

# APEX 3 reference manual

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## Warning

This is a preliminary version of the APEX 3 reference manual. It has not been proofread yet and will hence contain errors. It also contains documentation on experimental features, which have not been sufficiently tested.

This reference manual is automatically generated from the APEX 3 schema. The same documentation can be shown in context using a specialized XML editor. Please refer to the APEX 3 user manual for more information.

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## 1 apex

<apex>

**attrib** <version> *required* **type** positiveInteger

'Apex will only load experiment files with the correct version attribute. Conversion scripts will be provided to convert to newer versions.'

**<description>**                      *optional*                      **type** string

**doc** 'Describes the entire experiment. Is reported in the results file.'

**<procedure>**                      *required*                      **type** procedureType (see p 82)

**doc** 'Describes the procedure to be used. The procedure controls the sequence of trials that will be presented. Real procedures are derived from apex:procedureType.'

**<corrector>**                      *required*                      **type** correctorType (see p 81)

**doc** 'Describes the corrector to be used. The corrector compares the user input and the correct answer for a certain trail. Real correctors are derived from apex:correctorType'

**<screens>**                      *required*                      **type** screensType (see p 35)

**doc** 'Defines one or more screens to be used elsewhere. A screen is what is visible on the computer screen at a certain instant of time.'

**<datablocks>**                      *required*                      **type** datablockstype (see p 33)

**doc** 'A datablock is the smallest unit of output data used in Apex. Every sound or other stimulus file to be used elsewhere, is to be defined in this section.'

**<devices>**                      *required*                      **type** devicesType (see p 26)

**doc** 'All output devices to be used are enumerated in this section. Before the experiment can be started, Apex tries to open them. The experiment only starts if all devices can be opened. Devices are started in alphabetical order of their id, except if a master is specified. They are stopped in reverse alphabetical order. Thus if you want them to be started or stopped in a certain order, you can change their IDs.'

**<filters>**                      *optional*                      **type** filtersType (see p 19)

**doc** 'Filters can be placed anywhere in the output network. They can be real filters, ie blocks that process data, or generators, ie blocks that generate data without any input data.'

**<stimuli>**                      *required*                      **type** stimuliType (see p 16)

**doc** 'A stimulus is the whole of datablocks (for any number of devices) and parameters (fixed and variable) that is presented to the user at a certain instant of time.'

**<connections>**                    *optional*            **type** connectionsType (see p 15)

**doc** 'In this section, connections can be made between datablocks, filters and devices. \"from\" is only possible for datablocks and filters, \"to\" is only possible for filters that accept input (thus no generators) and devices. Connections can only be made between elements belonging to the same device. If no connections are specified, Apex tries to make a default network by connecting all channels from `_ALL_` (== all datablocks) to all channels from the datablocks\' device. Default connections are not made when filters are present.'

**<randomgenerators>** *optional*            **type** randomgeneratorsType (see p 13)

**doc** 'Randomgenerators generate random numbers according to a certain specification and can set any parameter defined elsewhere before stimulus output. All randomgenerators are asked to set their corresponding parameters right before a stimulus is output.'

**<calibration>**                    *optional*            **type** calibrationType (see p 11)

**doc** 'In this optional section, parameters for the built in calibration mechanism are defined. Calibration is the process of ensuring a relation between a digital stimulus level (dB) and the actual audio output (dBSPL). Calibration parameters are stored in profiles that are persistent between sessions. Profiles are stored in the `apex/config/calibration` directory and can be edited by hand if required.'

**<results>**                    *optional*            **type** resultsType (see p 11)

**doc** 'Parameters related to the presentation/analysis of the result of this experiment are defined here.'

**<interactive>**                    *optional*            **type** interactiveType (see p 10)

**doc** 'For every entry in this section, the value of a certain element in this experiment file will be changed to the value set by the user in a GUI window.'



**<general>**                    *optional*            **type** generalType (see p 9)

**doc** 'Some general experiment parameters are defined here.'

## 2 generalType

**<exitafter>**                    *optional*            **type** boolean

**doc** 'Exit immediately after the experiment was finished. The \”save results\” dialog box is always shown.'

**<autosave>**                    *optional*            **type** boolean

**doc** 'If defined, apex will automatically select a filename and only present the user with a messagebox asking wheter to save the results yes or no'

**<showresults>**                    *optional*            **type** boolean

**doc** 'Show the experiment results after transformation with the script defined in the results section in a dialog box. A dialog box will ask for confirmation before showing the results. This option will only work if an xslt script is defined and the results are successfully saved to disk.'

**<waitforstart>**                    *optional*            **type** boolean

**doc** 'If true, the next trial is only presented after clicking the Start button, selecting Start from the Experiment menu or pressing F5.'

**<allowskip>**                    *optional*            **type** boolean

**doc** 'If true, the F7 key can be used to skip anything that takes a certain amount of time, eg intro/outro/iti'

**<saveprocessedresults>** *optional*            **type** boolean

**doc** 'Save the experiment results after transformation at the end of the results xml file. This option will only work if an xslt script is defined and the results are successfully saved to disk.'

**<runoutputtest>**                    *optional*            **type** boolean

**doc** 'Run test to compare output with input files. Only works for WavDevice, and the apex executable must be compiled with WRITE-WAVOUTPUT defined. If set, the data send to the soundcard is also written to a file, and afterwards compared with the input. This allows to check if the entire processing/buffering works properly. If the input below is not specified, the test assumes all available datablocks were played sequential. Filters and connections are not taken into account. (eg if two datablocks are defined, the test just checks if the output is identical to the two wavefiles played right after each other). To allow testing filter/loop/connections functionality, create a wavefile that mimics all the processing, and specify the path below, and the test will use it to compare against the output. See the example tests for more info.'

**<outputtestinput>**    *optional*    **type** anyURI

**doc** 'Optional: path to a file to compare the output with.'

**<scriptlibrary>**    *optional*    **type** anyURI

**doc** 'Library of ECMAScript functions. Functions defined in this library can be used from any other script for the experiment.'

### 3 interactiveType

**<entry>**    *one or more*

**attrib** **<expression>**    *optional*    **type** string

'XPath expression defining the element to be modified. The user will be alerted if the expression yields no results. If the expression yields more than one result, every element found will be modified. The modification takes place before validation, so the resulting document will not be used unless valid. Modifications will be reported in the results file. If expression is not present, the user input will be saved to the results file, but nothing will be modified.'

**attrib** **<type>**    *required*

'Data type of the element to be modified. It impacts the dialog box presented to the user and prevents input of data of the wrong data type.'

**attrib** <**description**> *required* **type** string

'Description of this entry, will be shown to the user.'

**attrib** <**default**> *required* **type** string

'Default value for the replacement.'

## 4 resultsType

<**xsltscript**> *optional* **type** anyURI

**doc** 'xslt script to be used to transform the output xml file in a more human readable format. Apex looks for xslt scripts in the path defined in the main config file. It defaults to apex/scripts/xslt'

<**matlabscript**> *optional* **type** string

**doc** 'Matlab script to be used for processing results. Will be added as an XML processing tag to the results file'

<**subject**> *optional* **type** string

**doc** 'Name of the test subject. Will be appended to the suggested results file name. Is typically modified at the beginning of an experiment using an interactive entry.'

## 5 calibrationType

**attrib** <**profile**> *required* **type** Name

<**soundlevelmeter**> *optional*

**doc** 'Information necessary for automatic calibration using an interface to a sound level meter.'

<**plugin**> *required* **type** anyURI

**doc** 'Filename of the sound level meter plugin to be used'

**<transducer>** *optional* **type** string

**doc** 'Name of the transducer (microphone, ...) to be used by the SLM. Will only be set if your SLM supports it.'

**<frequency\_weighting>** *required*

**<time\_weighting>** *required*

**<type>** *required*

**<percentile>** *optional* **type** double

**doc** 'Percentile of statistics on measurement. If 0 an instantaneous measurement will be made.'

**<time>** *optional* **type** double

**doc** 'Measurement time in seconds. If percentile is defined, time should be >0'

**<stimuli>** *required*

**doc** 'Stimuli that are used for calibration. These can be, and in some cases should be stimuli that are used in the actual experiment.'

**<stimulus>** *one or more*

**attrib <id>** *required* **type** IDREF

**<parameters>** *required*

**doc** 'Parameters that are used to calibrate the system. Generally some output gain parameters of the last stage (eg the wavdevice) are used.'

**<parameter>** *one or more*

**attrib <id>** *required* **type** IDREF

**<targetamplitude>** *required* **type** double

**doc** 'Target acoustical measurement of the stimuli defined above during the experiment. Generally in dB SPL.'

**<calibrationamplitude>** *optional* **type** double

**doc** 'Value to calibrate at. Generally in dB SPL and higher than targetamplitude. Can be changed during calibration.'

**<mute>** *required* **type** double  
**doc** 'Value to be used for the other parameters while calibrating this parameter. Has no effect on the actual calibration. Useful for eg muting the other channel of a headphone.'  
**<min>** *optional* **type** double  
**doc** 'Minimum parameter value that can be set by the calibrator.'  
**<max>** *optional* **type** double  
**doc** 'Maximum parameter value that can be set by the calibrator.'

## 6 randomgeneratorsType

**<randomgenerator>** *any*

**subtype** uniform (see p 15)

**subtype** gaussian (see p 13)

**attrib** **<id>** *required* **type** ID  
**<min>** *required* **type** double  
**doc** 'Minimum value of the random numbers'  
**<max>** *required* **type** double  
**doc** 'Maximum value of the random numbers'  
**<type>** *required*  
**doc** 'Data type'  
**<parameter>** *required* **type** IDREF  
**doc** 'Parameter to be set to the random value'

## 7 gaussian

**parent** randomgenerator (see p 14)

**attrib** **<id>** *required* **type** ID

**<min>**                      *required*        **type** double  
                                  **doc** 'Minimum value of the random numbers'  
**<max>**                      *required*        **type** double  
                                  **doc** 'Maximum value of the random numbers'  
**<type>**                      *required*  
                                  **doc** 'Data type'  
**<parameter>**              *required*        **type** IDREF  
                                  **doc** 'Parameter to be set to the random value'

## 8 randomgenerator

**subtype** uniform (see p 15)

**subtype** gaussian (see p 13)

**attrib** **<id>**                      *required*        **type** ID  
**<min>**                      *required*        **type** double  
                                  **doc** 'Minimum value of the random numbers'  
**<max>**                      *required*        **type** double  
                                  **doc** 'Maximum value of the random numbers'  
**<type>**                      *required*  
                                  **doc** 'Data type'  
**<parameter>**              *required*        **type** IDREF  
                                  **doc** 'Parameter to be set to the random value'

## 9 uniform

**parent** randomgenerator (see p 14)

**attrib** <id> *required* **type** ID

<min> *required* **type** double

**doc** 'Minimum value of the random numbers'

<max> *required* **type** double

**doc** 'Maximum value of the random numbers'

<type> *required*

**doc** 'Data type'

<parameter> *required* **type** IDREF

**doc** 'Parameter to be set to the random value'

## 10 connectionsType

<connection> *any*

<from> *required*

**doc** 'The channel of the filter/datablock where the connection is started from.'

**attrib** <id> *optional* **type** ID

<id> *required*

<channel> *required*

**doc** 'The channel to be used. Channels are zero based, ie the first channel is 0, the second 1, etc. This parameter can have an ID for later referral.'

**attrib** <id> *optional* **type** ID

<to> *required*

**doc** 'The channel of the device/filter where the connection ends.'

<b>attrib</b>	<b>&lt;id&gt;</b>	<i>optional</i>	<b>type</b> ID
	<b>&lt;id&gt;</b>	<i>required</i>	<b>type</b> IDREF
	<b>&lt;channel&gt;</b>	<i>required</i>	
<b>doc</b>	'The channel to be used. Channels are zero based, ie the first channel is 0, the second 1, etc. This parameter can have an ID for later referral. Channel -1 means mute.'		
<b>attrib</b>	<b>&lt;id&gt;</b>	<i>optional</i>	<b>type</b> ID

## 11 stimuliType

**<fixed\_parameters>** *optional*

**doc** 'Fixed parameters describe fixed properties of every stimulus. They can be used by procedures to select a certain stimulus, they can be presented on the screen or can be used for the users own reference. They have no influence whatever on the actual sound/stimulation that is sent to the device when a particular stimulus is to be output. Every fixed stimulus that is used in any stimulus should be defined here. All fixed parameters defined here, should be present in all stimuli.'

**<parameter>** *any*

<b>attrib</b>	<b>&lt;id&gt;</b>	<i>required</i>	<b>type</b> ID
<b>attrib</b>	<b>&lt;useforresults&gt;</b>	<i>optional</i>	<b>type</b> boolean

**<stimulus>** *any*

<b>attrib</b>	<b>&lt;id&gt;</b>	<i>required</i>	<b>type</b> ID
---------------	-------------------	-----------------	----------------

<b>&lt;description&gt;</b>	<i>optional</i>	<b>type</b> string
----------------------------	-----------------	--------------------

**doc** 'Text description, for your own reference'

<b>&lt;datablocks&gt;</b>	<i>required</i>	<b>type</b> datablocksType (see p 17)
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**doc** 'Combination of datablocks to be output'

**<variableParameters>** *optional*

**doc** 'These parameters will be set just before the stimulus is output'

<b>&lt;parameter&gt;</b>	<i>any</i>
--------------------------	------------



<b>attrib</b>	<b>&lt;id&gt;</b>	<i>required</i>	<b>type</b> IDREF
<b>&lt;fixedParameters&gt;</b>	<i>optional</i>		
<b>doc</b> 'Fixed parameters are properties of a stimulus that can be displayed or used to select a stimulus from a list based on a certain criterion.'			
<b>&lt;parameter&gt;</b>	<i>any</i>		
<b>attrib</b>	<b>&lt;id&gt;</b>	<i>required</i>	<b>type</b> IDREF
	<b>&lt;b&gt;</b>	<i>any</i>	<b>type</b> string
	<b>&lt;i&gt;</b>	<i>any</i>	<b>type</b> string
	<b>&lt;u&gt;</b>	<i>any</i>	<b>type</b> string
<b>&lt;pluginstimuli&gt;</b>	<i>any</i>		
<b>parent</b> xmlGeneratingPluginType (see p 17)			
<b>&lt;script&gt;</b>	<i>optional</i>		
<b>attrib</b>	<b>&lt;source&gt;</b>	<i>required</i>	
<b>&lt;parameter&gt;</b>	<i>any</i>		
<b>attrib</b>	<b>&lt;name&gt;</b>	<i>required</i>	<b>type</b> Name

## 12 xmlGeneratingPluginType

<b>&lt;script&gt;</b>	<i>optional</i>		
<b>attrib</b>	<b>&lt;source&gt;</b>	<i>required</i>	
<b>&lt;parameter&gt;</b>	<i>any</i>		
<b>attrib</b>	<b>&lt;name&gt;</b>	<i>required</i>	<b>type</b> Name

## 13 datablocksType

	<i>optional</i>		
<b>&lt;datablock&gt;</b>	<i>required</i>		
<b>attrib</b>	<b>&lt;id&gt;</b>	<i>required</i>	<b>type</b> Name

<sequential>                      *required*

**doc** 'Present all child datablocks or child combinations of datablocks sequentially. The result is guaranteed gap-less when using a single device for all children.'  
*one            or*  
*more*

<datablock>                      *optional*

**attrib** <id>                      *required*                      **type** IDREF

<sequential>                      *optional*                      **type** datablocksSequentialType (see p 18)

<simultaneous>                      *optional*

*one            or*  
*more*

<datablock>                      *optional*                      **type** datablockRefType (see p 19)

<sequential>                      *optional*                      **type** datablocksSequentialType (see p 18)

<simultaneous>                      *optional*                      **type** datablocksSimultaneousType (see p 18)

<simultaneous>                      *required*                      **type** datablocksSimultaneousType (see p 18)

**doc** 'Present all child datablocks or child combinations of datablocks simultaneously. The total length of this block is the length of the longest child block. Zero\'s or null stimulation will be added to shorter children if necessary (this is not guaranteed!).'

## 14    datablocksSimultaneousType

*one            or*  
*more*

<datablock>                      *optional*                      **type** datablockRefType (see p 19)

<sequential>                      *optional*                      **type** datablocksSequentialType (see p 18)

<simultaneous>                      *optional*                      **type** datablocksSimultaneousType (see p 18)

## 15    datablocksSequentialType

*one            or*  
*more*

<datablock>	<i>optional</i>	<b>type</b> datablockRefType (see p 19)
<sequential>	<i>optional</i>	<b>type</b> datablocksSequentialType (see p 18)
<simultaneous>	<i>optional</i>	<b>type</b> datablocksSimultaneousType (see p 18)

## 16 datablockRefType

**attrib** <id> *required* **type** IDREF

## 17 filtersType

<filter> *any*

**doc** 'Every filter/generator derives from this base type. All filters to be used are defined here.'

**subtype** generator (see p 25)

**subtype** amplifier (see p 24)

**subtype** fader (see p 23)

**subtype** dataloop (see p 22)

**subtype** hrtffiltersum (see p 21)

**subtype** pluginfilter (see p 20)

**attrib** <id> *required* **type** ID

<device> *required* **type** IDREF

**doc** 'ID of the device to which this filter belongs. The mode of the filter (online or offline) is determined by the device.'

<channels> *required* **type** positiveInteger

**doc** 'Number of channels'

<continuous> *optional* **type** boolean

**doc** 'If continuous==true, the filter/generator keeps on running between trials (ie while the user is entering input). Only makes sense for generators.'

## 18 pluginfilter

**parent** filterType (see p 20)

**attrib** <id> *required* **type** ID

<device> *required* **type** IDREF

**doc** 'ID of the device to which this filter belongs. The mode of the filter (online or offline) is determined by the device.'

<channels> *required* **type** positiveInteger

**doc** 'Number of channels'

<continuous> *optional* **type** boolean

**doc** 'If continuous==true, the filter/generator keeps on running between trials (ie while the user is entering input). Only makes sense for generators.'

<plugin> *required* **type** anyURI

<parameter> *any*

**attrib** <id> *optional* **type** ID

**attrib** <name> *required* **type** Name

**attrib** <channel> *optional* **type** nonNegativeInteger

## 19 filterType

**subtype** generator (see p 25)

**subtype** amplifier (see p 24)

**subtype** fader (see p 23)

**subtype** dataloop (see p 22)

**subtype** hrtffiltersum (see p 21)

**subtype** pluginfilter (see p 20)

**attrib** <id> *required* **type** ID

<device> *required* **type** IDREF

**doc** 'ID of the device to which this filter belongs. The mode of the filter (online or offline) is determined by the device.'

<channels> *required* **type** positiveInteger

**doc** 'Number of channels'

<continuous> *optional* **type** boolean

**doc** 'If continuous==true, the filter/generator keeps on running between trials (ie while the user is entering input). Only makes sense for generators.'

## 20 hrtffiltersum

**parent** filterType (see p 20)

**attrib** <id> *required* **type** ID

<device> *required* **type** IDREF

**doc** 'ID of the device to which this filter belongs. The mode of the filter (online or offline) is determined by the device.'

<channels> *required* **type** positiveInteger

**doc** 'Number of channels'

<continuous> *optional* **type** boolean

**doc** 'If continuous==true, the filter/generator keeps on running between trials (ie while the user is entering input). Only makes sense for generators.'

<anglespeech> *required*

**attrib** <id> *optional* **type** ID

<b>&lt;anglenoise&gt;</b>	<i>required</i>		
<b>attrib &lt;id&gt;</b>		<i>optional</i>	<b>type ID</b>
<b>&lt;snr&gt;</b>	<i>required</i>		
<b>attrib &lt;id&gt;</b>		<i>optional</i>	<b>type ID</b>
<b>&lt;speechfile&gt;</b>	<i>required</i>		
<b>attrib &lt;id&gt;</b>		<i>optional</i>	<b>type ID</b>
<b>&lt;noise file&gt;</b>	<i>required</i>		
<b>attrib &lt;id&gt;</b>		<i>optional</i>	<b>type ID</b>

## 21 dataloop

**parent** filterType (see p 20)

<b>attrib &lt;id&gt;</b>	<i>required</i>	<b>type ID</b>
<b>&lt;device&gt;</b>	<i>required</i>	<b>type IDREF</b>
<b>doc</b> 'ID of the device to which this filter belongs. The mode of the filter (online or offline) is determined by the device.'		
<b>&lt;channels&gt;</b>	<i>required</i>	<b>type positiveInteger</b>
<b>doc</b> 'Number of channels'		
<b>&lt;continuous&gt;</b>	<i>optional</i>	<b>type boolean</b>
<b>doc</b> 'If continuous==true, the filter/generator keeps on running between trials (ie while the user is entering input). Only makes sense for generators.'		
<b>&lt;datablock&gt;</b>	<i>required</i>	<b>type IDREF</b>
<b>&lt;basegain&gt;</b>	<i>optional</i>	<b>type double</b>
<b>doc</b> 'The total gain is basegain+gain. Basegain is useful for amplitude normalization between different blocks'		

**<gain>** *required*

**parent** double (see p ??)

**attrib** **<id>** *optional* **type** ID

**<randomjump>** *optional* **type** boolean

**doc** 'Jump to a random place in the datablock upon start.'

**<jump>** *optional* **type** double

**doc** 'Jump to a fixed place in the datablock when the generator is started. The place is specified in seconds. Take care that you do not jump further than the length of the wave file.'

## 22 fader

**parent** filterType (see p 20)

**attrib** **<id>** *required* **type** ID

**<device>** *required* **type** IDREF

**doc** 'ID of the device to which this filter belongs. The mode of the filter (online or offline) is determined by the device.'

**<channels>** *required* **type** positiveInteger

**doc** 'Number of channels'

**<continuous>** *optional* **type** boolean

**doc** 'If continuous==true, the filter/generator keeps on running between trials (ie while the user is entering input). Only makes sense for generators.'

**<length>** *required*

**doc** 'Fade length in mSec.'

**attrib** **<id>** *optional* **type** ID

**<type>** *required*

**doc** 'Fader type: linear or cosine shaped.'

**<direction>** *required*

**doc** 'Fader direction: fadein (beginning of stimulus) or fadeout(end of stimulus)'

## 23 amplifier

**parent** filterType (see p 20)

**attrib** **<id>** *required* **type** ID

**<device>** *required* **type** IDREF

**doc** 'ID of the device to which this filter belongs. The mode of the filter (online or offline) is determined by the device.'

**<channels>** *required* **type** positiveInteger

**doc** 'Number of channels'

**<continuous>** *optional* **type** boolean

**doc** 'If continuous==true, the filter/generator keeps on running between trials (ie while the user is entering input). Only makes sense for generators.'

**<basegain>** *optional* **type** gainparam (see p 25)

**doc** 'The total gain is basegain+gain. Basegain is useful for amplitude normalization between different blocks'

**<gain>** *one or more*

**parent** gainparam (see p 25)

**attrib** **<id>** *optional* **type** ID

**attrib** **<channel>** *optional* **type** nonNegativeInteger



'Used to specify a single channel to apply gain to, instead of applying it to all channels at once. For example, for an amplifier having two channels, these are set independently by using -3.00 -6.00 Channels are zero based, ie the first channel is 0, the second 1 and so on.'

## 24 gainparam

**parent** double (see p ??)

**attrib** <id> *optional* **type** ID

## 25 generator

**parent** filterType (see p 20)

**attrib** <id> *required* **type** ID

<device> *required* **type** IDREF

**doc** 'ID of the device to which this filter belongs. The mode of the filter (online or offline) is determined by the device.'

<channels> *required* **type** positiveInteger

**doc** 'Number of channels'

<continuous> *optional* **type** boolean

**doc** 'If continuous==true, the filter/generator keeps on running between trials (ie while the user is entering input). Only makes sense for generators.'

<type> *required*

<basegain> *optional* **type** double

**doc** 'The total gain is basegain+gain. Basegain is useful for amplitude normalization between different blocks'

**<gain>** *required* **type** gainparam (see p 25)

**doc** 'The total gain is basegain+gain. Gain is a parameter that can be changed by other modules'

**<frequency>** *required*

**doc** 'Frequency: only makes sense for sinus, square and triangle'

**attrib** **<id>** *optional* **type** ID

**<phase>** *required*

**doc** 'Phase (rad): only makes sense for sinus, square and triangle'

**attrib** **<id>** *optional* **type** ID

**<pulsewidth>** *optional* **type** positiveInteger

**doc** 'Pulse width in samples. Currently only used for single pulse generator'

**<polarity>** *optional*

## 26 devicesType

**<master>** *optional* **type** IDREF

**doc** 'The master device is that last one to be started after all stimuli are loaded for all devices. This feature can be used when using triggers to synchronize devices.'

**<device>** *any*

**doc** 'All real devices derive from this base.'

**subtype** wavDeviceType (see p 31)

**subtype** dummyDeviceType (see p 31)

**subtype** mixerDeviceType (see p 29)

**subtype** pluginController (see p 29)

**subtype** L34DeviceType (see p 28)

**subtype** clarionDeviceType (see p 27)

<b>attrib</b>	<b>&lt;id&gt;</b>	<i>required</i>	<b>type</b> ID
<b>attrib</b>	<b>&lt;mode&gt;</b>	<i>optional</i>	<b>type</b> ref:deviceModesEnum

'Processing mode of this device. Impacts all associated filters.'

## 27 clarionDeviceType

**parent** deviceType (see p 27)

<b>attrib</b>	<b>&lt;id&gt;</b>	<i>required</i>	<b>type</b> ID
<b>attrib</b>	<b>&lt;mode&gt;</b>	<i>optional</i>	<b>type</b> ref:deviceModesEnum

'Processing mode of this device. Impacts all associated filters.'

**<parameter>**      *one      or  
more*

**doc** 'Any parameter known to Clarion. If the parameter does not exist on the device, an error will be shown.'

**parent** string (see p ??)

<b>attrib</b>	<b>&lt;id&gt;</b>	<i>optional</i>	<b>type</b> ID
<b>attrib</b>	<b>&lt;name&gt;</b>	<i>required</i>	<b>type</b> Name

## 28 deviceType

**subtype** wavDeviceType (see p 31)

**subtype** dummyDeviceType (see p 31)

**subtype** mixerDeviceType (see p 29)

**subtype** pluginController (see p 29)

**subtype** L34DeviceType (see p 28)

**subtype** clarionDeviceType (see p 27)

<b>attrib</b>	<b>&lt;id&gt;</b>	<i>required</i>	<b>type</b> ID
---------------	-------------------	-----------------	----------------

**attrib** <mode> *optional* **type** ref:deviceModesEnum

'Processing mode of this device. Impacts all associated filters.'

## 29 L34DeviceType

**parent** deviceType (see p 27)

**attrib** <id> *required* **type** ID

**attrib** <mode> *optional* **type** ref:deviceModesEnum

'Processing mode of this device. Impacts all associated filters.'

<device\_id> *required* **type** nonNegativeInteger

**doc** 'Device number. Devices are ordered according to the assigned com-port (cfr device manager). Device 0 is a simulated device.'

<implant> *required*

**doc** 'Implant type. CIC4==freedom'

<trigger> *required*

**doc** 'Generate or use a trigger from the audio port. Currently the trigger button status is not checked (nicv2 doesn\'t allow this yet)'

<volume> *optional*

**attrib** <id> *optional* **type** ID

<defaultmap> *required*

**doc** 'Defines the default subject map to be used'

<inline> *required*

**doc** 'The map is defined below'

**attrib** <id> *optional* **type** ID

<number\_electrodes>*required*

<mode> *required*

<b>&lt;pulsewidth&gt;</b>	<i>required</i>	<b>type</b> unsignedInt
<b>&lt;pulsegap&gt;</b>	<i>required</i>	<b>type</b> unsignedInt
<b>&lt;period&gt;</b>	<i>required</i>	
<b>&lt;channel&gt;</b>	<i>[1..22]</i>	
<b>attrib &lt;number&gt;</b>	<i>required</i>	
<b>attrib &lt;electrode&gt;</b>	<i>required</i>	
<b>attrib &lt;threshold&gt;</b>	<i>required</i>	
<b>attrib &lt;comfort&gt;</b>	<i>required</i>	
<b>&lt;from_r126&gt;</b>	<i>required</i>	
<b>doc</b> 'The user can select the map from the R126 wizard. R126 is the clinical fitting software.'		

## 30 pluginController

**parent** deviceType (see p 27)

<b>attrib &lt;id&gt;</b>	<i>required</i>	<b>type</b> ID
<b>attrib &lt;mode&gt;</b>	<i>optional</i>	<b>type</b> ref:deviceModesEnum

'Processing mode of this device. Impacts all associated filters.'

<b>&lt;plugin&gt;</b>	<i>required</i>	<b>type</b> anyURI
<b>&lt;parameter&gt;</b>	<i>any</i>	
<b>attrib &lt;id&gt;</b>	<i>optional</i>	<b>type</b> ID
<b>attrib &lt;name&gt;</b>	<i>required</i>	<b>type</b> Name
<b>attrib &lt;channel&gt;</b>	<i>optional</i>	<b>type</b> nonNegativeInteger

## 31 mixerDeviceType

**parent** deviceType (see p 27)

**subtype** PA5 (see p 31)

**subtype** soundcardmixer (see p 30)

**attrib** <id> *required* **type** ID

**attrib** <mode> *optional* **type** ref:deviceModesEnum

'Processing mode of this device. Impacts all associated filters.'

<gain> *required* **type** channelGainType (see p 30)

## 32 channelGainType

**parent** gainparam (see p 25)

**attrib** <id> *optional* **type** ID

**attrib** <channel> *optional* **type** nonNegativeInteger

'Used to specify a single channel to apply gain to, instead of applying it to all channels at once. For example, for an amplifier having two channels, these are set independently by using -3.00 -6.00 Channels are zero based, ie the first channel is 0, the second 1 and so on.'

## 33 soundcardmixer

**parent** mixerDeviceType (see p 29)

**attrib** <id> *required* **type** ID

**attrib** <mode> *optional* **type** ref:deviceModesEnum

'Processing mode of this device. Impacts all associated filters.'

<gain> *required* **type** channelGainType (see p 30)

<type> *required*

## 34 PA5

**parent** mixerDeviceType (see p 29)

**attrib** <id> *required* **type** ID

**attrib** <mode> *optional* **type** ref:deviceModesEnum

'Processing mode of this device. Impacts all associated filters.'

<gain> *required* **type** channelGainType (see p 30)

## 35 dummyDeviceType

**parent** deviceType (see p 27)

**attrib** <id> *required* **type** ID

**attrib** <mode> *optional* **type** ref:deviceModesEnum

'Processing mode of this device. Impacts all associated filters.'

## 36 wavDeviceType

**parent** deviceType (see p 27)

**attrib** <id> *required* **type** ID

**attrib** <mode> *optional* **type** ref:deviceModesEnum

'Processing mode of this device. Impacts all associated filters.'

<driver> *optional*

**doc** 'Driver architecture to be used for sound output'

<card> *optional* **type** string

**doc** 'Name of the soundcard to be used. Cards are defined in the main config file. Every soundcard in the system can be enumerated in the main configfile. Use the ID defined there. Otherwise the \"default\" card can be used.'

<**channels**>                    *required*            **type** positiveInteger

**doc** 'Number of output channels to be used. This is restricted by the selected driver, with a maximum of 2 for portaudio.'

<**gain**>                        *any*                    **type** channelGainType (see p 30)

**doc** 'Final gain of the device, implemented with a software mixer.'

<**samplerate**>                *required*

**doc** 'Sample rate of the device. Warning: not all sample rates are supported by all devices and some drivers automatically convert to other sample rates. Check your sound card documentation.'

<**buffersize**>                *optional*

**doc** 'Applies to the soundcard buffer size, not the internal apex buffer size. Larger sizes are more efficient, smaller sizes have smaller latencies. Some notes: for asio, latency is always ( 2 \* buffersize + overhead ) / samplerate. The overhead is very small, eg 16 samples for an Rme Multiface. Portaudio however always uses a number of internal buffers, mostly 4. Hence, actual latency is ( 2 \* 4 \* buffersize + overhead ) / samplerate. For asio/jack: must be set to the system buffer size.'

<**blocksize**>                *optional*

**doc** 'Applies to the block size that is used in the internal apex audio streams (for filters etc.). Larger sizes are more efficient, smaller sizes have smaller latencies.'

<**buffersize\_apex**>        *optional*

**doc** 'Size of internal apex sound buffer in seconds. This buffer ensures that no buffer underruns occur. The default value is 1s. If continuous filters are used, the system will need this amount of seconds before the next stimulus can be output. Note that the value in seconds is rounded down to the nearest multiple of 8192 samples (the buffersize used to fill the buffer): so using 1 second here, with



a samplerate of 44100, the actual amount of time will be 40960 samples / 44100 samples/sec = 0.9 seconds. If a buffersize smaller than 16384 samples is specified, a buffer of 16384 samples will be used.'

**<padzero>** *optional* **type** positiveInteger

**doc** 'Add the given number of empty (filled with zero\'s) buffers to the output on the end of a stream. This avoids dropping of the last N frames on some soundcards (notoriously LynxOne)'

**<setcardmixer>** *optional* **type** boolean

**doc** 'Set all output gains on the software mixer 0 dB to avoid quantization noise and set all input gains to -infinite dB to avoid picking up unwanted signals. The software mixer is the mixer that is normally controlled using the windows mixer or the /dev/mixer interface. For all implementations of our knowledge this is a software mixer. Warning: not all soundcards are supported. All soundcards that support the windows mixer and the RME mixer are supported.'

**<cisim>** *optional*

**doc** 'Parameters for automatic CI simulation'

**<number\_electrodes>***required* **type** positiveInteger

**<pulserate>** *required* **type** integer

**<noiseband>** *one or more*

**attrib** **<electrode>** *optional* **type** positiveInteger

## 37 datablockstype

**<uri\_prefix>** *optional*

**doc** 'The prefix for every filename used below. Only used if a filename is a relative path. This prefix is relative to the path of this experiment file.'

**parent** string (see p ??)

**attrib** <source> *optional*  
 <datablock> *any*

**attrib** <id> *required* **type** ID  
 <device> *required*  
     **doc** 'The device used to play the datablock.'  
 <description> *optional* **type** string  
     **doc** 'Text description, for your own reference'  
 <birth> *optional* **type** dateTime  
     **doc** 'Time stamp of the last modification of the data file. If specified, it will be checked and an error will be shown if it does not match.'  
 <checksum> *optional*  
     **doc** 'MD5 checksum of the datablock. If check==true, apex will check whether the checksum matches and issue a warning if it doesn\'t. Is useful to ensure data integrity.'  
     **attrib** <check> *optional* **type** boolean  
 <uri> *required* **type** anyURI  
     **doc** 'Filename of the corresponding datafile. If it is a relative path, it will be prefixed with the uri\_prefix defined above.'  
 <channels> *optional* **type** positiveInteger  
     **doc** 'Number of channels: defaults to the number of channels in a wav-file or to 1 in all other cases.'  
 <loop> *optional* **type** positiveInteger  
     **doc** 'Number of times the datablock should be looped'  
 <plugindatablocks> *any*

**parent** xmlGeneratingPluginType (see p 17)  
 <script> *optional*  
     **attrib** <source> *required*  
 <parameter> *any*  
     **attrib** <name> *required* **type** Name

## 38 screensType

**<uri\_prefix>**                    *optional*            **type** prefixType (see p 81)

**doc** 'Defines a prefix for the filenames of media files used in the screens below. The prefix is concatenated in the front of the filenames given below before trying to open any file. When specifying the file protocol, make sure to only use one / eg: file:/c:/tests/file.xml and NOT file://c:/tests/file.xml'

**<general>**                    *optional*

**doc** 'Some general properties of the entire Apex window are set in this section. They are applied for each particular screen defined below.'

**<stopbutton>**                    *optional*            **type** boolean

**doc** 'Show a red panic button that immediately stops all output when clicked.'

**<repeatbutton>**                    *optional*            **type** boolean

**doc** 'Show a repeat button that will repeat the last stimulus.'

**<showpanel>**                    *optional*            **type** boolean

**doc** 'Show the panel; in case of childmode: a movie if defined'

**<showmenu>**                    *optional*            **type** boolean

**doc** 'Determined whether the apex main menu (containing File, Calibration, etc.) is shown'

**<fullscreen>**                    *optional*            **type** boolean

**doc** 'If true, the main apex window will be shown full-screen, without window title or taskbar or whatever'

**<intertrialscreen>**                    *optional*

**doc** 'A screen to show in between trials (after feedback that is)'

**attrib** **<length>**                    *optional*            **type** positiveInteger  
'The period to show the screen'

**<reinforcement>**                    *optional*

**doc** 'Defines what kind of feedback about the procedure and correctness of answers is shown to the user. This is valid for the whole experiment.'

**<progressbar>**                      *required*                      **type** boolean

**doc** 'Show a progress bar in the right hand panel, indicating the experiment progress. Not functional for multiprocedure or trainingprocedure.'

**<feedback>**                      *required*

**doc** 'Show visual feedback according to the correctness of the last answer. Feedback is shown using an upward or downward pointing thumb in the right hand panel.'

**attrib**    **<length>**                      *optional*                      **type** nonNegativeInteger

                    'Length of the feedback in ms. If feedback is false but a length is present, the specified time will be the time between two trials.'

**<feedback\_on>**                      *optional*

**doc** 'If feedback is shown, it is shown as a picture in the panel, but a screen element can also be highlighted.'

**<feedback\_picture\_positive>**                      *optional*                      **type** string

**doc** 'Picture to be shown in the panel on positive feedback.'

**<feedback\_picture\_negative>**                      *optional*                      **type** string

**doc** 'Picture to be shown in the panel on negative feedback.'

**<showcurrent>**                      *optional*                      **type** boolean

**doc** 'Show a border around the screen element corresponding to the currently playing stimulus.'

**<style\_apex>**                      *optional*

**doc** 'Style that is to be applied to the whole of apex'

**<style>**                      *optional*                      **type** stylesheetType (see p 54)

**doc** 'Style that is to be applied to all screens'

**<childmode>**                      *optional*

**doc** 'Defines the elements used in child mode.'

**<intro>**                      *optional*

**doc** 'The screen to show as intro before the experiment starts'

**attrib**    **<length>**                      *optional*                      **type** nonNegativeInteger

'Length of the movie in ms, if not specified, the system will wait for the movie to end and then continue.'

**<outro>** *optional*

**doc** 'The screen to show as outro after the experiment has finished'

**attrib** **<length>** *optional* **type** nonNegativeInteger  
'Length of the movie in ms'

**<panel>** *optional* **type** anyURI

**doc** 'The panel reinforcement movie to use'

**<defaultFont>** *optional* **type** string

**doc** 'Name of the default font to be used for all elements of every screen. Possible names: any font found by QFontDialog'

**<defaultFontSize>** *optional* **type** positiveInteger

**doc** 'Size of the default font to be used for all elements of every screen. Unit: points as defined by the system'

**<screen>** *any* **type** screenType (see p 37)

**doc** 'Every single screen defines a screen with a certain ID to be used elsewhere in the experiment file.'

**<pluginscreens>** *any*

**parent** xmlGeneratingPluginType (see p 17)

**<script>** *optional*

**attrib** **<source>** *required*

**<parameter>** *any*

**attrib** **<name>** *required* **type** Name

## 39 screenType

*required*

**attrib** **<id>** *required* **type** ID

**<hLayout>** *optional* **type** hScreenLayoutType (see p 78)

**doc** 'Horizontal layout: places elements next to each other'

**<vLayout>**                      *optional*              **type** vScreenLayoutType (see p 76)

**doc** 'Vertical layout: places elements above each other'

**<gridLayout>**                      *optional*              **type** gridScreenLayoutType (see p 75)

**doc** 'Gridlayout: places elements in an (irregular) grid.'

**<twoPartLayout>**              *optional*              **type** twoPartLayoutType (see p 80)

**doc** 'Layout with a small upper part and larger lower part'

**<arcLayout>**                      *optional*              **type** arcScreenLayoutType (see p 38)

**doc** 'Arc layout: places elements in a semi-circle. Useful for localization experiments.'

**<buttongroup>**                      *optional*

**attrib** **<id>**    *required*              **type** Name

**<button>**    *one              or*  
*more*

**attrib** **<id>**    *required*              **type** Name

**<default\_answer\_element>**                      *optional*              **type** Name

**doc** 'Default element for getting the user input to send to the corrector.'

## 40 arcScreenLayoutType

*required*

**parent** screenLayoutType (see p 79)

**attrib** **<id>**    *optional*              **type** Name

**attrib** **<width>**    *required*              **type** int

**attrib** **<x>**    *optional*              **type** int

**attrib** **<y>**    *optional*              **type** positiveInteger

|                           |  |   |                                       |
|---------------------------|--|---|---------------------------------------|
| <b>attrib</b>             | <b>&lt;row&gt;</b>   | <i>optional</i>                             | <b>type</b> int                       |
|                           | 'Row in the grid. Is the same as y, but should not be used together with y'    |   |                                       |
| <b>attrib</b>             | <b>&lt;col&gt;</b>   | <i>optional</i>                             | <b>type</b> positiveInteger           |
|                           | 'Column in the grid. Is the same as x, but should not be used together with x' |   |                                       |
| <b>attrib</b>             | <b>&lt;type&gt;</b>  | <i>required</i>                             |                                       |
|                           | 'TODO'   |   |                                       |
| <b>&lt;hLayout&gt;</b>    | <i>optional</i>  | <b>type</b> hScreenLayoutType (see p 78)    |                                       |
| <b>&lt;vLayout&gt;</b>    | <i>optional</i>  | <b>type</b> vScreenLayoutType (see p 76)    |                                       |
| <b>&lt;gridLayout&gt;</b> | <i>optional</i>  | <b>type</b> gridScreenLayoutType (see p 75) |                                       |
| <b>&lt;arcLayout&gt;</b>  | <i>optional</i>  | <b>type</b> arcScreenLayoutType (see p 38)  |                                       |
| <b>&lt;button&gt;</b>     | <i>optional</i>  |   |                                       |
| <b>parent</b>             | screenElementType (see p 54)   |   |                                       |
| <b>attrib</b>             | <b>&lt;x&gt;</b>   | <i>optional</i>                             | <b>type</b> int                       |
| <b>attrib</b>             | <b>&lt;y&gt;</b>   | <i>optional</i>                             | <b>type</b> positiveInteger           |
| <b>attrib</b>             | <b>&lt;row&gt;</b>   | <i>optional</i>                             | <b>type</b> int                       |
|                           | 'Row in the grid. Is the same as y, but should not be used together with y'    |   |                                       |
| <b>attrib</b>             | <b>&lt;col&gt;</b>   | <i>optional</i>                             | <b>type</b> positiveInteger           |
|                           | 'Column in the grid. Is the same as x, but should not be used together with x' |   |                                       |
| <b>attrib</b>             | <b>&lt;id&gt;</b>  | <i>required</i>                             | <b>type</b> Name                      |
|                           | <b>&lt;style&gt;</b>   | <i>optional</i>                             | <b>type</b> stylesheetType (see p 54) |
|                           | <b>&lt;width&gt;</b>   | <i>optional</i>                             | <b>type</b> nonNegativeInteger        |
|                           | <b>doc</b>   | 'TODO: units?'                              |                                       |
|                           | <b>&lt;height&gt;</b>  | <i>optional</i>                             | <b>type</b> nonNegativeInteger        |

**<shortcut>** *optional*

**parent** shortcutBaseType (see p 54)

**attrib** **<modifier>** *optional*  
'Dead key to be used together with the shortcut'

**attrib** **<hex>** *optional* **type** boolean  
'If true, parses the shortcut as a hexadecimal number. See the Key enum in qtnamespace.h for known values'

**<font>** *optional* **type** string  
**doc** 'TODO: how is the font specified?'

**<fontsize>** *optional* **type** positiveInteger  
**doc** 'Text font size, in points as defined by the system'

**<bgcolor>** *optional*

**<fgcolor>** *optional* **type** colorType (see p 54)

**<floating>** *optional* **type** boolean  
**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

**<disabled>** *optional* **type** boolean  
**doc** 'If set to true, the element will always be disabled (can be used to \'guide the eye\')'

**<text>** *required* **type** string  
**doc** 'Text to be printed on the button'

**<label>** *optional*

**parent** screenElementType (see p 54)

**attrib** **<x>** *optional* **type** int

**attrib** **<y>** *optional* **type** positiveInteger

**attrib** **<row>** *optional* **type** int  
'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** **<col>** *optional* **type** positiveInteger  
'Column in the grid. Is the same as x, but should not be used together with x'



|                            |   |                 |                                       |
|----------------------------|---|-----------------|---------------------------------------|
| <b>attrib</b>              | <b>&lt;id&gt;</b>   | <i>required</i> | <b>type</b> Name                      |
|                            | <b>&lt;style&gt;</b>  | <i>optional</i> | <b>type</b> stylesheetType (see p 54) |
|                            | <b>&lt;width&gt;</b>  | <i>optional</i> | <b>type</b> nonNegativeInteger        |
|                            | <b>doc</b> 'TODO: units?'   |                 |                                       |
|                            | <b>&lt;height&gt;</b>   | <i>optional</i> | <b>type</b> nonNegativeInteger        |
|                            | <b>&lt;shortcut&gt;</b>   | <i>optional</i> | <b>type</b> shortcutType (see p 54)   |
|                            | <b>&lt;font&gt;</b>   | <i>optional</i> | <b>type</b> string                    |
|                            | <b>doc</b> 'TODO: how is the font specified?'   |                 |                                       |
|                            | <b>&lt;fontsize&gt;</b>   | <i>optional</i> | <b>type</b> positiveInteger           |
|                            | <b>doc</b> 'Text font size, in points as defined by the system'                                     |                 |                                       |
|                            | <b>&lt;bgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)      |
|                            | <b>&lt;fgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)      |
|                            | <b>&lt;floating&gt;</b>   | <i>optional</i> | <b>type</b> boolean                   |
|                            | <b>doc</b> 'Put the element in it\'s own window instead of embedding it in the current layout'      |                 |                                       |
|                            | <b>&lt;disabled&gt;</b>   | <i>optional</i> | <b>type</b> boolean                   |
|                            | <b>doc</b> 'If set to true, the element will always be disabled (can be used to \'guide the eye\')' |                 |                                       |
|                            | <b>&lt;text&gt;</b>   | <i>required</i> | <b>type</b> string                    |
| <b>&lt;answerlabel&gt;</b> | <i>optional</i>   |                 |                                       |
| <b>parent</b>              | screenElementType (see p 54)  |                 |                                       |
| <b>attrib</b>              | <b>&lt;x&gt;</b>  | <i>optional</i> | <b>type</b> int                       |
| <b>attrib</b>              | <b>&lt;y&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger           |
| <b>attrib</b>              | <b>&lt;row&gt;</b>  | <i>optional</i> | <b>type</b> int                       |
|                            | 'Row in the grid. Is the same as y, but should not be used together with y'                         |                 |                                       |
| <b>attrib</b>              | <b>&lt;col&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger           |
|                            | 'Column in the grid. Is the same as x, but should not be used together with x'                      |                 |                                       |
| <b>attrib</b>              | <b>&lt;id&gt;</b>   | <i>required</i> | <b>type</b> Name                      |

|   |                 |                                       |
|---|-----------------|---------------------------------------|
| <b>&lt;style&gt;</b>  | <i>optional</i> | <b>type</b> stylesheetType (see p 54) |
| <b>&lt;width&gt;</b>  | <i>optional</i> | <b>type</b> nonNegativeInteger        |
| <b>doc</b> 'TODO: units?'   |                 |                                       |
| <b>&lt;height&gt;</b>   | <i>optional</i> | <b>type</b> nonNegativeInteger        |
| <b>&lt;shortcut&gt;</b>   | <i>optional</i> | <b>type</b> shortcutType (see p 54)   |
| <b>&lt;font&gt;</b>   | <i>optional</i> | <b>type</b> string                    |
| <b>doc</b> 'TODO: how is the font specified?'   |                 |                                       |
| <b>&lt;fontsize&gt;</b>   | <i>optional</i> | <b>type</b> positiveInteger           |
| <b>doc</b> 'Text font size, in points as defined by the system'                                     |                 |                                       |
| <b>&lt;bgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)      |
| <b>&lt;fgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)      |
| <b>&lt;floating&gt;</b>   | <i>optional</i> | <b>type</b> boolean                   |
| <b>doc</b> 'Put the element in it\'s own window instead of embedding it in the current layout'      |                 |                                       |
| <b>&lt;disabled&gt;</b>   | <i>optional</i> | <b>type</b> boolean                   |
| <b>doc</b> 'If set to true, the element will always be disabled (can be used to \'guide the eye\')' |                 |                                       |
| <b>&lt;parameterlabel&gt;</b>   | <i>optional</i> |                                       |

**parent** screenElementType (see p 54)

|  |                      |                 |                                       |
|--|----------------------|-----------------|---------------------------------------|
| <b>attrib</b>  | <b>&lt;x&gt;</b>     | <i>optional</i> | <b>type</b> int                       |
| <b>attrib</b>  | <b>&lt;y&gt;</b>     | <i>optional</i> | <b>type</b> positiveInteger           |
| <b>attrib</b>  | <b>&lt;row&gt;</b>   | <i>optional</i> | <b>type</b> int                       |
| 'Row in the grid. Is the same as y, but should not be used together with y'    |                      |                 |                                       |
| <b>attrib</b>  | <b>&lt;col&gt;</b>   | <i>optional</i> | <b>type</b> positiveInteger           |
| 'Column in the grid. Is the same as x, but should not be used together with x' |                      |                 |                                       |
| <b>attrib</b>  | <b>&lt;id&gt;</b>    | <i>required</i> | <b>type</b> Name                      |
|  | <b>&lt;style&gt;</b> | <i>optional</i> | <b>type</b> stylesheetType (see p 54) |
|  | <b>&lt;width&gt;</b> | <i>optional</i> | <b>type</b> nonNegativeInteger        |

**doc** 'TODO: units?'

**<height>** *optional* **type** nonNegativeInteger

**<shortcut>** *optional* **type** shortcutType (see p 54)

**<font>** *optional* **type** string

**doc** 'TODO: how is the font specified?'

**<fontsize>** *optional* **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

**<bgcolor>** *optional* **type** colorType (see p 54)

**<fgcolor>** *optional* **type** colorType (see p 54)

**<floating>** *optional* **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

**<disabled>** *optional* **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'guide the eye\')'

**<parameter>** *required*

**parent** IDREF (see p ??)

**attrib** **<name>** *optional* **type** string  
 'Parameter name to show in the list'

**attrib** **<expression>** *optional* **type** ref:mathexpression  
 'Expression to be evaluated. Expressions must be in the format  $a*x+b$ , where x is the parameter value and a and b are floats'

**<textEdit>** *optional*

**parent** screenElementType (see p 54)

**attrib** **<x>** *optional* **type** int

**attrib** **<y>** *optional* **type** positiveInteger

**attrib** **<row>** *optional* **type** int  
 'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** **<col>** *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

| <b>attrib</b>          | <b>&lt;id&gt;</b>  | <i>required</i> | <b>type</b> Name                      |
|------------------------|--|-----------------|---------------------------------------|
|                        | <b>&lt;style&gt;</b>   | <i>optional</i> | <b>type</b> stylesheetType (see p 54) |
|                        | <b>&lt;width&gt;</b>   | <i>optional</i> | <b>type</b> nonNegativeInteger        |
|                        | <b>doc</b> 'TODO: units?'  |                 |                                       |
|                        | <b>&lt;height&gt;</b>  | <i>optional</i> | <b>type</b> nonNegativeInteger        |
|                        | <b>&lt;shortcut&gt;</b>  | <i>optional</i> | <b>type</b> shortcutType (see p 54)   |
|                        | <b>&lt;font&gt;</b>  | <i>optional</i> | <b>type</b> string                    |
|                        | <b>doc</b> 'TODO: how is the font specified?'  |                 |                                       |
|                        | <b>&lt;fontsize&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger           |
|                        | <b>doc</b> 'Text font size, in points as defined by the system'  |                 |                                       |
|                        | <b>&lt;bgcolor&gt;</b>   | <i>optional</i> | <b>type</b> colorType (see p 54)      |
|                        | <b>&lt;fgcolor&gt;</b>   | <i>optional</i> | <b>type</b> colorType (see p 54)      |
|                        | <b>&lt;floating&gt;</b>  | <i>optional</i> | <b>type</b> boolean                   |
|                        | <b>doc</b> 'Put the element in it\'s own window instead of embedding it in the current layout'   |                 |                                       |
|                        | <b>&lt;disabled&gt;</b>  | <i>optional</i> | <b>type</b> boolean                   |
|                        | <b>doc</b> 'If set to true, the element will always be disabled (can be used to \'guide the eye\')'  |                 |                                       |
|                        | <b>&lt;text&gt;</b>  | <i>optional</i> | <b>type</b> string                    |
|                        | <b>&lt;inputmask&gt;</b>   | <i>optional</i> | <b>type</b> string                    |
|                        | <b>doc</b> 'Input mask to restrict what can be typed in the textbox. Defined in the Qt documentation. If inputmask=\'numbers\', only numeric input will be allowed.' |                 |                                       |
| <b>&lt;picture&gt;</b> | <i>optional</i>  |                 |                                       |
| <b>parent</b>          | screenElementType (see p 54)   |                 |                                       |
| <b>attrib</b>          | <b>&lt;x&gt;</b>   | <i>optional</i> | <b>type</b> int                       |
| <b>attrib</b>          | <b>&lt;y&gt;</b>   | <i>optional</i> | <b>type</b> positiveInteger           |
| <b>attrib</b>          | <b>&lt;row&gt;</b>   | <i>optional</i> | <b>type</b> int                       |

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** <col> *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** <id> *required* **type** Name

<style> *optional* **type** stylesheetType (see p 54)

<width> *optional* **type** nonNegativeInteger

**doc** 'TODO: units?'

<height> *optional* **type** nonNegativeInteger

<shortcut> *optional* **type** shortcutType (see p 54)

<font> *optional* **type** string

**doc** 'TODO: how is the font specified?'

<fontsize> *optional* **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

<bgcolor> *optional* **type** colorType (see p 54)

<fgcolor> *optional* **type** colorType (see p 54)

<floating> *optional* **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

<disabled> *optional* **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'\'guide the eye\'')'

<path> *required* **type** anyURI

**doc** 'Filename of the picture. The format can be any of: PNG, BMP, XBM, XPM, JPEG, MNG, GIF, PBM (P1 or P4), PGM (P2 or P5), and PPM (P3 or P6). If path is relative, it will be prefixed with the prefix given above.'

<feedback> *optional*

**doc** 'If used, overrides the normal feedback (using coloured borders) by drawing a different picture on screen.'

<highlight> *required* **type** anyURI

<positive> *required* **type** anyURI

|                      |   |                 |                                       |
|----------------------|---|-----------------|---------------------------------------|
|                      | <b>&lt;negative&gt;</b>   | <i>required</i> | <b>type</b> anyURI                    |
| <b>&lt;flash&gt;</b> |   | <i>optional</i> |                                       |
| <b>parent</b>        | screenElementType (see p 54)  |                 |                                       |
| <b>attrib</b>        | <b>&lt;x&gt;</b>  | <i>optional</i> | <b>type</b> int                       |
| <b>attrib</b>        | <b>&lt;y&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger           |
| <b>attrib</b>        | <b>&lt;row&gt;</b>  | <i>optional</i> | <b>type</b> int                       |
|                      | 'Row in the grid. Is the same as y, but should not be used together with y'                         |                 |                                       |
| <b>attrib</b>        | <b>&lt;col&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger           |
|                      | 'Column in the grid. Is the same as x, but should not be used together with x'                      |                 |                                       |
| <b>attrib</b>        | <b>&lt;id&gt;</b>   | <i>required</i> | <b>type</b> Name                      |
|                      | <b>&lt;style&gt;</b>  | <i>optional</i> | <b>type</b> stylesheetType (see p 54) |
|                      | <b>&lt;width&gt;</b>  | <i>optional</i> | <b>type</b> nonNegativeInteger        |
|                      | <b>doc</b> 'TODO: units?'   |                 |                                       |
|                      | <b>&lt;height&gt;</b>   | <i>optional</i> | <b>type</b> nonNegativeInteger        |
|                      | <b>&lt;shortcut&gt;</b>   | <i>optional</i> | <b>type</b> shortcutType (see p 54)   |
|                      | <b>&lt;font&gt;</b>   | <i>optional</i> | <b>type</b> string                    |
|                      | <b>doc</b> 'TODO: how is the font specified?'   |                 |                                       |
|                      | <b>&lt;fontsize&gt;</b>   | <i>optional</i> | <b>type</b> positiveInteger           |
|                      | <b>doc</b> 'Text font size, in points as defined by the system'                                     |                 |                                       |
|                      | <b>&lt;bgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)      |
|                      | <b>&lt;fgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)      |
|                      | <b>&lt;floating&gt;</b>   | <i>optional</i> | <b>type</b> boolean                   |
|                      | <b>doc</b> 'Put the element in it\'s own window instead of embedding it in the current layout'      |                 |                                       |
|                      | <b>&lt;disabled&gt;</b>   | <i>optional</i> | <b>type</b> boolean                   |
|                      | <b>doc</b> 'If set to true, the element will always be disabled (can be used to \'guide the eye\')' |                 |                                       |
|                      | <b>&lt;path&gt;</b>   | <i>required</i> | <b>type</b> anyURI                    |







**doc** 'If set to true, the element will always be disabled (can be used to \"guide the eye\")'

**<path>** *required* **type** anyURI

**doc** 'Filename of the picture. The format can be any of: PNG, BMP, XBM, XPM, JPEG, MNG, GIF, PBM (P1 or P4), PGM (P2 or P5), and PPM (P3 or P6). If path is relative, it will be prefixed with the prefix given above.'

**<spinBox>** *optional*

**parent** screenElementType (see p 54)

**attrib** **<x>** *optional* **type** int

**attrib** **<y>** *optional* **type** positiveInteger

**attrib** **<row>** *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** **<col>** *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** **<id>** *required* **type** Name

**<style>** *optional* **type** stylesheetType (see p 54)

**<width>** *optional* **type** nonNegativeInteger

**doc** 'TODO: units?'

**<height>** *optional* **type** nonNegativeInteger

**<shortcut>** *optional* **type** shortcutType (see p 54)

**<font>** *optional* **type** string

**doc** 'TODO: how is the font specified?'

**<fontsize>** *optional* **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

**<bgcolor>** *optional* **type** colorType (see p 54)

**<fgcolor>** *optional* **type** colorType (see p 54)

**<floating>** *optional* **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

|                          |   |                     |
|--------------------------|---|---------------------|
| <b>&lt;disabled&gt;</b>  | <i>optional</i>   | <b>type</b> boolean |
| <b>doc</b>               | 'If set to true, the element will always be disabled (can be used to \"guide the eye\")'      |                     |
| <b>&lt;value&gt;</b>     | <i>optional</i>   | <b>type</b> integer |
| <b>doc</b>               | 'Default value'   |                     |
| <b>&lt;min&gt;</b>       | <i>optional</i>   | <b>type</b> integer |
| <b>doc</b>               | 'Minimum value'   |                     |
| <b>&lt;max&gt;</b>       | <i>optional</i>   | <b>type</b> integer |
| <b>doc</b>               | 'Maximum value'   |                     |
| <b>&lt;step&gt;</b>      | <i>optional</i>   | <b>type</b> integer |
| <b>doc</b>               | 'Stepsize'  |                     |
| <b>&lt;parameter&gt;</b> | <i>optional</i>   | <b>type</b> IDREF   |
| <b>doc</b>               | 'Parameter to be set to the value of the spinbox. This parameter will be set the NEXT trial.' |                     |
| <b>&lt;reset&gt;</b>     | <i>optional</i>   | <b>type</b> boolean |
| <b>doc</b>               | 'Reset the value for every new trial'   |                     |
| <b>&lt;checkBox&gt;</b>  | <i>optional</i>   |                     |

**parent** screenElementType (see p 54)

|               |                      |                 |  |
|---------------|----------------------|-----------------|--|
| <b>attrib</b> | <b>&lt;x&gt;</b>     | <i>optional</i> | <b>type</b> int  |
| <b>attrib</b> | <b>&lt;y&gt;</b>     | <i>optional</i> | <b>type</b> positiveInteger  |
| <b>attrib</b> | <b>&lt;row&gt;</b>   | <i>optional</i> | <b>type</b> int  |
|               |                      |                 | 'Row in the grid. Is the same as y, but should not be used together with y'    |
| <b>attrib</b> | <b>&lt;col&gt;</b>   | <i>optional</i> | <b>type</b> positiveInteger  |
|               |                      |                 | 'Column in the grid. Is the same as x, but should not be used together with x' |
| <b>attrib</b> | <b>&lt;id&gt;</b>    | <i>required</i> | <b>type</b> Name   |
|               | <b>&lt;style&gt;</b> | <i>optional</i> | <b>type</b> stylesheetType (see p 54)  |
|               | <b>&lt;width&gt;</b> | <i>optional</i> | <b>type</b> nonNegativeInteger   |
| <b>doc</b>    | 'TODO: units?'       |                 |  |

|  |                 |                                       |
|--|-----------------|---------------------------------------|
| <b>&lt;height&gt;</b>  | <i>optional</i> | <b>type</b> nonNegativeInteger        |
| <b>&lt;shortcut&gt;</b>  | <i>optional</i> | <b>type</b> shortcutType (see p 54)   |
| <b>&lt;font&gt;</b>  | <i>optional</i> | <b>type</b> string                    |
| <b>doc</b> 'TODO: how is the font specified?'  |                 |                                       |
| <b>&lt;fontsize&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger           |
| <b>doc</b> 'Text font size, in points as defined by the system'  |                 |                                       |
| <b>&lt;bgcolor&gt;</b>   | <i>optional</i> | <b>type</b> colorType (see p 54)      |
| <b>&lt;fgcolor&gt;</b>   | <i>optional</i> | <b>type</b> colorType (see p 54)      |
| <b>&lt;floating&gt;</b>  | <i>optional</i> | <b>type</b> boolean                   |
| <b>doc</b> 'Put the element in it\'s own window instead of embedding it in the current layout'         |                 |                                       |
| <b>&lt;disabled&gt;</b>  | <i>optional</i> | <b>type</b> boolean                   |
| <b>doc</b> 'If set to true, the element will always be disabled (can be used to \'\'guide the eye\'')' |                 |                                       |
| <b>&lt;text&gt;</b>  | <i>required</i> | <b>type</b> string                    |
| <b>doc</b> 'Text to be printed right to the checkbox'  |                 |                                       |
| <b>&lt;isChecked&gt;</b>   | <i>optional</i> | <b>type</b> integer                   |
| <b>doc</b> 'Determines whether checkbox is checked by default'   |                 |                                       |
| <b>&lt;slider&gt;</b>  | <i>optional</i> |                                       |
| <b>parent</b> screenElementType (see p 54)   |                 |                                       |
| <b>attrib &lt;x&gt;</b>  | <i>optional</i> | <b>type</b> int                       |
| <b>attrib &lt;y&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger           |
| <b>attrib &lt;row&gt;</b>  | <i>optional</i> | <b>type</b> int                       |
| 'Row in the grid. Is the same as y, but should not be used together with y'                            |                 |                                       |
| <b>attrib &lt;col&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger           |
| 'Column in the grid. Is the same as x, but should not be used together with x'                         |                 |                                       |
| <b>attrib &lt;id&gt;</b>   | <i>required</i> | <b>type</b> Name                      |
| <b>&lt;style&gt;</b>   | <i>optional</i> | <b>type</b> stylesheetType (see p 54) |

|                |  |                                     |
|----------------|--|-------------------------------------|
| <width>        | <i>optional</i>  | <b>type</b> nonNegativeInteger      |
| doc            | 'TODO: units?'   |                                     |
| <height>       | <i>optional</i>  | <b>type</b> nonNegativeInteger      |
| <shortcut>     | <i>optional</i>  | <b>type</b> shortcutType (see p 54) |
| <font>         | <i>optional</i>  | <b>type</b> string                  |
| doc            | 'TODO: how is the font specified?'   |                                     |
| <fontsize>     | <i>optional</i>  | <b>type</b> positiveInteger         |
| doc            | 'Text font size, in points as defined by the system'                                     |                                     |
| <bgcolor>      | <i>optional</i>  | <b>type</b> colorType (see p 54)    |
| <fgcolor>      | <i>optional</i>  | <b>type</b> colorType (see p 54)    |
| <floating>     | <i>optional</i>  | <b>type</b> boolean                 |
| doc            | 'Put the element in it\'s own window instead of embedding it in the current layout'      |                                     |
| <disabled>     | <i>optional</i>  | <b>type</b> boolean                 |
| doc            | 'If set to true, the element will always be disabled (can be used to \'guide the eye\')' |                                     |
| <orientation>  | <i>optional</i>  |                                     |
| doc            | 'Orientation of slider'  |                                     |
| <min>          | <i>optional</i>  | <b>type</b> integer                 |
| doc            | 'Minimum value of slider'  |                                     |
| <max>          | <i>optional</i>  | <b>type</b> integer                 |
| doc            | 'Maximum value of slider'  |                                     |
| <value>        | <i>optional</i>  | <b>type</b> integer                 |
| doc            | 'Default value of slider'  |                                     |
| <tickinterval> | <i>optional</i>  | <b>type</b> integer                 |
| doc            | 'Interval between slider ticks'  |                                     |
| <stepsize>     | <i>optional</i>  | <b>type</b> integer                 |
| doc            | 'Step size on single arrow key press'  |                                     |
| <pagesize>     | <i>optional</i>  | <b>type</b> integer                 |
| doc            | 'Step size of pageUp pageDown key press'   |                                     |
| <matrix>       | <i>optional</i>  |                                     |

**parent** screenElementType (see p 54)

**attrib** <x> *optional* **type** int

**attrib** <y> *optional* **type** positiveInteger

**attrib** <row> *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** <col> *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** <id> *required* **type** Name

<style> *optional* **type** stylesheetType (see p 54)

<width> *optional* **type** nonNegativeInteger

**doc** 'TODO: units?'

<height> *optional* **type** nonNegativeInteger

<shortcut> *optional* **type** shortcutType (see p 54)

<font> *optional* **type** string

**doc** 'TODO: how is the font specified?'

<fontsize> *optional* **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

<bgcolor> *optional* **type** colorType (see p 54)

<fgcolor> *optional* **type** colorType (see p 54)

<floating> *optional* **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

<disabled> *optional* **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'guide the eye\')'

<autocontinue> *optional* **type** boolean

**doc** 'Automatically end the trial when all columns are completed'

<element> *one or more*

**attrib** <row> *required* **type** positiveInteger

'Row in the matrix'  
**attrib** <col> *required* **type** positiveInteger  
 'Column in the matrix'  
 <name> *required* **type** string  
**doc** 'Name of the element. Will be reported in the results.  
 Will also be used as text if no text is given.'  
 <text> *optional* **type** string  
**doc** 'Text to be shown on the button'

## 41 colorType

## 42 shortcutType

**parent** shortcutBaseType (see p 54)

**attrib** <modifier> *optional*

'Dead key to be used together with the shortcut'

**attrib** <hex> *optional* **type** boolean

'If true, parses the shortcut as a hexadecimal number. See the  
 Key enum in qtnamespace.h for known values'

## 43 shortcutBaseType

## 44 stylesheetType

## 45 screenElementType

**subtype** screenSpinBoxType (see p 73)

**subtype** screenButtonType (see p 72)

**subtype** screenCheckBoxType (see p 70)

**subtype** screenSliderType (see p 69)

**subtype** screenParameterlistType (see p 67)

**subtype** screenLabelType (see p 66)

**subtype** screenMatrixType (see p 64)

**subtype** screenPictureLabelType (see p 63)

**subtype** screenAnswerLabelType (see p 62)

**subtype** screenParameterLabelType (see p 60)

**subtype** screenTextEditType (see p 59)

**subtype** screenPictureType (see p 58)

**subtype** screenFlashType (see p 56)

**attrib** <x> *optional* **type** int

**attrib** <y> *optional* **type** positiveInteger

**attrib** <row> *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** <col> *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** <id> *required* **type** Name

<style> *optional* **type** stylesheetType (see p 54)

<width> *optional* **type** nonNegativeInteger

**doc** 'TODO: units?'

<height> *optional* **type** nonNegativeInteger

<shortcut> *optional* **type** shortcutType (see p 54)

<font> *optional* **type** string

**doc** 'TODO: how is the font specified?'

**<fontsize>**                      *optional*            **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

**<bgcolor>**                      *optional*            **type** colorType (see p 54)

**<fgcolor>**                      *optional*            **type** colorType (see p 54)

**<floating>**                      *optional*            **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

**<disabled>**                      *optional*            **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'guide the eye\')'

## 46 screenFlashType

**parent** screenElementType (see p 54)

**attrib** **<x>**                                      *optional*            **type** int

**attrib** **<y>**                                      *optional*            **type** positiveInteger

**attrib** **<row>**                                    *optional*            **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** **<col>**                                    *optional*            **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** **<id>**                                      *required*            **type** Name

**<style>**    *optional*            **type** stylesheetType (see p 54)

**<width>**    *optional*            **type** nonNegativeInteger



**doc** 'TODO: units?'

**<height>**                      *optional*            **type** nonNegativeInteger

**<shortcut>**                      *optional*            **type** shortcutType (see p 54)

**<font>**                              *optional*            **type** string

**doc** 'TODO: how is the font specified?'

**<fontsize>**                      *optional*            **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

**<bgcolor>**                      *optional*            **type** colorType (see p 54)

**<fgcolor>**                      *optional*            **type** colorType (see p 54)

**<floating>**                      *optional*            **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

**<disabled>**                      *optional*            **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'guide the eye\')'

**<path>**                              *required*            **type** anyURI

**doc** 'Flash movie to be put on the screen.'

**<feedback>**                      *optional*            **type** feedbackPathsType (see p 57)

**doc** 'If used, overrides the normal feedback (using coloured borders) by putting a different movie on screen.'

## 47 feedbackPathsType

**<highlight>**                      *required*            **type** anyURI

**<positive>**                      *required*            **type** anyURI

**<negative>**                      *required*            **type** anyURI

## 48 screenPictureType

**parent** screenElementType (see p 54)

**attrib** <x> *optional* **type** int

**attrib** <y> *optional* **type** positiveInteger

**attrib** <row> *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** <col> *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** <id> *required* **type** Name

<style> *optional* **type** stylesheetType (see p 54)

<width> *optional* **type** nonNegativeInteger

**doc** 'TODO: units?'

<height> *optional* **type** nonNegativeInteger

<shortcut> *optional* **type** shortcutType (see p 54)

<font> *optional* **type** string

**doc** 'TODO: how is the font specified?'

<fontsize> *optional* **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

<bgcolor> *optional* **type** colorType (see p 54)

<fgcolor> *optional* **type** colorType (see p 54)

<floating> *optional* **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

**<disabled>** *optional* **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'\'guide the eye\'')'

**<path>** *required* **type** anyURI

**doc** 'Filename of the picture. The format can be any of: PNG, BMP, XBM, XPM, JPEG, MNG, GIF, PBM (P1 or P4), PGM (P2 or P5), and PPM (P3 or P6). If path is relative, it will be prefixed with the prefix given above.'

**<feedback>** *optional* **type** feedbackPathsType (see p 57)

**doc** 'If used, overrides the normal feedback (using coloured borders) by drawing a different picture on screen.'

## 49 screenTextEditType

**parent** screenElementType (see p 54)

**attrib** **<x>** *optional* **type** int

**attrib** **<y>** *optional* **type** positiveInteger

**attrib** **<row>** *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** **<col>** *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** **<id>** *required* **type** Name

**<style>** *optional* **type** stylesheetType (see p 54)

**<width>** *optional* **type** nonNegativeInteger

**doc** 'TODO: units?'

**<height>**                      *optional*              **type** nonNegativeInteger

**<shortcut>**                      *optional*              **type** shortcutType (see p 54)

**<font>**                              *optional*              **type** string

**doc** 'TODO: how is the font specified?'

**<fontsize>**                      *optional*              **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

**<bgcolor>**                      *optional*              **type** colorType (see p 54)

**<fgcolor>**                      *optional*              **type** colorType (see p 54)

**<floating>**                      *optional*              **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

**<disabled>**                      *optional*              **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'guide the eye\')'

**<text>**                              *optional*              **type** string

**<inputmask>**                      *optional*              **type** string

**doc** 'Input mask to restrict what can be typed in the textbox. Defined in the Qt documentation. If inputmask==\'numbers\', only numeric input will be allowed.'

## 50 screenParameterLabelType

**parent** screenElementType (see p 54)

**attrib** **<x>**                              *optional*              **type** int

**attrib** **<y>**                              *optional*              **type** positiveInteger

|               |   |                 |  |
|---------------|---|-----------------|--|
| <b>attrib</b> | <b>&lt;row&gt;</b>  | <i>optional</i> | <b>type</b> int                          |
|               | 'Row in the grid. Is the same as y, but should not be used together with y'                         |                 |  |
| <b>attrib</b> | <b>&lt;col&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger              |
|               | 'Column in the grid. Is the same as x, but should not be used together with x'                      |                 |  |
| <b>attrib</b> | <b>&lt;id&gt;</b>   | <i>required</i> | <b>type</b> Name                         |
|               | <b>&lt;style&gt;</b>  | <i>optional</i> | <b>type</b> stylesheetType (see p 54)    |
|               | <b>&lt;width&gt;</b>  | <i>optional</i> | <b>type</b> nonNegativeInteger           |
|               | <b>doc</b> 'TODO: units?'   |                 |  |
|               | <b>&lt;height&gt;</b>   | <i>optional</i> | <b>type</b> nonNegativeInteger           |
|               | <b>&lt;shortcut&gt;</b>   | <i>optional</i> | <b>type</b> shortcutType (see p 54)      |
|               | <b>&lt;font&gt;</b>   | <i>optional</i> | <b>type</b> string                       |
|               | <b>doc</b> 'TODO: how is the font specified?'   |                 |  |
|               | <b>&lt;fontsize&gt;</b>   | <i>optional</i> | <b>type</b> positiveInteger              |
|               | <b>doc</b> 'Text font size, in points as defined by the system'                                     |                 |  |
|               | <b>&lt;bgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)         |
|               | <b>&lt;fgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)         |
|               | <b>&lt;floating&gt;</b>   | <i>optional</i> | <b>type</b> boolean                      |
|               | <b>doc</b> 'Put the element in it\'s own window instead of embedding it in the current layout'      |                 |  |
|               | <b>&lt;disabled&gt;</b>   | <i>optional</i> | <b>type</b> boolean                      |
|               | <b>doc</b> 'If set to true, the element will always be disabled (can be used to \'guide the eye\')' |                 |  |
|               | <b>&lt;parameter&gt;</b>  | <i>required</i> | <b>type</b> showparameterType (see p 62) |

## 51 showparameterType

**parent** IDREF (see p ??)

**attrib** <name> *optional* **type** string

'Parameter name to show in the list'

**attrib** <expression> *optional* **type** ref:mathexpression

'Expression to be evaluated. Expressions must be in the format  $a*x+b$ , where x is the parameter value and a and b are floats'

## 52 screenAnswerLabelType

**parent** screenElementType (see p 54)

**attrib** <x> *optional* **type** int

**attrib** <y> *optional* **type** positiveInteger

**attrib** <row> *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** <col> *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** <id> *required* **type** Name

<style> *optional* **type** stylesheetType (see p 54)

<width> *optional* **type** nonNegativeInteger

**doc** 'TODO: units?'

<height> *optional* **type** nonNegativeInteger

|  |                 |                                     |
|--|-----------------|-------------------------------------|
| <b>&lt;shortcut&gt;</b>  | <i>optional</i> | <b>type</b> shortcutType (see p 54) |
| <b>&lt;font&gt;</b>  | <i>optional</i> | <b>type</b> string                  |
| <b>doc</b> 'TODO: how is the font specified?'  |                 |                                     |
| <b>&lt;fontsize&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger         |
| <b>doc</b> 'Text font size, in points as defined by the system'  |                 |                                     |
| <b>&lt;bgcolor&gt;</b>   | <i>optional</i> | <b>type</b> colorType (see p 54)    |
| <b>&lt;fgcolor&gt;</b>   | <i>optional</i> | <b>type</b> colorType (see p 54)    |
| <b>&lt;floating&gt;</b>  | <i>optional</i> | <b>type</b> boolean                 |
| <b>doc</b> 'Put the element in it\'s own window instead of embedding it in the current layout'         |                 |                                     |
| <b>&lt;disabled&gt;</b>  | <i>optional</i> | <b>type</b> boolean                 |
| <b>doc</b> 'If set to true, the element will always be disabled (can be used to \"/>guide the eye\"')' |                 |                                     |

## 53 screenPictureLabelType

**parent** screenElementType (see p 54)

|   |                    |                 |                             |
|---|--------------------|-----------------|-----------------------------|
| <b>attrib</b>   | <b>&lt;x&gt;</b>   | <i>optional</i> | <b>type</b> int             |
| <b>attrib</b>   | <b>&lt;y&gt;</b>   | <i>optional</i> | <b>type</b> positiveInteger |
| <b>attrib</b>   | <b>&lt;row&gt;</b> | <i>optional</i> | <b>type</b> int             |
| <b>doc</b> 'Row in the grid. Is the same as y, but should not be used together with y'    |                    |                 |                             |
| <b>attrib</b>   | <b>&lt;col&gt;</b> | <i>optional</i> | <b>type</b> positiveInteger |
| <b>doc</b> 'Column in the grid. Is the same as x, but should not be used together with x' |                    |                 |                             |
| <b>attrib</b>   | <b>&lt;id&gt;</b>  | <i>required</i> | <b>type</b> Name            |

|   |                 |                                       |
|---|-----------------|---------------------------------------|
| <b>&lt;style&gt;</b>  | <i>optional</i> | <b>type</b> stylesheetType (see p 54) |
| <b>&lt;width&gt;</b>  | <i>optional</i> | <b>type</b> nonNegativeInteger        |
| <b>doc</b> 'TODO: units?'   |                 |                                       |
| <b>&lt;height&gt;</b>   | <i>optional</i> | <b>type</b> nonNegativeInteger        |
| <b>&lt;shortcut&gt;</b>   | <i>optional</i> | <b>type</b> shortcutType (see p 54)   |
| <b>&lt;font&gt;</b>   | <i>optional</i> | <b>type</b> string                    |
| <b>doc</b> 'TODO: how is the font specified?'   |                 |                                       |
| <b>&lt;fontsize&gt;</b>   | <i>optional</i> | <b>type</b> positiveInteger           |
| <b>doc</b> 'Text font size, in points as defined by the system'   |                 |                                       |
| <b>&lt;bgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)      |
| <b>&lt;fgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)      |
| <b>&lt;floating&gt;</b>   | <i>optional</i> | <b>type</b> boolean                   |
| <b>doc</b> 'Put the element in it\'s own window instead of embedding it in the current layout'  |                 |                                       |
| <b>&lt;disabled&gt;</b>   | <i>optional</i> | <b>type</b> boolean                   |
| <b>doc</b> 'If set to true, the element will always be disabled (can be used to \'guide the eye\')'   |                 |                                       |
| <b>&lt;path&gt;</b>   | <i>required</i> | <b>type</b> anyURI                    |
| <b>doc</b> 'Filename of the picture. The format can be any of: PNG, BMP, XBM, XPM, JPEG, MNG, GIF, PBM (P1 or P4), PGM (P2 or P5), and PPM (P3 or P6). If path is relative, it will be prefixed with the prefix given above.' |                 |                                       |

## 54 screenMatrixType

**parent** screenElementType (see p 54)

**attrib** **<x>** *optional* **type** int



|               |   |                 |                                       |
|---------------|---|-----------------|---------------------------------------|
| <b>attrib</b> | <b>&lt;y&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger           |
| <b>attrib</b> | <b>&lt;row&gt;</b>  | <i>optional</i> | <b>type</b> int                       |
|               | 'Row in the grid. Is the same as y, but should not be used together with y'                         |                 |                                       |
| <b>attrib</b> | <b>&lt;col&gt;</b>  | <i>optional</i> | <b>type</b> positiveInteger           |
|               | 'Column in the grid. Is the same as x, but should not be used together with x'                      |                 |                                       |
| <b>attrib</b> | <b>&lt;id&gt;</b>   | <i>required</i> | <b>type</b> Name                      |
|               | <b>&lt;style&gt;</b>  | <i>optional</i> | <b>type</b> stylesheetType (see p 54) |
|               | <b>&lt;width&gt;</b>  | <i>optional</i> | <b>type</b> nonNegativeInteger        |
|               | <b>doc</b> 'TODO: units?'   |                 |                                       |
|               | <b>&lt;height&gt;</b>   | <i>optional</i> | <b>type</b> nonNegativeInteger        |
|               | <b>&lt;shortcut&gt;</b>   | <i>optional</i> | <b>type</b> shortcutType (see p 54)   |
|               | <b>&lt;font&gt;</b>   | <i>optional</i> | <b>type</b> string                    |
|               | <b>doc</b> 'TODO: how is the font specified?'   |                 |                                       |
|               | <b>&lt;fontsize&gt;</b>   | <i>optional</i> | <b>type</b> positiveInteger           |
|               | <b>doc</b> 'Text font size, in points as defined by the system'                                     |                 |                                       |
|               | <b>&lt;bgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)      |
|               | <b>&lt;fgcolor&gt;</b>  | <i>optional</i> | <b>type</b> colorType (see p 54)      |
|               | <b>&lt;floating&gt;</b>   | <i>optional</i> | <b>type</b> boolean                   |
|               | <b>doc</b> 'Put the element in it\'s own window instead of embedding it in the current layout'      |                 |                                       |
|               | <b>&lt;disabled&gt;</b>   | <i>optional</i> | <b>type</b> boolean                   |
|               | <b>doc</b> 'If set to true, the element will always be disabled (can be used to \"guide the eye\")' |                 |                                       |
|               | <b>&lt;autocontinue&gt;</b>   | <i>optional</i> | <b>type</b> boolean                   |



**doc** 'TODO: units?'

**<height>**                      *optional*            **type** nonNegativeInteger

**<shortcut>**                      *optional*            **type** shortcutType (see p 54)

**<font>**                              *optional*            **type** string

**doc** 'TODO: how is the font specified?'

**<fontsize>**                      *optional*            **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

**<bgcolor>**                      *optional*            **type** colorType (see p 54)

**<fgcolor>**                      *optional*            **type** colorType (see p 54)

**<floating>**                      *optional*            **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

**<disabled>**                      *optional*            **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'\'guide the eye\'')'

**<text>**                              *required*            **type** string

## 56 screenParameterlistType

**parent** screenElementType (see p 54)

**attrib** **<x>**                              *optional*            **type** int

**attrib** **<y>**                              *optional*            **type** positiveInteger

**attrib** **<row>**                              *optional*            **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** **<col>**                              *optional*            **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

| <b>attrib</b> | <b>&lt;id&gt;</b>   | <i>required</i>    | <b>type</b> Name                         |
|---------------|---|--------------------|--|
|               | <b>&lt;style&gt;</b>  | <i>optional</i>    | <b>type</b> stylesheetType (see p 54)    |
|               | <b>&lt;width&gt;</b>  | <i>optional</i>    | <b>type</b> nonNegativeInteger           |
|               | <b>doc</b> 'TODO: units?'   |                    |  |
|               | <b>&lt;height&gt;</b>   | <i>optional</i>    | <b>type</b> nonNegativeInteger           |
|               | <b>&lt;shortcut&gt;</b>   | <i>optional</i>    | <b>type</b> shortcutType (see p 54)      |
|               | <b>&lt;font&gt;</b>   | <i>optional</i>    | <b>type</b> string                       |
|               | <b>doc</b> 'TODO: how is the font specified?'   |                    |  |
|               | <b>&lt;fontsize&gt;</b>   | <i>optional</i>    | <b>type</b> positiveInteger              |
|               | <b>doc</b> 'Text font size, in points as defined by the system'                                     |                    |  |
|               | <b>&lt;bgcolor&gt;</b>  | <i>optional</i>    | <b>type</b> colorType (see p 54)         |
|               | <b>&lt;fgcolor&gt;</b>  | <i>optional</i>    | <b>type</b> colorType (see p 54)         |
|               | <b>&lt;floating&gt;</b>   | <i>optional</i>    | <b>type</b> boolean                      |
|               | <b>doc</b> 'Put the element in it\'s own window instead of embedding it in the current layout'      |                    |  |
|               | <b>&lt;disabled&gt;</b>   | <i>optional</i>    | <b>type</b> boolean                      |
|               | <b>doc</b> 'If set to true, the element will always be disabled (can be used to \'guide the eye\')' |                    |  |
|               | <b>&lt;parameter&gt;</b>  | <i>one or more</i> | <b>type</b> showparameterType (see p 62) |

## 57 screenSliderType

**parent** screenElementType (see p 54)

**attrib** <x> *optional* **type** int

**attrib** <y> *optional* **type** positiveInteger

**attrib** <row> *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** <col> *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** <id> *required* **type** Name

<style> *optional* **type** stylesheetType (see p 54)

<width> *optional* **type** nonNegativeInteger

**doc** 'TODO: units?'

<height> *optional* **type** nonNegativeInteger

<shortcut> *optional* **type** shortcutType (see p 54)

<font> *optional* **type** string

**doc** 'TODO: how is the font specified?'

<fontsize> *optional* **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

<bgcolor> *optional* **type** colorType (see p 54)

<fgcolor> *optional* **type** colorType (see p 54)

<floating> *optional* **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

**<disabled>**                      *optional*            **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'\'guide the eye\'')'

**<orientation>**                      *optional*

**doc** 'Orientation of slider'

**<min>**                                  *optional*            **type** integer

**doc** 'Minimum value of slider'

**<max>**                                  *optional*            **type** integer

**doc** 'Maximum value of slider'

**<value>**                                *optional*            **type** integer

**doc** 'Default value of slider'

**<tickinterval>**                      *optional*            **type** integer

**doc** 'Interval between slider ticks'

**<stepsize>**                            *optional*            **type** integer

**doc** 'Step size on single arrow key press'

**<pagesize>**                          *optional*            **type** integer

**doc** 'Step size of pageUp pageDown key press'

## 58    screenCheckBoxType

**parent** screenElementType (see p 54)

**attrib**   **<x>**                                  *optional*            **type** int

**attrib**   **<y>**                                  *optional*            **type** positiveInteger

**attrib**   **<row>**                                *optional*            **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** <col> *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** <id> *required* **type** Name

<style> *optional* **type** stylesheetType (see p 54)

<width> *optional* **type** nonNegativeInteger

**doc** 'TODO: units?'

<height> *optional* **type** nonNegativeInteger

<shortcut> *optional* **type** shortcutType (see p 54)

<font> *optional* **type** string

**doc** 'TODO: how is the font specified?'

<fontsize> *optional* **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

<bgcolor> *optional* **type** colorType (see p 54)

<fgcolor> *optional* **type** colorType (see p 54)

<floating> *optional* **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

<disabled> *optional* **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'guide the eye\')'

<text> *required* **type** string

**doc** 'Text to be printed right to the checkbox'

<isChecked> *optional* **type** integer

**doc** 'Determines whether checkbox is checked by default'

## 59 screenButtonType

**parent** screenElementType (see p 54)

**attrib** <x> *optional* **type** int

**attrib** <y> *optional* **type** positiveInteger

**attrib** <row> *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** <col> *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** <id> *required* **type** Name

<style> *optional* **type** stylesheetType (see p 54)

<width> *optional* **type** nonNegativeInteger

**doc** 'TODO: units?'

<height> *optional* **type** nonNegativeInteger

<shortcut> *optional* **type** shortcutType (see p 54)

<font> *optional* **type** string

**doc** 'TODO: how is the font specified?'

<fontsize> *optional* **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

<bgcolor> *optional* **type** colorType (see p 54)

<fgcolor> *optional* **type** colorType (see p 54)

<floating> *optional* **type** boolean



**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

**<disabled>** *optional* **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'guide the eye\')'

**<text>** *required* **type** string

**doc** 'Text to be printed on the button'

## 60 screenSpinBoxType

**parent** screenElementType (see p 54)

**attrib** **<x>** *optional* **type** int

**attrib** **<y>** *optional* **type** positiveInteger

**attrib** **<row>** *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** **<col>** *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

**attrib** **<id>** *required* **type** Name

**<style>** *optional* **type** stylesheetType (see p 54)

**<width>** *optional* **type** nonNegativeInteger

**doc** 'TODO: units?'

**<height>** *optional* **type** nonNegativeInteger

**<shortcut>** *optional* **type** shortcutType (see p 54)

**<font>** *optional* **type** string

**doc** 'TODO: how is the font specified?'

**<fontsize>**                    *optional*        **type** positiveInteger

**doc** 'Text font size, in points as defined by the system'

**<bgcolor>**                    *optional*        **type** colorType (see p 54)

**<fgcolor>**                    *optional*        **type** colorType (see p 54)

**<floating>**                    *optional*        **type** boolean

**doc** 'Put the element in it\'s own window instead of embedding it in the current layout'

**<disabled>**                    *optional*        **type** boolean

**doc** 'If set to true, the element will always be disabled (can be used to \'guide the eye\')'

**<value>**                        *optional*        **type** integer

**doc** 'Default value'

**<min>**                          *optional*        **type** integer

**doc** 'Minimum value'

**<max>**                          *optional*        **type** integer

**doc** 'Maximum value'

**<step>**                         *optional*        **type** integer

**doc** 'Stepsize'

**<parameter>**                   *optional*        **type** IDREF

**doc** 'Parameter to be set to the value of the spinbox. This parameter will be set the NEXT trial.'

**<reset>**                        *optional*        **type** boolean

**doc** 'Reset the value for every new trial'

## 61 gridScreenLayoutType

*required*

**parent** screenLayoutType (see p 79)

**attrib** <id> *optional* **type** Name

**attrib** <width> *required* **type** int

**attrib** <height> *required* **type** int

**attrib** <columnstretch> *optional* **type** ref:stretchregexp

'Stretch factor for the columns: a list of integers separated by comma\'s. If specified, there should be as much integers as columns. The width of the columns will be proportional to the numbers. E.g. if width=2 and columnstretch=\'1,2\'', the second column will be twice as wide as the first. columnstretch=\'2,4\'' would have the same effect.'

**attrib** <rowstretch> *optional* **type** ref:stretchregexp

'Stretch factor for the rows: a list of integers separated by comma\'s. If specified, there should be as much integers as rows. The width of the rows will be proportional to the numbers. E.g. if height=3 and rowstretch=\'1,2,1\'', the second row will be twice as wide as the first and thirs. rowstretch=\'2,4,2\'' would have the same effect.'

**attrib** <x> *optional* **type** int

**attrib** <y> *optional* **type** positiveInteger

**attrib** <row> *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** <col> *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

|                  |                 |   |
|------------------|-----------------|---|
| <hLayout>        | <i>optional</i> | <b>type</b> hScreenLayoutType (see p 78)        |
| <vLayout>        | <i>optional</i> | <b>type</b> vScreenLayoutType (see p 76)        |
| <gridLayout>     | <i>optional</i> | <b>type</b> gridScreenLayoutType (see p 75)     |
| <arcLayout>      | <i>optional</i> | <b>type</b> arcScreenLayoutType (see p 38)      |
| <button>         | <i>optional</i> | <b>type</b> screenButtonType (see p 72)         |
| <label>          | <i>optional</i> | <b>type</b> screenLabelType (see p 66)          |
| <answerlabel>    | <i>optional</i> | <b>type</b> screenAnswerLabelType (see p 62)    |
| <parameterlabel> | <i>optional</i> | <b>type</b> screenParameterLabelType (see p 60) |
| <textEdit>       | <i>optional</i> | <b>type</b> screenTextEditType (see p 59)       |
| <picture>        | <i>optional</i> | <b>type</b> screenPictureType (see p 58)        |
| <flash>          | <i>optional</i> | <b>type</b> screenFlashType (see p 56)          |
| <parameterlist>  | <i>optional</i> | <b>type</b> screenParameterlistType (see p 67)  |
| <picturelabel>   | <i>optional</i> | <b>type</b> screenPictureLabelType (see p 63)   |
| <spinBox>        | <i>optional</i> | <b>type</b> screenSpinBoxType (see p 73)        |
| <checkBox>       | <i>optional</i> | <b>type</b> screenCheckBoxType (see p 70)       |
| <slider>         | <i>optional</i> | <b>type</b> screenSliderType (see p 69)         |
| <matrix>         | <i>optional</i> | <b>type</b> screenMatrixType (see p 64)         |

## 62 vScreenLayoutType

*required*

**parent** screenLayoutType (see p 79)

|               |          |                 |                             |
|---------------|----------|-----------------|-----------------------------|
| <b>attrib</b> | <id>     | <i>optional</i> | <b>type</b> Name            |
| <b>attrib</b> | <height> | <i>required</i> | <b>type</b> int             |
| <b>attrib</b> | <x>      | <i>optional</i> | <b>type</b> int             |
| <b>attrib</b> | <y>      | <i>optional</i> | <b>type</b> positiveInteger |

**attrib** <row> *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** <col> *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

<hLayout> *optional* **type** hScreenLayoutType (see p 78)

<vLayout> *optional* **type** vScreenLayoutType (see p 76)

<gridLayout> *optional* **type** gridScreenLayoutType (see p 75)

<arcLayout> *optional* **type** arcScreenLayoutType (see p 38)

<button> *optional* **type** screenButtonType (see p 72)

<label> *optional* **type** screenLabelType (see p 66)

<answerlabel> *optional* **type** screenAnswerLabelType (see p 62)

<parameterlabel> *optional* **type** screenParameterLabelType (see p 60)

<textEdit> *optional* **type** screenTextEditType (see p 59)

<picture> *optional* **type** screenPictureType (see p 58)

<flash> *optional* **type** screenFlashType (see p 56)

<parameterlist> *optional* **type** screenParameterlistType (see p 67)

<picturelabel> *optional* **type** screenPictureLabelType (see p 63)

<spinBox> *optional* **type** screenSpinBoxType (see p 73)

<checkBox> *optional* **type** screenCheckBoxType (see p 70)

<slider> *optional* **type** screenSliderType (see p 69)

<matrix> *optional* **type** screenMatrixType (see p 64)

## 63 hScreenLayoutType

*required*

**parent** screenLayoutType (see p 79)

**attrib** <id> *optional* **type** Name

**attrib** <width> *required* **type** int

**attrib** <x> *optional* **type** int

**attrib** <y> *optional* **type** positiveInteger

**attrib** <row> *optional* **type** int

'Row in the grid. Is the same as y, but should not be used together with y'

**attrib** <col> *optional* **type** positiveInteger

'Column in the grid. Is the same as x, but should not be used together with x'

<hLayout> *optional* **type** hScreenLayoutType (see p 78)

<vLayout> *optional* **type** vScreenLayoutType (see p 76)

<gridLayout> *optional* **type** gridScreenLayoutType (see p 75)

<arcLayout> *optional* **type** arcScreenLayoutType (see p 38)

<button> *optional* **type** screenButtonType (see p 72)

<label> *optional* **type** screenLabelType (see p 66)

<answerlabel> *optional* **type** screenAnswerLabelType (see p 62)

<parameterlabel> *optional* **type** screenParameterLabelType (see p 60)

<textEdit> *optional* **type** screenTextEditType (see p 59)

<picture> *optional* **type** screenPictureType (see p 58)

<flash> *optional* **type** screenFlashType (see p 56)

<parameterlist> *optional* **type** screenParameterlistType (see p 67)

|                |                 |   |
|----------------|-----------------|---|
| <picturelabel> | <i>optional</i> | <b>type</b> screenPictureLabelType (see p 63) |
| <spinBox>      | <i>optional</i> | <b>type</b> screenSpinBoxType (see p 73)      |
| <checkBox>     | <i>optional</i> | <b>type</b> screenCheckBoxType (see p 70)     |
| <slider>       | <i>optional</i> | <b>type</b> screenSliderType (see p 69)       |
| <matrix>       | <i>optional</i> | <b>type</b> screenMatrixType (see p 64)       |

## 64 screenLayoutType

*required*

**subtype** hScreenLayoutType (see p 78)

**subtype** vScreenLayoutType (see p 76)

**subtype** gridScreenLayoutType (see p 75)

**subtype** twoPartLayoutType (see p 80)

**subtype** arcScreenLayoutType (see p 38)

| <b>attrib</b> | <b>&lt;id&gt;</b> | <i>optional</i> | <b>type</b> Name                                |
|---------------|-------------------|-----------------|---|
|               | <hLayout>         | <i>optional</i> | <b>type</b> hScreenLayoutType (see p 78)        |
|               | <vLayout>         | <i>optional</i> | <b>type</b> vScreenLayoutType (see p 76)        |
|               | <gridLayout>      | <i>optional</i> | <b>type</b> gridScreenLayoutType (see p 75)     |
|               | <arcLayout>       | <i>optional</i> | <b>type</b> arcScreenLayoutType (see p 38)      |
|               | <button>          | <i>optional</i> | <b>type</b> screenButtonType (see p 72)         |
|               | <label>           | <i>optional</i> | <b>type</b> screenLabelType (see p 66)          |
|               | <answerlabel>     | <i>optional</i> | <b>type</b> screenAnswerLabelType (see p 62)    |
|               | <parameterlabel>  | <i>optional</i> | <b>type</b> screenParameterLabelType (see p 60) |
|               | <textEdit>        | <i>optional</i> | <b>type</b> screenTextEditType (see p 59)       |
|               | <picture>         | <i>optional</i> | <b>type</b> screenPictureType (see p 58)        |
|               | <flash>           | <i>optional</i> | <b>type</b> screenFlashType (see p 56)          |

|                 |                 |  |
|-----------------|-----------------|--|
| <parameterlist> | <i>optional</i> | <b>type</b> screenParameterlistType (see p 67) |
| <picturelabel>  | <i>optional</i> | <b>type</b> screenPictureLabelType (see p 63)  |
| <spinBox>       | <i>optional</i> | <b>type</b> screenSpinBoxType (see p 73)       |
| <checkBox>      | <i>optional</i> | <b>type</b> screenCheckBoxType (see p 70)      |
| <slider>        | <i>optional</i> | <b>type</b> screenSliderType (see p 69)        |
| <matrix>        | <i>optional</i> | <b>type</b> screenMatrixType (see p 64)        |

## 65 twoPartLayoutType

*required*

**parent** screenLayoutType (see p 79)

|               |             |                 |                              |
|---------------|-------------|-----------------|------------------------------|
| <b>attrib</b> | <id>        | <i>optional</i> | <b>type</b> Name             |
| <b>attrib</b> | <ratio>     | <i>required</i> | <b>type</b> float            |
| <b>attrib</b> | <direction> | <i>required</i> | <b>type</b> ref:horivertType |
| <b>attrib</b> | <x>         | <i>optional</i> | <b>type</b> int              |
| <b>attrib</b> | <y>         | <i>optional</i> | <b>type</b> positiveInteger  |
| <b>attrib</b> | <row>       | <i>optional</i> | <b>type</b> int              |

'Row in the grid. Is the same as y, but should not be used together with y'

|               |       |                 |                             |
|---------------|-------|-----------------|-----------------------------|
| <b>attrib</b> | <col> | <i>optional</i> | <b>type</b> positiveInteger |
|---------------|-------|-----------------|-----------------------------|

'Column in the grid. Is the same as x, but should not be used together with x'

|              |                 |   |
|--------------|-----------------|---|
| <hLayout>    | <i>optional</i> | <b>type</b> hScreenLayoutType (see p 78)    |
| <vLayout>    | <i>optional</i> | <b>type</b> vScreenLayoutType (see p 76)    |
| <gridLayout> | <i>optional</i> | <b>type</b> gridScreenLayoutType (see p 75) |
| <arcLayout>  | <i>optional</i> | <b>type</b> arcScreenLayoutType (see p 38)  |



|                  |                 |   |
|------------------|-----------------|---|
| <button>         | <i>optional</i> | <b>type</b> screenButtonType (see p 72)         |
| <label>          | <i>optional</i> | <b>type</b> screenLabelType (see p 66)          |
| <answerlabel>    | <i>optional</i> | <b>type</b> screenAnswerLabelType (see p 62)    |
| <parameterlabel> | <i>optional</i> | <b>type</b> screenParameterLabelType (see p 60) |
| <textEdit>       | <i>optional</i> | <b>type</b> screenTextEditType (see p 59)       |
| <picture>        | <i>optional</i> | <b>type</b> screenPictureType (see p 58)        |
| <flash>          | <i>optional</i> | <b>type</b> screenFlashType (see p 56)          |
| <parameterlist>  | <i>optional</i> | <b>type</b> screenParameterlistType (see p 67)  |
| <picturelabel>   | <i>optional</i> | <b>type</b> screenPictureLabelType (see p 63)   |
| <spinBox>        | <i>optional</i> | <b>type</b> screenSpinBoxType (see p 73)        |
| <checkBox>       | <i>optional</i> | <b>type</b> screenCheckBoxType (see p 70)       |
| <slider>         | <i>optional</i> | <b>type</b> screenSliderType (see p 69)         |
| <matrix>         | <i>optional</i> | <b>type</b> screenMatrixType (see p 64)         |

## 66 prefixType

**parent** string (see p ??)

**attrib** <source> *optional*

## 67 correctorType

**subtype** isequal (see p 82)

**subtype** cvc (see p 82)

**subtype** alternatives (see p 82)

## 68 alternatives

**parent** correctorType (see p 81)

**<answers>** *optional*

**doc** 'All possible answers are specified here. A screen element is associated with a time slot.'

**<answer>** *one or more*

**attrib** **<number>** *optional* **type** positiveInteger  
'Time slot of the stimulus'

**attrib** **<value>** *optional* **type** Name  
'Name of the screen element corresponding to the time slot'

## 69 cvc

**parent** correctorType (see p 81)

**<language>** *required*

## 70 isequal

**parent** correctorType (see p 81)

## 71 procedureType

**subtype** adaptiveProcedureType (see p 100)

**subtype** constantProcedureType (see p 98)

**subtype** trainingProcedureType (see p 95)

**subtype** multiProcedureType (see p 95)

**subtype** pluginProcedureType (see p 83)

**attrib** <id> *optional* **type** ID

'The ID is optional, except for child procedures of a multiprocedure. IDs are reported in the results file.'

## 72 pluginProcedureType

**parent** procedureType (see p 82)

**attrib** <id> *optional* **type** ID

'The ID is optional, except for child procedures of a multiprocedure. IDs are reported in the results file.'

<parameters> *required*

**parent** procedureParametersType (see p 86)

<presentations> *required* **type** positiveInteger

**doc** 'Number of times every trial will be presented.'

<skip> *optional* **type** integer

**doc** 'Number of trials that will be presented before the actual presentations start. Eg if skip=2 and presentations=3 then first 2 trials will be presented and then 3\*#trials. If the order is sequential, the skipped trials will be the first skip trials from the trial list, repeated if necessary. If the order is random, the skipped trials will be picked from the trial list without replacement, repeating this procedure if necessary (if skip>nTrials). Trials that are to be skipped in the results analysis are marked with the skip tag in the results file. Warning: this has not been thoroughly checked for other procedures than constant.'

<order> *required*

**doc** 'The order in which to present the trials.'

<defaultstandard> *optional* **type** IDREF

**doc** 'The default standard: only relevant if choices; 1 This standard will be used if no standard is defined in a certain trial.'

**<uniquestandard>** *optional* **type** boolean

**doc** 'If uniquestandard is true and multiple standards are defined per trial, Apex will try to present another standard in each interval of the trial.'

**<choices>** *optional*

**doc** 'Number of choices: choices stimuli are presented, one of which is the stimulus. The others are the current standard (defined in the trial or the default standard). To be combined with an \"alternatives\" corrector.'

**attrib** **<select>** *optional* **type** ref:selectChoicesType

'If select is defined, the stimulus will only be presented in the intervals enumerated in the select attribute. e.g.: if select=\"2,3\", the stimulus will never occur in interval 1, but only in 2 and 3'

**<pause\_between\_stimuli>** *optional* **type** positiveInteger

**doc** 'If specified, a pause of n milliseconds will be introduced between successive stimulus/standard presentations'

**<time\_before\_first\_trial>** *optional* **type** double

**doc** 'If specified, apex will wait for the given number of seconds before starting the first stimulus of the first trial when the procedure is started.'

**<input\_during\_stimulus>** *optional* **type** boolean

**<script>** *required*

**doc** 'Name of the script to be used as plugin procedure TODO'

**<adjust\_parameter>** *optional* **type** IDREF

**doc** 'Parameter to be modified by the procedure'

**<parameter>** *any*

**attrib** **<name>** *required* **type** Name

**<trials>** *required*

**<trial>** *any*

**attrib** <id> *required* **type** ID  
 <answer> *any*  
     **doc** 'The correct answer for this trial. Can be the name of a screen element, a string, a number or mixed xml data.'  
     <key> *any* **type** string  
         **doc** 'Keyword, to be used by the corrector'  
     <skey> *any* **type** string  
         **doc** 'Part of a split keyword, to be used by the corrector.'  
 <answer\_element> *optional* **type** IDREF  
     **doc** 'Screen element that contains the user input to be used by the corrector.'  
 <screen> *required*  
     **doc** 'Screen to be shown'  
     **attrib** <id> *required* **type** Name  
 <stimulus> *one or more*  
     **doc** 'One or more stimuli. An adaptive procedure using a fixed parameter will select one of these stimuli. Other procedures select a random stimulus if more than one is present. Notice that it is not guaranteed that all stimuli will be presented an equal number of times, in the case a random stimulus is selected here.'  
     **attrib** <id> *required* **type** Name  
 <standard> *any* **type** stimulusRefType (see p 85)  
     **doc** 'The standard to be used when procedure/choices=1. The standard will be presented on every time-slot except for one when the stimulus is presented. If more than one standard is defined, a random standard will be selected for each presentation. If e.g. 3 standards are defined and choices=4, a possible sequence would be standard1 stimulus1 standard2 standard1'

## 73 stimulusRefType

**attrib** <id> *required* **type** Name

## 74 procedureParametersType

**subtype** adaptiveProcedureParametersType (see p 92)

**subtype** constantProcedureParametersType (see p 90)

**subtype** trainingProcedureParametersType (see p 89)

**subtype** pluginProcedureParametersType (see p 87)

**<presentations>**      *required*      **type** positiveInteger

**doc** 'Number of times every trial will be presented.'

**<skip>**      *optional*      **type** integer

**doc** 'Number of trials that will be presented before the actual presentations start. Eg if skip=2 and presentations=3 then first 2 trials will be presented and then 3\*#trials. If the order is sequential, the skipped trials will be the first skip trials from the trial list, repeated if necessary. If the order is random, the skipped trials will be picked from the trial list without replacement, repeating this procedure if necessary (if skip>nTrials). Trials that are to be skipped in the results analysis are marked with the skip tag in the results file. Warning: this has not been thoroughly checked for other procedures than constant.'

**<order>**      *required*

**doc** 'The order in which to present the trials.'

**<defaultstandard>**      *optional*      **type** IDREF

**doc** 'The default standard: only relevant if choices<sub>l</sub>1 This standard will be used if no standard is defined in a certain trial.'

**<uniqustandard>**      *optional*      **type** boolean

**doc** 'If uniqustandard is true and multiple standards are defined per trial, Apex will try to present another standard in each interval of the trial.'

**<choices>**      *optional*

**doc** 'Number of choices: choices stimuli are presented, one of which is the stimulus. The others are the current standard (defined in the trial or the default standard). To be combined with an \”alternatives\” corrector.'

**attrib** **<select>** *optional* **type** ref:selectChoicesType

'If select is defined, the stimulus will only be presented in the intervals enumerated in the select attribute. e.g.: if select=\”2,3\”, the stimulus will never occur in interval 1, but only in 2 and 3'

**<pause\_between\_stimuli>** *optional* **type** positiveInteger

**doc** 'If specified, a pause of n milliseconds will be introduced between successive stimulus/standard presentations'

**<time\_before\_first\_trial>** *optional* **type** double

**doc** 'If specified, apex will wait for the given number of seconds before starting the first stimulus of the first trial when the procedure is started.'

**<input\_during\_stimulus>** *optional* **type** boolean

## 75 pluginProcedureParametersType

**parent** procedureParametersType (see p 86)

**<presentations>** *required* **type** positiveInteger

**doc** 'Number of times every trial will be presented.'

**<skip>** *optional* **type** integer

**doc** 'Number of trials that will be presented before the actual presentations start. Eg if skip=2 and presentations=3 then first 2 trials will be presented and then 3\*#trials. If the order is sequential, the skipped trials will be the first skip trials from the trial list, repeated if necessary. If the order is random, the skipped trials will be picked from the trial list without replacement, repeating this procedure if necessary (if skip<nTrials). Trials that are to be skipped in the results analysis are marked with the skip tag in

the results file. Warning: this has not been thoroughly checked for other procedures than constant.'

**<order>** *required*

**doc** 'The order in which to present the trials.'

**<defaultstandard>** *optional* **type** IDREF

**doc** 'The default standard: only relevant if choices<sub>1</sub> This standard will be used if no standard is defined in a certain trial.'

**<uniquestandard>** *optional* **type** boolean

**doc** 'If uniquestandard is true and multiple standards are defined per trial, Apex will try to present another standard in each interval of the trial.'

**<choices>** *optional*

**doc** 'Number of choices: choices stimuli are presented, one of which is the stimulus. The others are the current standard (defined in the trial or the default standard). To be combined with an \”alternatives\” corrector.'

**attrib** **<select>** *optional* **type** ref:selectChoicesType

'If select is defined, the stimulus will only be presented in the intervals enumerated in the select attribute. e.g.: if select=\”2,3\”, the stimulus will never occur in interval 1, but only in 2 and 3'

**<pause\_between\_stimuli>** *optional* **type** positiveInteger

**doc** 'If specified, a pause of n milliseconds will be introduced between successive stimulus/standard presentations'

**<time\_before\_first\_trial>** *optional* **type** double

**doc** 'If specified, apex will wait for the given number of seconds before starting the first stimulus of the first trial when the procedure is started.'

**<input\_during\_stimulus>** *optional* **type** boolean

**<script>** *required*



**doc** 'Name of the script to be used as plugin procedure TODO'

**<adjust\_parameter>** *optional*      **type** IDREF

**doc** 'Parameter to be modified by the procedure'

**<parameter>**      *any*

**attrib** **<name>**      *required*      **type** Name

## 76 trainingProcedureParametersType

**parent** procedureParametersType (see p 86)

**<presentations>**      *required*      **type** positiveInteger

**doc** 'Number of times every trial will be presented.'

**<skip>**      *optional*      **type** integer

**doc** 'Number of trials that will be presented before the actual presentations start. Eg if skip=2 and presentations=3 then first 2 trials will be presented and then 3\*#trials. If the order is sequential, the skipped trials will be the first skip trials from the trial list, repeated if necessary. If the order is random, the skipped trials will be picked from the trial list without replacement, repeating this procedure if necessary (if skip>nTrials). Trials that are to be skipped in the results analysis are marked with the skip tag in the results file. Warning: this has not been thoroughly checked for other procedures than constant.'

**<order>**      *required*

**doc** 'The order in which to present the trials.'

**<defaultstandard>**      *optional*      **type** IDREF

**doc** 'The default standard: only relevant if choices<sub>1</sub> This standard will be used if no standard is defined in a certain trial.'

**<uniquestandard>**      *optional*      **type** boolean

**doc** 'If uniquestandard is true and multiple standards are defined per trial, Apex will try to present another standard in each interval of the trial.'

**<choices>** *optional*

**doc** 'Number of choices: choices stimuli are presented, one of which is the stimulus. The others are the current standard (defined in the trial or the default standard). To be combined with an \"alternatives\" corrector.'

**attrib** **<select>** *optional* **type** ref:selectChoicesType

'If select is defined, the stimulus will only be presented in the intervals enumerated in the select attribute. e.g.: if select=\"2,3\", the stimulus will never occur in interval 1, but only in 2 and 3'

**<pause\_between\_stimuli>** *optional* **type** positiveInteger

**doc** 'If specified, a pause of n milliseconds will be introduced between successive stimulus/standard presentations'

**<time\_before\_first\_trial>** *optional* **type** double

**doc** 'If specified, apex will wait for the given number of seconds before starting the first stimulus of the first trial when the procedure is started.'

**<input\_during\_stimulus>** *optional* **type** boolean

## 77 constantProcedureParametersType

**parent** procedureParametersType (see p 86)

**<presentations>** *required* **type** positiveInteger

**doc** 'Number of times every trial will be presented.'

**<skip>** *optional* **type** integer

**doc** 'Number of trials that will be presented before the actual presentations start. Eg if skip=2 and presentations=3 then first 2 trials will be presented and then 3\*#trials. If the order is sequential, the skipped trials will be the first skip trials from the trial list, repeated if necessary. If the order is random, the skipped trials will be picked from the trial list without replacement, repeating this procedure if necessary (if skip<nTrials). Trials that are to be skipped in the results analysis are marked with the skip tag in the results file. Warning: this has not been thoroughly checked for other procedures than constant.'

**<order>** *required*

**doc** 'The order in which to present the trials.'

**<defaultstandard>** *optional* **type** IDREF

**doc** 'The default standard: only relevant if choices<1 This standard will be used if no standard is defined in a certain trial.'

**<uniqustandard>** *optional* **type** boolean

**doc** 'If uniqustandard is true and multiple standards are defined per trial, Apex will try to present another standard in each interval of the trial.'

**<choices>** *optional*

**doc** 'Number of choices: choices stimuli are presented, one of which is the stimulus. The others are the current standard (defined in the trial or the default standard). To be combined with an \alternatives\ corrector.'

**attrib** **<select>** *optional* **type** ref:selectChoicesType

'If select is defined, the stimulus will only be presented in the intervals enumerated in the select attribute. e.g.: if select=\2,3\, the stimulus will never occur in interval 1, but only in 2 and 3'

**<pause\_between\_stimuli>** *optional* **type** positiveInteger

**doc** 'If specified, a pause of n milliseconds will be introduced between successive stimulus/standard presentations'

**<time\_before\_first\_trial>** *optional* **type** double

**doc** 'If specified, apex will wait for the given number of seconds before starting the first stimulus of the first trial when the procedure is started.'

**<input\_during\_stimulus>** *optional* **type** boolean

## 78 adaptiveProcedureParametersType

**parent** procedureParametersType (see p 86)

**<presentations>** *required* **type** positiveInteger

**doc** 'Number of times every trial will be presented.'

**<skip>** *optional* **type** integer

**doc** 'Number of trials that will be presented before the actual presentations start. Eg if skip=2 and presentations=3 then first 2 trials will be presented and then 3\*#trials. If the order is sequential, the skipped trials will be the first skip trials from the trial list, repeated if necessary. If the order is random, the skipped trials will be picked from the trial list without replacement, repeating this procedure if necessary (if skip>nTrials). Trials that are to be skipped in the results analysis are marked with the skip tag in the results file. Warning: this has not been thoroughly checked for other procedures than constant.'

**<order>** *required*

**doc** 'The order in which to present the trials.'

**<defaultstandard>** *optional* **type** IDREF

**doc** 'The default standard: only relevant if choices<sub>1</sub> This standard will be used if no standard is defined in a certain trial.'

**<uniqustandard>** *optional* **type** boolean

**doc** 'If uniqustandard is true and multiple standards are defined per trial, Apex will try to present another standard in each interval of the trial.'

**<choices>** *optional*

**doc** 'Number of choices: choices stimuli are presented, one of which is the stimulus. The others are the current standard (defined in the trial or the default standard). To be combined with an \”alternatives\” corrector.'

**attrib** **<select>** *optional* **type** ref:selectChoicesType

'If select is defined, the stimulus will only be presented in the intervals enumerated in the select attribute. e.g.: if select=\”2,3\”, the stimulus will never occur in interval 1, but only in 2 and 3'

**<pause\_between\_stimuli>** *optional* **type** positiveInteger

**doc** 'If specified, a pause of n milliseconds will be introduced between successive stimulus/standard presentations'

**<time\_before\_first\_trial>** *optional* **type** double

**doc** 'If specified, apex will wait for the given number of seconds before starting the first stimulus of the first trial when the procedure is started.'

**<input\_during\_stimulus>** *optional* **type** boolean

**<nUp>** *required* **type** positiveInteger

**doc** 'Number of times the user has to give a correct answer before the parameter is adapted'

**<nDown>** *required* **type** positiveInteger

**doc** 'Number of times the user has to give a wrong answer before the parameter is adapted'

**<adapt\_parameter>** *one or more* **type** IDREF

**doc** 'Parameter to be adapted. Can be a fixed, variable or general parameter. If more than one parameter is specified, all parameters will be set to the same value. Only the first parameter given can be a fixed parameter.'

**<start\_value>** *required* **type** string

**doc** 'Start value of the parameter'

**<stop\_after\_type>**     *required*

**doc** 'Criterion to be used to stop the procedure. The procedure will be stopped after stop\_after instances of this event.'

**<stop\_after>**             *required*     **type** positiveInteger

**doc** 'The procedure ends after stop\_after events of type stop\_after\_type'

**<min\_value>**             *optional*     **type** double

**doc** 'Minimal value of the parameter. If the procedure tries to go below this value, the parameter is saturated and saturation is reported on screen and in the results file.'

**<max\_value>**             *optional*     **type** double

**doc** 'Maximal value of the parameter. If the procedure tries to go above this value, the parameter is saturated and saturation is reported on screen and in the results file.'

**<rev\_for\_mean>**          *optional*     **type** positiveInteger

**doc** 'Number of reversals to be taken for mean value. Currently only used in xslt scripts to convert/analyse the results file.'

**<larger\_is\_easier>**      *required*     **type** boolean

**doc** 'Larger values of the parameter are easier than smaller values'

**<repeat\_first\_until\_correct>**     *optional*     **type** boolean

**doc** 'Repeat the first trial untill the answer is correct.'

**<stepsizes>**             *required*

**doc** 'Defines the stepsizes to be used to adapt the parameter'

**<change\_after>**          *optional*

**doc** 'Change the stepsize after a certain number of trials or a certain number of reversals'

**<stepsize>**             *one        or*  
                              *more*

**doc** 'The procedure uses a step of size \"size\" after \"begin\" events of type \"change\_after\" have occurred'  
**attrib** <**begin**> *required* **type** nonNegativeInteger  
**attrib** <**size**> *required* **type** double

## 79 multiProcedureType

**parent** procedureType (see p 82)

**attrib** <**id**> *optional* **type** ID

'The ID is optional, except for child procedures of a multiprocedure. IDs are reported in the results file.'

<**parameters**> *required*

<**order**> *required*

**doc** 'Order of interleaving the child procedures.'

<**procedure**> *one or more* **type** procedureType (see p 82)

**doc** 'All child procedures MUST have an ID'

## 80 trainingProcedureType

**parent** procedureType (see p 82)

**attrib** <**id**> *optional* **type** ID

'The ID is optional, except for child procedures of a multiprocedure. IDs are reported in the results file.'

<**parameters**> *required*

**parent** procedureParametersType (see p 86)

**<presentations>**      *required*      **type** positiveInteger  
**doc** 'Number of times every trial will be presented.'

**<skip>**      *optional*      **type** integer  
**doc** 'Number of trials that will be presented before the actual presentations start. Eg if skip=2 and presentations=3 then first 2 trials will be presented and then 3\*#trials. If the order is sequential, the skipped trials will be the first skip trials from the trial list, repeated if necessary. If the order is random, the skipped trials will be picked from the trial list without replacement, repeating this procedure if necessary (if skip>nTrials). Trials that are to be skipped in the results analysis are marked with the skip tag in the results file. Warning: this has not been thoroughly checked for other procedures than constant.'

**<order>**      *required*  
**doc** 'The order in which to present the trials.'

**<defaultstandard>**      *optional*      **type** IDREF  
**doc** 'The default standard: only relevant if choices;1 This standard will be used if no standard is defined in a certain trial.'

**<uniqustandard>**      *optional*      **type** boolean  
**doc** 'If uniqustandard is true and multiple standards are defined per trial, Apex will try to present another standard in each interval of the trial.'

**<choices>**      *optional*  
**doc** 'Number of choices: choices stimuli are presented, one of which is the stimulus. The others are the current standard (defined in the trial or the default standard). To be combined with an \"alternatives\" corrector.'

**attrib** **<select>**      *optional*      **type** ref:selectChoicesType  
'If select is defined, the stimulus will only be presented in the intervals enumerated in the select attribute. e.g.: if select=\"2,3\", the stimulus will never occur in interval 1, but only in 2 and 3'

**<pause\_between\_stimuli>**      *optional*      **type** positiveInteger  
**doc** 'If specified, a pause of n milliseconds will be introduced between successive stimulus/standard presentations'

**<time\_before\_first\_trial>**      *optional*      **type** double



**doc** 'If specified, apex will wait for the given number of seconds before starting the first stimulus of the first trial when the procedure is started.'

**<input\_during\_stimulus>** *optional* **type** boolean

**<trials>** *required* **type** trialsType (see p 97)

## 81 trialsType

**<trial>** *any* **type** trialType (see p 97)

## 82 trialType

**attrib <id>** *required* **type** ID

**<answer>** *any*

**doc** 'The correct answer for this trial. Can be the name of a screen element, a string, a number or mixed xml data.'

**<key>** *any* **type** string

**doc** 'Keyword, to be used by the corrector'

**<skey>** *any* **type** string

**doc** 'Part of a split keyword, to be used by the corrector.'

**<answer\_element>** *optional* **type** IDREF

**doc** 'Screen element that contains the user input to be used by the corrector.'

**<screen>** *required* **type** screenRefType (see p 98)

**doc** 'Screen to be shown'

**<stimulus>** *one or more* **type** stimulusRefType (see p 85)

**doc** 'One or more stimuli. An adaptive procedure using a fixed parameter will select one of these stimuli. Other procedures select a random stimulus if more than one is present. Notice that it is not guaranteed that all stimuli will be presented an equal number of times, in the case a random stimulus is selected here.'

**<standard>**                      *any*                      **type** stimulusRefType (see p 85)

**doc** 'The standard to be used when procedure/choices=1. The standard will be presented on every time-slot except for one when the stimulus is presented. If more than one standard is defined, a random standard will be selected for each presentation. If e.g. 3 standards are defined and choices=4, a possible sequence would be standard1 stimulus1 standard2 standard1'

## 83 screenRefType

**attrib** **<id>**                                      *required*                      **type** Name

## 84 constantProcedureType

**parent** procedureType (see p 82)

**attrib** **<id>**                                      *optional*                      **type** ID

'The ID is optional, except for child procedures of a multiprocedure. IDs are reported in the results file.'

**<parameters>**                      *required*

**parent** procedureParametersType (see p 86)

**<presentations>**                      *required*                      **type** positiveInteger

**doc** 'Number of times every trial will be presented.'

**<skip>**                                      *optional*                      **type** integer

**doc** 'Number of trials that will be presented before the actual presentations start. Eg if skip=2 and presentations=3 then first 2 trials will be presented and then 3\*#trials. If the order is sequential, the skipped trials will be the first skip trials from the trial list, repeated if necessary. If the order is random, the skipped trials will be picked from the trial list without replacement, repeating this procedure if necessary (if skip>nTrials). Trials that are to be skipped in the results analysis are marked with the skip tag in the results file. Warning: this has not been thoroughly checked for other procedures than constant.'

**<order>** *required*

**doc** 'The order in which to present the trials.'

**<defaultstandard>** *optional* **type** IDREF

**doc** 'The default standard: only relevant if choices<1 This standard will be used if no standard is defined in a certain trial.'

**<uniquestandard>** *optional* **type** boolean

**doc** 'If uniquestandard is true and multiple standards are defined per trial, Apex will try to present another standard in each interval of the trial.'

**<choices>** *optional*

**doc** 'Number of choices: choices stimuli are presented, one of which is the stimulus. The others are the current standard (defined in the trial or the default standard). To be combined with an \"alternatives\" corrector.'

**attrib** **<select>** *optional* **type** ref:selectChoicesType

'If select is defined, the stimulus will only be presented in the intervals enumerated in the select attribute. e.g.: if select=\"2,3\", the stimulus will never occur in interval 1, but only in 2 and 3'

**<pause\_between\_stimuli>** *optional* **type** positiveInteger

**doc** 'If specified, a pause of n milliseconds will be introduced between successive stimulus/standard presentations'

**<time\_before\_first\_trial>** *optional* **type** double

**doc** 'If specified, apex will wait for the given number of seconds before starting the first stimulus of the first trial when the procedure is started.'

**<input\_during\_stimulus>** *optional*      **type** boolean  
**<trials>** *required*      **type** trialsType (see p 97)  
**doc** 'If a trial contains more than one stimulus, a random one will be selected.'

## 85 adaptiveProcedureType

**parent** procedureType (see p 82)

**attrib** **<id>** *optional*      **type** ID

'The ID is optional, except for child procedures of a multiprocedure. IDs are reported in the results file.'

**<parameters>** *required*

**parent** procedureParametersType (see p 86)

**<presentations>** *required*      **type** positiveInteger

**doc** 'Number of times every trial will be presented.'

**<skip>** *optional*      **type** integer

**doc** 'Number of trials that will be presented before the actual presentations start. Eg if skip=2 and presentations=3 then first 2 trials will be presented and then 3\*#trials. If the order is sequential, the skipped trials will be the first skip trials from the trial list, repeated if necessary. If the order is random, the skipped trials will be picked from the trial list without replacement, repeating this procedure if necessary (if skip>nTrials). Trials that are to be skipped in the results analysis are marked with the skip tag in the results file. Warning: this has not been thoroughly checked for other procedures than constant.'

**<order>** *required*

**doc** 'The order in which to present the trials.'

**<defaultstandard>** *optional*      **type** IDREF

**doc** 'The default standard: only relevant if choices<1 This standard will be used if no standard is defined in a certain trial.'

**<uniqustandard>**      *optional*      **type** boolean

**doc** 'If uniqustandard is true and multiple standards are defined per trial, Apex will try to present another standard in each interval of the trial.'

**<choices>**      *optional*

**doc** 'Number of choices: choices stimuli are presented, one of which is the stimulus. The others are the current standard (defined in the trial or the default standard). To be combined with an \"alternatives\" corrector.'

**attrib** **<select>**      *optional*      **type** ref:selectChoicesType

'If select is defined, the stimulus will only be presented in the intervals enumerated in the select attribute. e.g.: if select=\"2,3\", the stimulus will never occur in interval 1, but only in 2 and 3'

**<pause\_between\_stimuli>**      *optional*      **type** positiveInteger

**doc** 'If specified, a pause of n milliseconds will be introduced between successive stimulus/standard presentations'

**<time\_before\_first\_trial>**      *optional*      **type** double

**doc** 'If specified, apex will wait for the given number of seconds before starting the first stimulus of the first trial when the procedure is started.'

**<input\_during\_stimulus>**      *optional*      **type** boolean

**<nUp>**      *required*      **type** positiveInteger

**doc** 'Number of times the user has to give a correct answer before the parameter is adapted'

**<nDown>**      *required*      **type** positiveInteger

**doc** 'Number of times the user has to give a wrong answer before the parameter is adapted'

**<adapt\_parameter>**      *one or more*      **type** IDREF

**doc** 'Parameter to be adapted. Can be a fixed, variable or general parameter. If more than one parameter is specified, all parameters will be set to the same value. Only the first parameter given can be a fixed parameter.'

**<start\_value>**      *required*      **type** string

**doc** 'Start value of the parameter'

**<stop\_after\_type>**      *required*

**doc** 'Criterion to be used to stop the procedure. The procedure will be stopped after stop\_after instances of this event.'

**<stop\_after>**              *required*      **type** positiveInteger

**doc** 'The procedure ends after stop\_after events of type stop\_after\_type'

**<min\_value>**              *optional*      **type** double

**doc** 'Minimal value of the parameter. If the procedure tries to go below this value, the parameter is saturated and saturation is reported on screen and in the results file.'

**<max\_value>**              *optional*      **type** double

**doc** 'Maximal value of the parameter. If the procedure tries to go above this value, the parameter is saturated and saturation is reported on screen and in the results file.'

**<rev\_for\_mean>**          *optional*      **type** positiveInteger

**doc** 'Number of reversals to be taken for mean value. Currently only used in xslt scripts to convert/analyse the results file.'

**<larger\_is\_easier>**      *required*      **type** boolean

**doc** 'Larger values of the parameter are easier than smaller values'

**<repeat\_first\_until\_correct>**      *optional*      **type** boolean

**doc** 'Repeat the first trial untill the answer is correct.'

**<stepsizes>**              *required*

**doc** 'Defines the stepsizes to be used to adapt the parameter'

**<change\_after>**          *optional*

**doc** 'Change the stepsize after a certain number of trials or a certain number of reversals'

**<stepsize>**              *one      or  
more*

**doc** 'The procedure uses a step of size \"size\" after \"begin\" events of type \"change\_after\" have occurred'

**attrib** **<begin>**              *required*      **type** nonNegativeInteger

**attrib** **<size>**              *required*      **type** double

**<trials>**                  *required*      **type** trialsType (see p 97)

**doc** 'Trials are selected according to the sequence parameter. A trial can contain multiple stimuli. If the parameter to be adapted is fixed, a stimulus is selected from this list according to the target value of the parameter of the procedure. If more than one stimulus has the same fixed parameter value, a random stimulus is selected out of this subset. If no exact match for the fixed parameter is found, the closest match is used. If the parameter to be adapted is variable, the value of the parameter is set right before stimulus output.'