, 472
- setSymbolPen
  - QwtPlotTradingCurve, 472
- setSymbolStyle
  - QwtPlotTradingCurve, 472
- setText
  - QwtLegendLabel, 189
  - QwtPlotTextLabel, 462
  - QwtText, 598
  - QwtTextLabel, 605, 607
- setTextEngine
  - QwtText, 598
- setTextPen

- QwtPlotLegendItem, 381
- setTickCount
  - QwtWheel, 632
- setTickLength
  - QwtAbstractScaleDraw, 48
- setTicks
  - QwtScaleDiv, 519
- setTime
  - QwtAnalogClock, 67
- setTimeSpec
  - QwtDateScaleDraw, 108
  - QwtDateScaleEngine, 113
- setTitle
  - QwtPlot, 282, 283
  - QwtPlotItem, 359
  - QwtScaleWidget, 549
- setTitleRect
  - QwtPlotLayout, 372
- setTolerance
  - QwtWeedingCurveFitter, 624
- setTotalAngle
  - QwtKnob, 175
  - QwtWheel, 632
- setTotalSteps
  - QwtAbstractSlider, 58
- setTrackerFont
  - QwtPicker, 245
- setTrackerMode
  - QwtPicker, 245
- setTrackerPen
  - QwtPicker, 245
- setTracking
  - QwtAbstractSlider, 59
  - QwtWheel, 632
- setTransformation
  - QwtAbstractScaleDraw, 50
  - QwtScaleEngine, 535
  - QwtScaleMap, 539
  - QwtScaleWidget, 549
- setTrough
  - QwtSlider, 569
- setUpdateInterval
  - QwtSlider, 569
  - QwtWheel, 633
- setUpperBound
  - QwtAbstractScale, 41
  - QwtScaleDiv, 520
- setUtcOffset
  - QwtDateScaleDraw, 108
  - QwtDateScaleEngine, 113
- setValid
  - QwtAbstractSlider, 59
  - QwtCounter, 95
- setValue
  - QwtAbstractSlider, 59
  - QwtCounter, 95
  - QwtLegendData, 184
  - QwtMatrixRasterData, 213
- QwtThermo, 618
- QwtWheel, 633
- setValueMatrix
  - QwtMatrixRasterData, 213
- setValues
  - QwtLegendData, 184
- setViewAngle
  - QwtWheel, 633
- setVisible
  - QwtPlotItem, 359
- setWeek0Type
  - QwtDateScaleDraw, 108
  - QwtDateScaleEngine, 113
- setWheelBorderWidth
  - QwtWheel, 633
- setWheelFactor
  - QwtMagnifier, 205
- setWheelModifiers
  - QwtMagnifier, 206
- setWheelWidth
  - QwtWheel, 634
- setWidth
  - QwtDialSimpleNeedle, 128
  - QwtIntervalSymbol, 166
  - QwtSimpleCompassRose, 561
- setWrapping
  - QwtAbstractSlider, 59
  - QwtCounter, 95
  - QwtWheel, 634
- setXAxis
  - QwtPlotItem, 360
- setXDiv
  - QwtPlotGrid, 331
- setYAxis
  - QwtPlotItem, 360
- setYDiv
  - QwtPlotGrid, 331
- setZ
  - QwtPlotItem, 360
- setZoomBase
  - QwtPlotZoomer, 482, 484
- setZoomInKey
  - QwtMagnifier, 206
- setZoomOutKey
  - QwtMagnifier, 206
- setZoomStack
  - QwtPlotZoomer, 484
- Shadow
  - QwtDial, 117
  - QwtPlotGLCanvas, 323
- Shape
  - QwtPlotGLCanvas, 323
- shape
  - QwtPlotShapeItem, 443
- shrinkFactor
  - QwtSimpleCompassRose, 562
- singleStep
  - QwtCounter, 95

- QwtWheel, 634
- singleSteps
  - QwtAbstractSlider, 59
- size
  - QwtArraySeriesData, 69
  - QwtCPointerData, 98
  - QwtPointArrayData, 491
  - QwtSeriesData, 552
  - QwtSymbol, 587
  - QwtSyntheticPointData, 591
- sizeHint
  - QwtArrowButton, 71
  - QwtDial, 124
  - QwtDynGridLayout, 133
  - QwtKnob, 175
  - QwtPlot, 283
  - QwtScaleWidget, 549
  - QwtSlider, 570
  - QwtThermo, 618
  - QwtWheel, 634
- sizeMetrics
  - QwtGraphic, 150
  - QwtNullPaintDevice, 217
- sliderMoved
  - QwtAbstractSlider, 60
- sliderPressed
  - QwtAbstractSlider, 60
- sliderRect
  - QwtSlider, 570
- sliderReleased
  - QwtAbstractSlider, 60
- spacing
  - QwtAbstractScaleDraw, 50
  - QwtLegendLabel, 189
  - QwtPlotAbstractBarChart, 289
  - QwtPlotLayout, 372
  - QwtPlotLegendItem, 381
  - QwtPlotMarker, 389
  - QwtScaleWidget, 549
  - QwtSlider, 570
  - QwtThermo, 619
- specialSymbol
  - QwtPlotBarChart, 295
  - QwtPlotMultiBarChart, 396
- Spline
  - QwtSplineCurveFitter, 575
- spline
  - QwtSplineCurveFitter, 576
- splineSize
  - QwtSplineCurveFitter, 576
- SplineType
  - QwtSpline, 572
- splineType
  - QwtSpline, 573
- Stacked
  - QwtPlotMultiBarChart, 392
- Star1
  - QwtSymbol, 579
- Star2
  - QwtSymbol, 579
- start
  - QwtSystemClock, 592
- startBorderDist
  - QwtScaleWidget, 549
- State
  - QwtPainterCommand, 226
- stateData
  - QwtPainterCommand, 228
- stateMachine
  - QwtPicker, 247
- stepAlignment
  - QwtAbstractSlider, 60
  - QwtWheel, 634
- Steps
  - QwtPlotCurve, 305
- Sticks
  - QwtPlotCurve, 305
- stop
  - QwtSamplingThread, 513
- Stretch
  - QwtPicker, 238
- stretchGrid
  - QwtDynGridLayout, 133
- stretchSelection
  - QwtPicker, 247
- strip
  - QwtScaleEngine, 535
- Style
  - QwtColumnSymbol, 77
  - QwtCompassMagnetNeedle, 83
  - QwtCompassWindArrow, 88
  - QwtDialSimpleNeedle, 127
  - QwtIntervalSymbol, 164
  - QwtSymbol, 578
- style
  - QwtColumnSymbol, 79
  - QwtIntervalSymbol, 166
  - QwtPlotCurve, 315
  - QwtPlotHistogram, 340
  - QwtPlotIntervalCurve, 348
  - QwtPlotMultiBarChart, 396
  - QwtSymbol, 587
- Style1
  - QwtCompassWindArrow, 88
- Style2
  - QwtCompassWindArrow, 88
- Styled
  - QwtKnob, 169
- Sunken
  - QwtDial, 117
  - QwtKnob, 169
  - QwtPlotGLCanvas, 323
- SvgDocument
  - QwtSymbol, 579
- swapData
  - QwtSeriesStore, 555

- symbol
  - QwtPlotBarChart, 296
  - QwtPlotCurve, 315
  - QwtPlotHistogram, 341
  - QwtPlotIntervalCurve, 348
  - QwtPlotMarker, 390
  - QwtPlotMultiBarChart, 397
- symbolBrush
  - QwtPlotTradingCurve, 473
- symbolExtent
  - QwtPlotTradingCurve, 473
- symbolPen
  - QwtPlotTradingCurve, 473
- SymbolStyle
  - QwtPlotTradingCurve, 466
- symbolStyle
  - QwtPlotTradingCurve, 473
- Symmetric
  - QwtScaleEngine, 531
- symmetrize
  - QwtInterval, 160
- syncScale
  - QwtPlotRescaler, 429
- takeAt
  - QwtDynGridLayout, 133
- TeXText
  - QwtText, 595
- testAndSetPixel
  - QwtPixelMatrix, 261
- testAttribute
  - QwtPlotDirectPainter, 321
  - QwtScaleEngine, 535
- testConrecFlag
  - QwtPlotSpectrogram, 456
- testCurveAttribute
  - QwtPlotCurve, 315
- testDiscardFlag
  - QwtPlotRenderer, 419
- testDisplayMode
  - QwtPlotSpectrogram, 456
- testFlag
  - QwtPointMapper, 493
- testItemAttribute
  - QwtPlotItem, 360
- testItemInterest
  - QwtPlotItem, 360
- testLayoutAttribute
  - QwtText, 599
- testLayoutFlag
  - QwtPlotRenderer, 419
  - QwtScaleWidget, 550
- testLegendAttribute
  - QwtPlotCurve, 315
- testPaintAttribute
  - QwtPlotCanvas, 301
  - QwtPlotCurve, 315
  - QwtPlotIntervalCurve, 348
  - QwtPlotRasterItem, 412
  - QwtPlotShapelItem, 443
  - QwtPlotSpectroCurve, 448
  - QwtPlotTradingCurve, 473
  - QwtText, 599
- testPixel
  - QwtPixelMatrix, 261
- testRenderHint
  - QwtGraphic, 150
  - QwtPlotItem, 362
- text
  - QwtPlotTextLabel, 462
  - QwtText, 599
- textEngine
  - QwtText, 599, 600
- TextFormat
  - QwtText, 594
- textMargins
  - QwtMathMLTextEngine, 210
  - QwtPlainTextEngine, 263
  - QwtRichTextEngine, 507
  - QwtTextEngine, 602
- textPen
  - QwtPlotLegendItem, 381
- textRect
  - QwtPlotTextLabel, 462
  - QwtTextLabel, 607
- textSize
  - QwtMathMLTextEngine, 210
  - QwtPlainTextEngine, 263
  - QwtRichTextEngine, 507
  - QwtText, 600
  - QwtTextEngine, 603
- ThinStyle
  - QwtCompassMagnetNeedle, 83
- Tick
  - QwtKnob, 169
- tickCount
  - QwtWheel, 634
- tickLabel
  - QwtAbstractScaleDraw, 50
- tickLength
  - QwtAbstractScaleDraw, 50
- TickType
  - QwtScaleDiv, 515
- Ticks
  - QwtAbstractScaleDraw, 44
- ticks
  - QwtScaleDiv, 520
- time
  - QwtOHLCSample, 220
- timeSpec
  - QwtDateScaleDraw, 109
  - QwtDateScaleEngine, 114
- timerEvent
  - QwtSlider, 570
  - QwtWheel, 635
- title
  - QwtLegendData, 184



- QwtPlot, 283
- QwtPlotItem, 362
- QwtScaleWidget, 550
- TitleInverted
  - QwtScaleWidget, 542
- titleHeightForWidth
  - QwtScaleWidget, 550
- titleLabel
  - QwtPlot, 283
- titleRect
  - QwtPlotLayout, 372
- toDateTime
  - QwtDate, 103
  - QwtDateScaleDraw, 109
  - QwtDateScaleEngine, 114
- toDouble
  - QwtDate, 103
- toImage
  - QwtGraphic, 150
  - QwtPointMapper, 494
- toPixmap
  - QwtGraphic, 151
- toPoint
  - QwtPoint3D, 487
  - QwtPointPolar, 498
- toPoints
  - QwtPointMapper, 494
- toPointsF
  - QwtPointMapper, 494
- toPolygon
  - QwtPointMapper, 495
- toPolygonF
  - QwtPointMapper, 495
- toRect
  - QwtColumnRect, 76
- toString
  - QwtDate, 103
- tolerance
  - QwtWeedingCurveFitter, 624
- TopLegend
  - QwtPlot, 268
- TopScale
  - QwtScaleDraw, 522
- TopToBottom
  - QwtColumnRect, 76
- totalAngle
  - QwtKnob, 175
  - QwtWheel, 635
- totalSteps
  - QwtAbstractSlider, 60
- trackerFont
  - QwtPicker, 247
- trackerMode
  - QwtPicker, 247
- trackerOverlay
  - QwtPicker, 247
- trackerPen
  - QwtPicker, 248
- trackerPosition
  - QwtPicker, 248
- trackerRect
  - QwtPicker, 248
- trackerText
  - QwtPicker, 248
  - QwtPlotPicker, 406
- trackerTextF
  - QwtPlotPicker, 406
- TrailingScale
  - QwtSlider, 564
  - QwtThermo, 610
- transform
  - QwtAbstractScale, 41
  - QwtLogTransform, 200
  - QwtNullTransform, 218
  - QwtPlot, 283
  - QwtPlotPicker, 406
  - QwtPowerTransform, 502
  - QwtScaleMap, 539
  - QwtTransform, 621
- transformation
  - QwtScaleEngine, 535
- TransformationFlag
  - QwtPointMapper, 492
- TransformationFlags
  - QwtPointMapper, 492
- transition
  - QwtPicker, 248
- Triangle
  - QwtKnob, 169
  - QwtSymbol, 579
- TriangleStyle
  - QwtCompassMagnetNeedle, 83
- Tube
  - QwtPlotIntervalCurve, 343
- Type
  - QwtPainterCommand, 226
- type
  - QwtPainterCommand, 228
- UTriangle
  - QwtSymbol, 579
- updateAxes
  - QwtPlot, 283
- updateCanvasMargins
  - QwtPlot, 284
- updateInterval
  - QwtSlider, 570
  - QwtWheel, 635
- updateLayout
  - QwtPlot, 284
- updateLegend
  - QwtAbstractLegend, 34
  - QwtLegend, 182
  - QwtPlot, 284
  - QwtPlotItem, 362
  - QwtPlotLegendItem, 381
- updateOverlay



- QwtWidgetOverlay, 642
- updateScaleDiv
  - QwtPlotGrid, 331
  - QwtPlotItem, 362
  - QwtPlotScaleItem, 434
  - QwtPlotSeriesItem, 437
- updateScales
  - QwtPlotRescaler, 429
- updateState
  - QwtGraphic, 151
- updateWidget
  - QwtLegend, 182
- upperBound
  - QwtAbstractScale, 42
  - QwtScaleDiv, 520
- upperMargin
  - QwtScaleEngine, 535
- usedColor
  - QwtText, 600
- usedFont
  - QwtText, 600
- UserCurve
  - QwtPlotCurve, 305
  - QwtPlotIntervalCurve, 343
- UserRubberBand
  - QwtPicker, 238
- UserStyle
  - QwtColumnSymbol, 77
  - QwtPlotHistogram, 334
  - QwtSymbol, 579
- UserSymbol
  - QwtIntervalSymbol, 164
  - QwtPlotTradingCurve, 466
- utcOffset
  - QwtDate, 104
  - QwtDateScaleDraw, 109
  - QwtDateScaleEngine, 114
- VLine
  - QwtPlotMarker, 385
  - QwtSymbol, 579
- VLineRubberBand
  - QwtPicker, 238
- value
  - QwtCounter, 96
  - QwtLegendData, 184
  - QwtMatrixRasterData, 214
  - QwtRasterData, 505
  - QwtSpline, 573
  - QwtWheel, 635
- valueAt
  - QwtWheel, 635
- valueChanged
  - QwtAbstractSlider, 60
  - QwtCounter, 96
  - QwtWheel, 636
- valueMatrix
  - QwtMatrixRasterData, 214
- values
  - QwtLegendData, 186
- verticalScrollBar
  - QwtLegend, 182
- viewAngle
  - QwtWheel, 636
- viewBox
  - QwtPlotSvgItem, 459
- WeedOutPoints
  - QwtPointMapper, 492
- Week
  - QwtDate, 101
- Week0Type
  - QwtDate, 101
- week0Type
  - QwtDateScaleDraw, 109
  - QwtDateScaleEngine, 114
- weekNumber
  - QwtDate, 104
- wheelBorderWidth
  - QwtWheel, 636
- wheelEvent
  - QwtAbstractSlider, 61
  - QwtCounter, 96
  - QwtDial, 124
  - QwtWheel, 636
- wheelFactor
  - QwtMagnifier, 206
- wheelModifiers
  - QwtMagnifier, 207
- wheelMoved
  - QwtWheel, 636
- wheelPressed
  - QwtWheel, 637
- wheelRect
  - QwtWheel, 637
- wheelReleased
  - QwtWheel, 637
- wheelWidth
  - QwtWheel, 637
- widgetEnterEvent
  - QwtPicker, 249
- widgetKeyPressEvent
  - QwtMagnifier, 207
  - QwtPanner, 233
  - QwtPicker, 249
  - QwtPlotZoomer, 484
- widgetKeyReleaseEvent
  - QwtMagnifier, 207
  - QwtPanner, 233
  - QwtPicker, 249
- widgetLeaveEvent
  - QwtPicker, 249
- widgetMouseDoubleClickEvent
  - QwtPicker, 249
- widgetMouseMoveEvent
  - QwtMagnifier, 207
  - QwtPanner, 233
  - QwtPicker, 251

- widgetMouseEvent
  - QwtMagnifier, [207](#)
  - QwtPanner, [233](#)
  - QwtPicker, [251](#)
- widgetMouseReleaseEvent
  - QwtMagnifier, [208](#)
  - QwtPanner, [233](#)
  - QwtPicker, [251](#)
  - QwtPlotZoomer, [484](#)
- widgetWheelEvent
  - QwtMagnifier, [208](#)
  - QwtPicker, [251](#)
- width
  - QwtDialSimpleNeedle, [128](#)
  - QwtInterval, [160](#)
  - QwtIntervalSymbol, [166](#)
  - QwtSimpleCompassRose, [562](#)
- wrapping
  - QwtAbstractSlider, [61](#)
  - QwtCounter, [96](#)
  - QwtWheel, [637](#)
- x
  - QwtPoint3D, [488](#)
  - QwtSyntheticPointData, [591](#)
- xBottom
  - QwtPlot, [267](#)
- XCross
  - QwtSymbol, [579](#)
- xTop
  - QwtPlot, [267](#)
- xData
  - QwtCPointerData, [98](#)
  - QwtPointArrayData, [491](#)
- xEnabled
  - QwtPlotGrid, [331](#)
- xMinEnabled
  - QwtPlotGrid, [332](#)
- xScaleDiv
  - QwtPlotGrid, [332](#)
- y
  - QwtPoint3D, [488](#)
  - QwtSyntheticPointData, [591](#)
- yLeft
  - QwtPlot, [267](#)
- yRight
  - QwtPlot, [267](#)
- yData
  - QwtCPointerData, [98](#)
  - QwtPointArrayData, [491](#)
- yEnabled
  - QwtPlotGrid, [332](#)
- yMinEnabled
  - QwtPlotGrid, [332](#)
- yScaleDiv
  - QwtPlotGrid, [332](#)
- Year
  - QwtDate, [101](#)
- z
  - QwtPlotItem, [363](#)
  - QwtPoint3D, [488](#)
- zoom
  - QwtPlotZoomer, [485](#)
- zoomBase
  - QwtPlotZoomer, [485](#)
- zoomRect
  - QwtPlotZoomer, [485](#)
- zoomRectIndex
  - QwtPlotZoomer, [485](#)
- zoomStack
  - QwtPlotZoomer, [486](#)
- zoomed
  - QwtPlotZoomer, [485](#)