Lab-LINK$_{TM}$ for Windows

Part 2
SmartPanel for Windows
User's Manual

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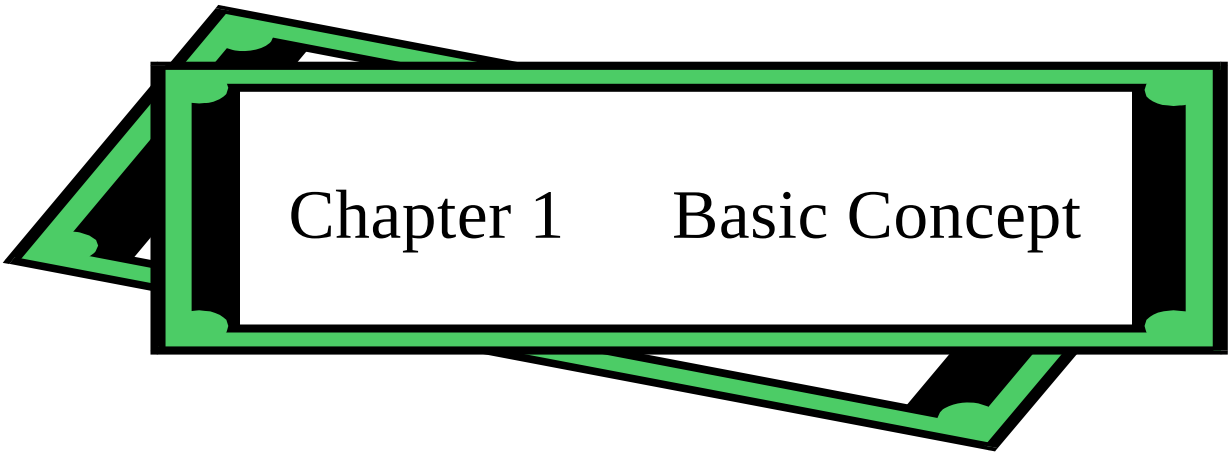


Chapter 1 Basic Concept

TAG

TAG works as the data carrier in Lab-LINK. All modules are linked by Tags and any changed in the values will be sent to the modules used them.

There are two kinds of Tags in **Lab-LINK**: system Tag and user Tag. System Tags are built-in to show or control some kind system information and their name always begin with the character “$”. User Tags are user defined to suit their purpose and their names are given by users.

Panel TAG

Some Tags are only used by panels for user interface and thus do not belong to any workstation. These Tags are called Panel Tags. Though they are not included in workstations’ Tag database, they will be store by Lab-LINK projects and can be used when configuring panels.

Tag Name

There are restrictions on the name of Tag:

- All Alpha-Numeric characters can be used as well as some of the special characters such as “-“ and “_”.
- The following special characters cannot be used in Tag name:
  ! . [ ] ` / \ : * ? “ < > | # $ % & ‘( ) + , ; = @ ^ { } ~
- Tag name cannot start with a numeric character.
- The limit on the length if Tag name is 8 characters.
- Tag name is case sensitive.

Data structure of Tag

- Name: Unique identification of a Tag.
- Status: Communication related status of a Tag. Possible status value of a Tag include:
  - Unknown: Initial status of a Tag.
  - Reserved: Reserved fo future application.
  - On-line: Tag is on-line and its value is valid for an IO Tag.
  - Off-line: Tag is off-line probably due to a communication problem.
  - Output Failure: The last Write action to the IO Tag failed.
- Date: The date when the latest Tag value or message change occurred.
- Time: The time when the latest Tag value or message change occurred.
- Value: The latest data value obtained for a Tag. Values are stored as a floting number with range: Negative:-1.797693134862316E+308~-4.94065E-324
  Positive: 4.94065E-324~1.797693134862316E+308.
- Message: The latest text message stored in a Tag with the maximum length of 80 characters.

System TAG

All System Tags are system built-in and with names begin with character "$". Meanings of System Tags are described as follows:

- $DISK：Its value indicates the remaining space in MB on the system hard disk.
- $EXIT：The execution of **Lab-LINK** is terminated when its valu is set to "1"
- $TIME：Its value is incremented by 1 each second since the execution of **Lab-LINK**.
- $USER：Its value indicates the privilege, ranged 0~255, of the current logged-in user, and its message indicate the name of the current user.
- $ALARM*：Its value indicates the number of current alarm, and it message is the newest alarm message.
- $ALM_PRI*：Its value is the priority of the alarm with the highest priority of current active and unacknowledged alarms. Its range is between 0~255.
- $NEW_ALM*：Its value will be set to "1" when any new alarm occurs.
- $LOGOUT：Current logged-in user will be logged out when its value is set to "1".

*These system TAGs are related to Alarm Module.

Objects

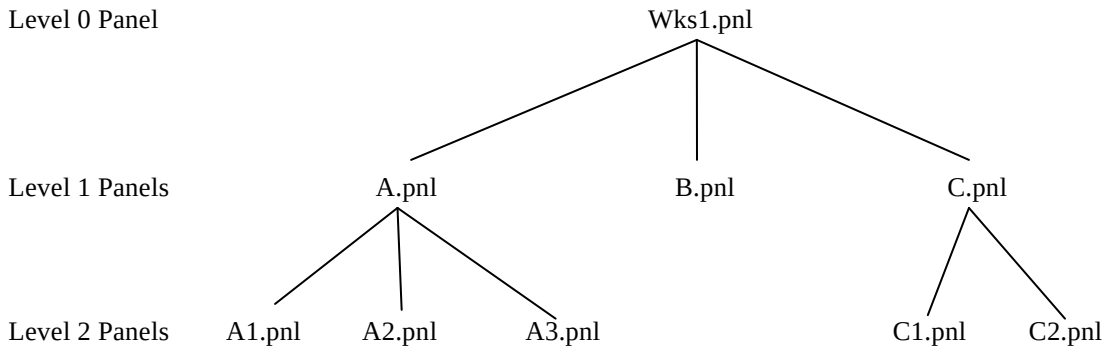
There are seven categories of more than fifty kinds of objects:

Category	Description	Objects
Panel	Control the open and close of panels	Panel Box, Popup Panel, Panel Player
Action	Invisible objects providing logic, calculation, timing, and program execution functions	Initiator, AND, OR, Inverter, ExIndex, Multiplexer, Scanner, Counter, Timer, Multi-Timer, Delay Timer, Clock, Calculator, Runner, Executer, WAV Player
Control	Object to control and adjust parameters	Button, LEDButton, Rocker, SetButton, SpinButton, BMPButton, WMF Button, Horizontal Slider, Vertical Slider, Edit Box, Number Pad
Static Display	Objects to display static graphics and text	ShowBMP, ShowWMF, Memo Box
Dynamic Display	Objects to dynamically display the change of lamps, text and graphics	Log Box, Static Text, Dynamic Text, Indicator, Lamp, Shape, Digit Meter, Text Meter, Level
Graphs	Objects showing graphs and charts	Horizontal Bar, Vertical Bar, Scroll Trend, Horizontal Trend, Data Trend, X-Y Chart
Alarm	Objects to show alarm status	Alarm Concetrator, Annunciator, Alarm WAV Player, AlarmBar

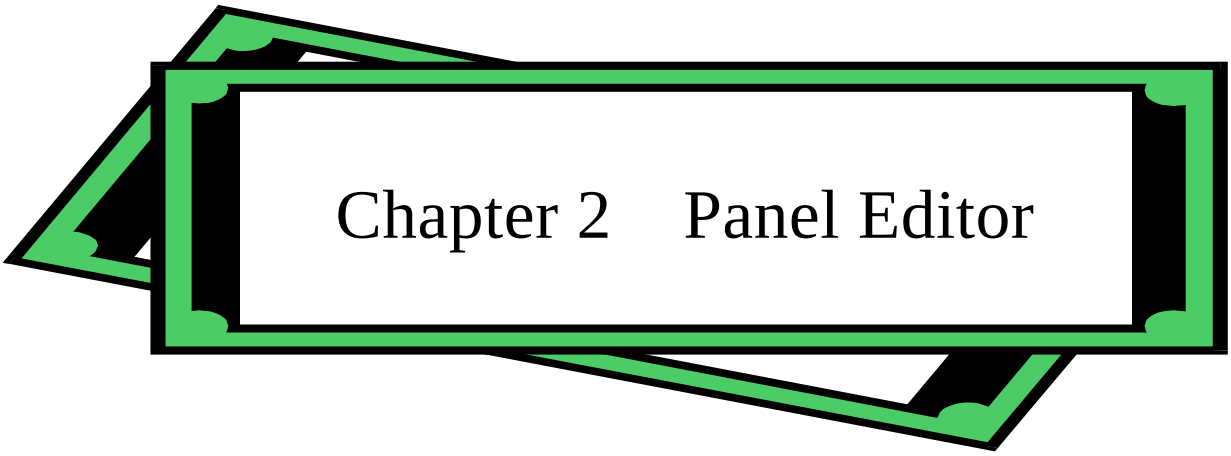
Category	Description	Objects
		Alarm Log　Group Annunciator

Panel Structure

Panels are organized into a tree structure with a single root panel for each work station. Root panel is also the first panel that is automatically opened when a Lab-LINK project is executed. As shown in the figure below, Wks1.pnl is the root panel containing three panel objects used to open its three child panels, namely A.pnl、B.pnl 及 C.pnl. A.pnl and C.pnl will contain three and two panel objects respectively to open the second level of child panels.



Parent panels on upper layer must be opened first before opening child panels on lower layer. When parent panels are closed, their child panels will also be closed. When a panel is closed, all objects inside the panel will be cleared and cease functioning. Beware of this when designing your panel structure. Extra care should be taken when decide which panel to place action objects since their logical function will stop when the panel they reside is closed.



Chapter 2 Panel Editor

Panel Editor is the tool used to define objects and panels. It is started when a panel is selected by double clicking a panel file in a project. The new ***Panel Editor 4*** is a major upgrade with new user interface and abundant new features.

Panel Files

When a panel is edited and saved, two files are created by Panel Editor. These two files have the same name with the panel but with different extension names of ***pnl*** and ***pnd*** respectively. The pnl file is the file that is actually displayed at run time, and the pnd file contain the definition used by Panel Editor for editing.

Note: For previous version of Lab-LINK, only pnl files are created and used. If an old pnl file created by previous version of Panel Editor is edited by ***Panel Editor 4***, it may become incompatible for older version of Panel Editor.

Coordinate System

Two types of Coordinate Systems are used:

- ❒ Absolute Coordinates: This is used by Panel Editor to define objects. The unit is pixel in this coordinate system with origin at the top left corner of a panel.
- ❒ Relative Coordinates: This is used to define runtime panel size by ***Popup Panel*** and ***Panel Player,*** the two objects used to control panel display, in their definition.

Note: Previous version of Panel Editor use relative coordinates only. When a older version panel file is edited by Panel Editor 4, all coordinates definition in objects will be converted to absolute coordinates automatically.

Foreground, Background and Object Orders

To help users arrange the objects when editing a panel, Panel Editor 4 introduces foreground and background. For example, users can move objects that's need not to be adjusted to background and edit other objects in foreground to avoid change those object accidentally. The action to move objects to foreground or background is only used in Panel Editor for convenience.

Order is used to determine which object is on top of another when they overlap. By pushing an object backward or forward can change its order in display. The orders of objects are treated separately in foreground and background while objects in foreground are always on top of objects in background. The order of objects displayed is shown as follows:

Top object in foreground
…
Bottom object in foreground
Top object in background
…
Bottom object in background

When two objects overlap, only the object on top can be operated. Care should be taken when arrange the order of objects.

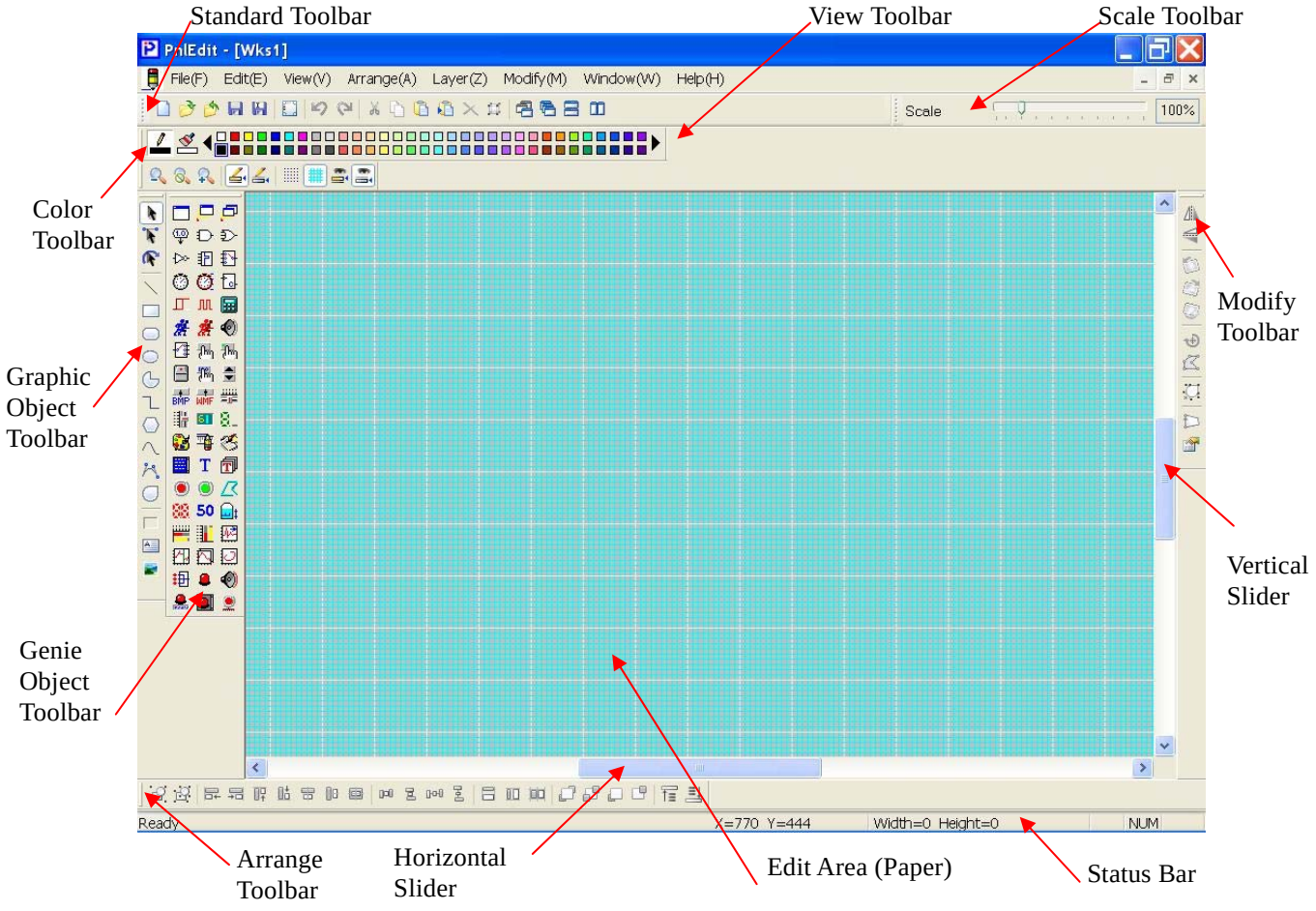
Graphic Objects and Genie Objects

Graphic Objects are new features of Panel Editor 4. Graphic objects can be used to draw static background graphics in Panel Editor. Users no longer need to draw these graphics using a graphic application first, outport them as a bmp or wmf file, and then use **ShowBMP** or **ShowWMF** objects to display them in a panel. The Graphics Object are static and runtime which cannot be related to Tags and will not change with Tag values changes.

The original dynamic ***SmartPanel*** objects are renamed as **Genie Objects** to avoid the confusion with the new static **Graphic Object**. **Genie Objects** are completely compatible and have the same settings as defined in previous version.

Panel Editor

The user interface of Panel Editor is shown as below. Usage of the menu and toolbars will be discussed in the following sections.



Menu

Menu provides the following function selections:

❒ File Menu

Menu Item	Function	Toolbar Icon	
New	Create a new panel and start editing	Standard	
Open	Open an existed panel for editing	Standard	
Import	Import a panel created by previous version Panel Editor		
Close	Close the panel being edited	Standard	
Save	Save the panel being edited to disk	Standard	
Save As	Save the edited panel as a different name	Standard	
Save As BMP	Save the edited panel as a BMP graphic file.		
Save As EMF	Save the edited panel as an EMF graphic file.		
Panel Setup	Define the size and grid setting of the panel being edited	Standard	
Print Setup	Setup printer option of the panel being edited		
Print Preview	Preview the printout of the panel being edited		
Print	Print the panel being edited		
Exit	End the execution of Panel Editor and return to PAM		

❒ Edit Menu

Menu Item	Function	Toolbar Icon	
Undo	Undo the previous operation	Standard	
Redo	Redo the previous undone operation	Standard	
Cut	Cut the selected content and store it in the clipboard	Standard	
Copy	Copy the selected content and store it in the clipboard	Standard	
Paste	Past the content in the clipboard into the panel being edited	Standard	
Erase	Delete the selected content	Standard	
Duplicate	Duplicate the selected content	Standard	

Menu Item	Function	Toolbar Icon	
Select All	Select every objects in the panel being edited		
Erase All	Delete every objects in the panel being edited		
Edit Foreground	Edit objects in the foreground	View	
Edit Background	Edit objects in the background	View	
Copy Properties	Copy the details and style parameters of the base Genie Object and assign them to all selected Genie Object of the same type		

❒ View Menu

Menu Item	Function	Toolbar Icon	
Standard Toolbar	Toggle to show or hide the Standard Toolbar		
Color Toolbar	Toggle to show or hide the Color Toolbar		
Graphic Toolbar	Toggle to show or hide the Graphic Object Toolbar		
Arrange Toolbar	Toggle to show or hide the Arrange Toolbar		
Modify Toolbar	Toggle to show or hide the Modify Toolbar		
Layer Toolbar	Toggle to show or hide the Layer Toolbar		
Status Bar	Toggle to show or hide the Status Bar		
Properties	Toggle to show or hide the object properties dialog		
1:1 View	Show the panel content in 1:1 scale	View	
Zoom In	Zoom in to enlarge the panel display 2 times	View	
Zoom Out	Zoom out to shrink the panel display to half	View	
Grid Marks	Toggle to show or hide grid marks	View	
Grid Lines	Toggle to show or hide grid lines	View	
Foreground	Toggle to show or hide foreground objects	View	
Background	Toggle to show or hide background objects	View	

❒ Arrange Menu

Menu Item	Function	Toolbar Icon	
Group	Convert the selected objects into a grouped object	Arrange	
Ungroup	Convert the selected grouped object into separate objects	Arrange	
Align To Left	Align the left edge of all selected object to the left edge of the base object	Arrange	
Align To Right	Align the right edge of all selected object to the right edge of the base object	Arrange	
Align To Top	Align the top edge of all selected object to the top edge of the base object	Arrange	
Align To Bottom	Align the bottom edge of all selected object to the bottom edge of the base object	Arrange	
Center Horizontally	Align the horizontal center of all selected object to the horizontal center of the base object	Arrange	
Center Vertically	Align the vertical center of all selected object to the vertical center of the base object	Arrange	
Center	Align the horizontal and vertical center of all selected object to the horizontal and vertical center of the base object	Arrange	
Attach Horizontally	Place the selected objects side by side horizontally	Arrange	
Attach Vertically	Place the selected objects side by side vertically	Arrange	
Even Space Horizontally	Arrange the selected object to have equal horizontal distance between neighboring objects	Arrange	
Even Space Vertically	Arrange the selected object to have equal vertical distance between neighboring objects	Arrange	
Same Width	Set the width of all selected objects to be the same as the base object	Arrange	
Same Height	Set the height of all selected objects to be the same as the base object	Arrange	
Same size	Set the width and height of all selected objects to be the same as the base object	Arrange	

❒ Layer Menu

Menu Item	Function	Toolbar Icon	
Send To Top	Move the selected objects to be on top of all objects	Arrange	
Send To Bottom	Move the selected objects to be at the bottom of all objects	Arrange	
Send Forward	Move the selected objects one step forward	Arrange	
Send Backward	Move the selected objects one step backward	Arrange	
Move To Foreground	Move the selected objects to the foreground	Arrange	
Move To Background	Move the selected objects to the background	Arrange	

❒ Modify Menu

Menu Item	Function	Toolbar Icon	
Flip Horizontally	Flip the selected object horizontally	Modify	
Flip Vertically	Flip the selected object vertically	Modify	
Rotate -90°	Rotate the selected object 90° counterclockwise	Modify	
Rotate 90°	Rotate the selected object 90°clockwise	Modify	
Rotate 180°	Rotate the selected object 180°	Modify	
Rotate Freely	Rotate the selected object freely	Modify	
Edit Nodes	Edit the nodes of the selected object	Modify	
Convert To Shape	Cover the selected object into a shape object	Modify	
Enclose	Toggle to convert a open outline object into an enclosed area or convert an enclosed area into an open outline object	Modify	
Properties	Open the properties dialog of the selected object for editing	Modify	

❒ Window Menu

Menu Item	Function	Toolbar Icon	
New Window	Open a new window for the panel being edited	Standard	

Menu Item	Function	Toolbar Icon	
Cascade	Arrange all open windows in cascade mode	Standard	
Tile Horizontally	Arrange all open windows in horizontal tile mode	Standard	
Tile Vertically	Arrange all open windows in vertical tile mode	Standard	
Arrange Icon	Automatically arrange all the minimized window icons at the bottom		

❒ Help Menu

Menu Item	Function	Toolbar Icon	
About	Show version, license and other information about Panel Editor		

Toolbar

Toolbars contain frequently used menu item for user's convenience.

❒ Standard Toolbar:

Tool Button	Icon	Function
New		Create a new panel and start editing
Open		Open an existed panel for editing
Import		Import a panel created by previous version Panel Editor
Save		Save the panel being edited to disk
Save As		Save the edited panel as a different name
Panel Setup		Define the size and grid setting of the panel being edited
Undo		Undo the previous operation
Redo		Redo the previous undone operation
Cut		Cut the selected content and store it in the clipboard
Copy		Copy the selected content and store it in the clipboard
Paste		Past the content in the clipboard into the panel being edited

Tool Button	Icon	Function
Erase		Delete the selected content
Duplicate		Duplicate the selected content
New Window		Open a new window for the panel being edited
Cascade		Arrange all open windows in cascade mode
Tile Horizontally		Arrange all open windows in horizontal tile mode
Tile Vertically		Arrange all open windows in vertical tile mode

❒ View Toolbar

Tool Button	Icon	Function
Zoom Out		Zoom out to shrink the panel display to half
1:1 View		Show the panel content in 1:1 scale
Zoom In		Zoom in to enlarge the panel display 2 times
Edit Foreground		Edit objects in the foreground
Edit Background		Edit objects in the background
Grid Marks		Toggle to show or hide grid marks
Grid Lines		Toggle to show or hide grid lines
Foreground		Toggle to show or hide foreground objects
Background		Toggle to show or hide background objects

❒ Arrange Toolbar

Tool Button	Icon	Function
Group		Convert the selected objects into a grouped object
Ungroup		Convert the selected grouped object into separate objects
Align to Left		Align the left edge of all selected object to the left edge of the base object
Align to Right		Align the right edge of all selected object to the right edge of the base object
Align to Top		Align the top edge of all selected object to the top edge of the base object
Align to Bottom		Align the bottom edge of all selected object to the bottom edge of the base object
Align to Horizontal		Align the horizontal center of all selected object to the horizontal center of the base object

Tool Button	Icon	Function
Center		
Align to Vertical Center		Align the vertical center of all selected object to the vertical center of the base object
Align to Center		Align the horizontal and vertical center of all selected object to the horizontal and vertical center of the base object
Attach Horizontally		Place the selected objects side by side horizontally
Attach Vertically		Place the selected objects side by side vertically
Even Space Horizontally		Arrange the selected object to have equal horizontal distance between neighboring objects
Even Space Vertically		Arrange the selected object to have equal vertical distance between neighboring objects
Same Width		Set the width of all selected objects to be the same as the base object
Same Height		Set the height of all selected objects to be the same as the base object
Same size		Set the width and height of all selected objects to be the same as the base object
Send To Top		Move the selected objects to be on top of all objects
Send To Bottom		Move the selected objects to be at the bottom of all objects
Send Forward		Move the selected objects one step forward
Send Backward		Move the selected objects one step backward
Move To Foreground		Move the selected objects to the foreground
Move To Background		Move the selected objects to the background

❒ Modify Toolbar

Tool Button	Icon	Function
Flip Horizontally		Flip the selected object horizontally
Flip Vertically		Flip the selected object vertically
Rotate -90°		Rotate the selected object 90° counterclockwise
Rotate 90°		Rotate the selected object 90°clockwise
Rotate 180°		Rotate the selected object 180°
Rotate Freely		Rotate the selected object freely
Edit Nodes		Edit the nodes of the selected object
Convert To Shape		Cover the selected object into a shape object
Enclose		Toggle to convert a open outline object into an enclosed area or convert an enclosed area into an open outline object
Properties		Open the properties dialog of the selected object for editing

❒ Graphic Toolbar

Tool Button	Icon	Function
Select Tool		Select objects to be edited
Node Tool		Edit nodes of the selected object
Rotate Tool		Rotate the selected object
Line		Draw a straight line
Rectangle Tool		Draw a rectangle
Rounded Rectangle		Draw a rectangle with rounded corners
Ellipse		Draw an ellipse or a circle
Pie		Draw a pie shape
Polyline		Draw a polyline
Polygon		Draw a polygon
Curve		Draw a curve
Bezier Curve		Draw a Bezier Curve
Shape		Draw a shape

Frame		Draw a 3-D rectangular frame
Text		Insert a text box
Picture		Insert a picture

❒ Genie Object Toolbar ◦

Type	Icon	Tool Button
Panel		Panel Box
Panel		Popup Panel
Panel		Panel Player
Action		Initiator
Action		AND
Action		OR
Action		NOT
Action		ExIndex
Action		Multiplexer
Action		Scanner
Action		Counter
Action		Timer
Action		Multi-Timer
Action		Delay Timer
Action		Clock
Action		Calculator
Action		Runner
Action		Executer
Action		WAV Player
Control		Button
Control		LED Button
Control		Rocker

Type	Icon	Tool Button
Control		Set button
Control		Spin Button
Control		BMP Button
Control		WMF Button
Control		Horizontal Slider
Control		Vertical Slider
Control		Edit Box
Control		Number Pad
Static Display		Show BMP
Static Display		Show WMF
Static Display		Memo Box
Dynamic Display		Log Box
Dynamic Display		Static Text
Dynamic Display		Dynamic Text
Dynamic Display		Indicator
Dynamic Display		Lamp
Dynamic Display		Shape
Dynamic Display		Digit Meter
Dynamic Display		Text Meter
Dynamic Display		Level
Chart		Horizontal Bar
Chart		Vertical Bar
Chart		Scroll Trend
Chart		Horizontal Trend
Chart		Data Trend
Chart		X-Y Chart
Alarm		Alarm OR

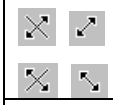
Type	Icon	Tool Button
Alarm		Annunciator
Alarm		Alarm WAV Player
Alarm		Alarm Bar
Alarm		Alarm Log
Alarm		Group Annunciator

- Color Toolbar: Used for quick selection of colors. Its usage will be discussed in later chapters.

- Status Bar: Shows information regarding the status of Panel Editor operation. Information displayed includes brief description of the tool button or the menu item selected, location and size of the object selected, and keyboard lock status.

Cursor

During the operation of panel editor, the shape of cursor may change to indicate its function. This is explained as follows.

Cursor	Name	Function
	Standard	Used for general editing operation that includes menu and tool button selection.
	Locate	After a graphic or genie object is selected from the toolbar, this cursor indicates the location on the panel where a new object can be inserted.
	Grab	This cursor indicates that the interior of an object is grabbed and can be moved to new location in the panel.
	Move	This cursor indicates that the Outline of an object is grabbed and can be moved to new location in the panel.
	Resize Width	This cursor indicates that the width of an object can be resized.
	Resize Height	This cursor indicates that the height of an object can be resized.
	Resize	This cursor indicates that the width and height of an object can be resized simultaneously.
	Node Tool	This cursor indicates that the Node Tool is selected.
	Select Node	This cursor indicates that a node can be selected for operation.
	Rotate Tool	This cursor indicates that the Rotate Tool is selected.
	Rotate	This cursor indicates the node of an object can be selected to do free rotation.
	Text Tool	This cursor indicates that the Text Tool is selected.
	Picture Tool	This cursor indicates that the Picture Tool is selected.

Scale Adjustment

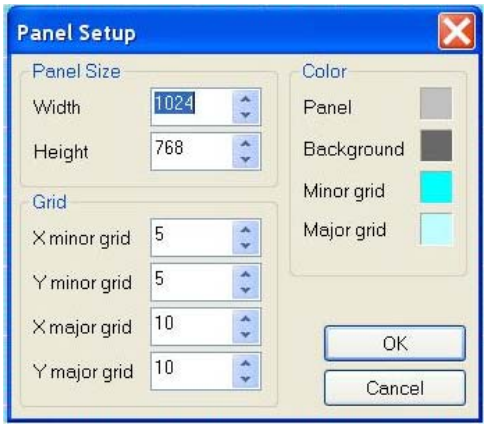
For the convenience of panel editing, tools are provided to adjust the display scale of panel. User can either enlarge or shrink the display scale at any time depending on the detail level of display they need to edit on the objects. Besides the scale related menu items and toll buttons described before, there are some other tool can be used to adjust the display scale of the panel:

- ❒ Scale Toolbar: Pressing left mouse button to drag the slider can adjust the display scale dynamically. The number on the right of the tool indicates the percentage of the display scale. 100% means each pixel on the panel is equal to a pixel on the screen.

- ❒ Horizontal Slider: Dragging the slider can pan the view horizontally to show the portion of the panel that was outside of the view.
- ❒ Vertical Slider: Dragging the slider can pan the view vertically to show hidden portion of the panel that was outside of the view.

Panel Setup

Panel size can be defined by selecting **Panel Setup** from **File** menu or **Standard** toolbar to open the **Panel Setup** dialog.



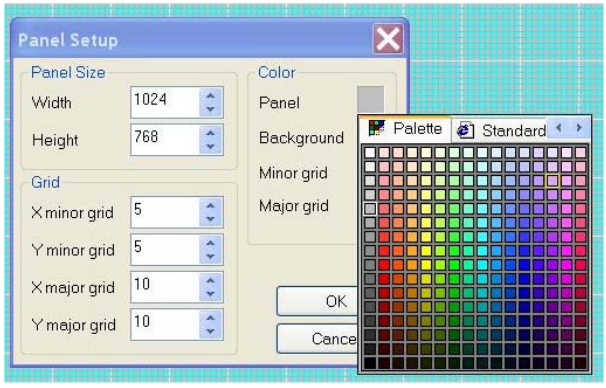
Settings in the dialog include:

Area	Item	Description
Panel size	Width	Width of the panel in pixels.

	Height	Height of the panel in pixels.
Grid	X minor grid	The horizontal distance between minor grids in pixels.
	Y minor grid	The vertical distance between minor grids in pixels.
	X major grid	Define the number of minor grids between horizontal major grids.
	Y major grid	Define the number of minor grids between vertical major grids.
Color	Panel	The color of the panel. This definition is used in panel editor only and will not affect the color of panels during runtime
	Background	The color of the desktop background. This definition is used in panel editor only since the desktop will not be displayed during runtime
	Minor grid	The color of the minor grid lines.
	Major grid	The color of the major grid lines.

Grid is used as an auxiliary tool for object editing. When grid is set to be shown, mouse operation on objects, such as moving and resizing, will lock to grids automatically. When the arrow keys on keyboard are used to move object, the movement distance will also be based on grid size. They can also help users visually to align objects. Grids are displayed in Panel Editor only, and will not be shown at runtime.

To define colors, please right click on the color setting box to open the color pallet. Click on the tab “Pallet”, “Standard”, “System” and “Custom” to switch among different color pallets, and then click on the colors on the pallet to define color properties. Click on any area outside of the color pallet to cancel color selection and close the pallet.



When panel setup is finished, please **OK** button to close the dialog and the new setting will take effect. To give the modification, press **Cancel** button to close the dialog without saving the setting.

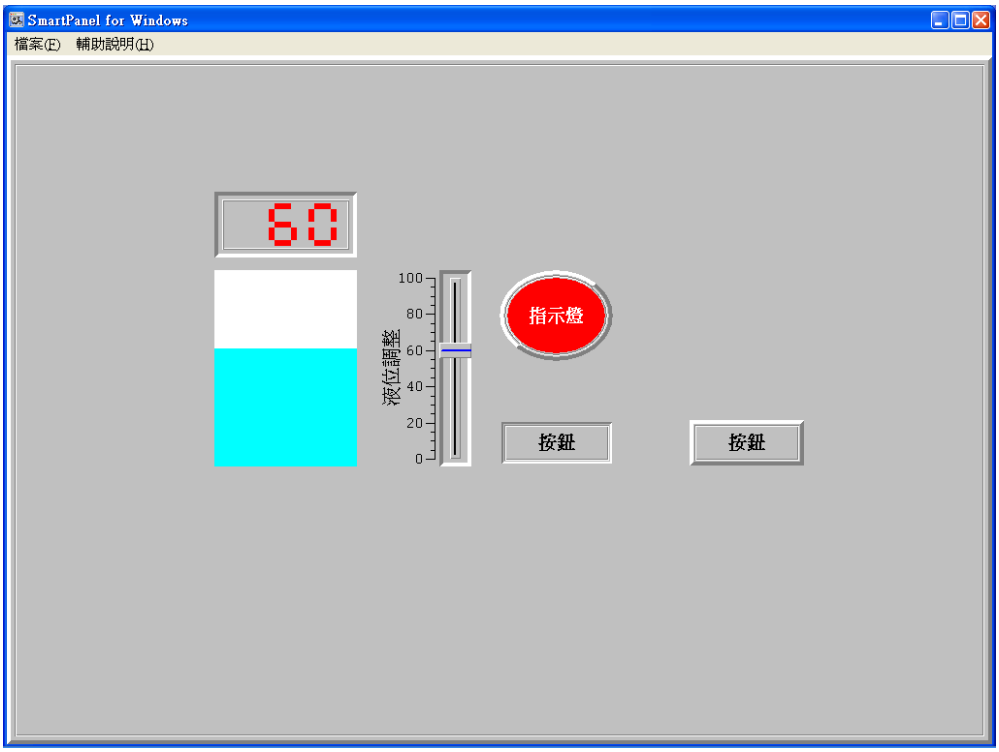
At runtime, since **Lab-LINK** will stretch the panel to fit the screen resolution, all objects will be converted to a logical relative coordinates and displayed with correct relative position and size maintained. To have the best display quality, It is recommended to set the panel size to be the actual window of the panel at run time.

Exit Panel Editor

Select **Exit** from the **File** menu or press the  button on the upper right corner of the panel editor window to exit the application. If any modification has been made to the panel, a dialog will appear to ask for confirmation on saving the panel file.

Chapter 3 Tutorial

A simple example is used to illustrate the using of Panel Editor to create a panel.



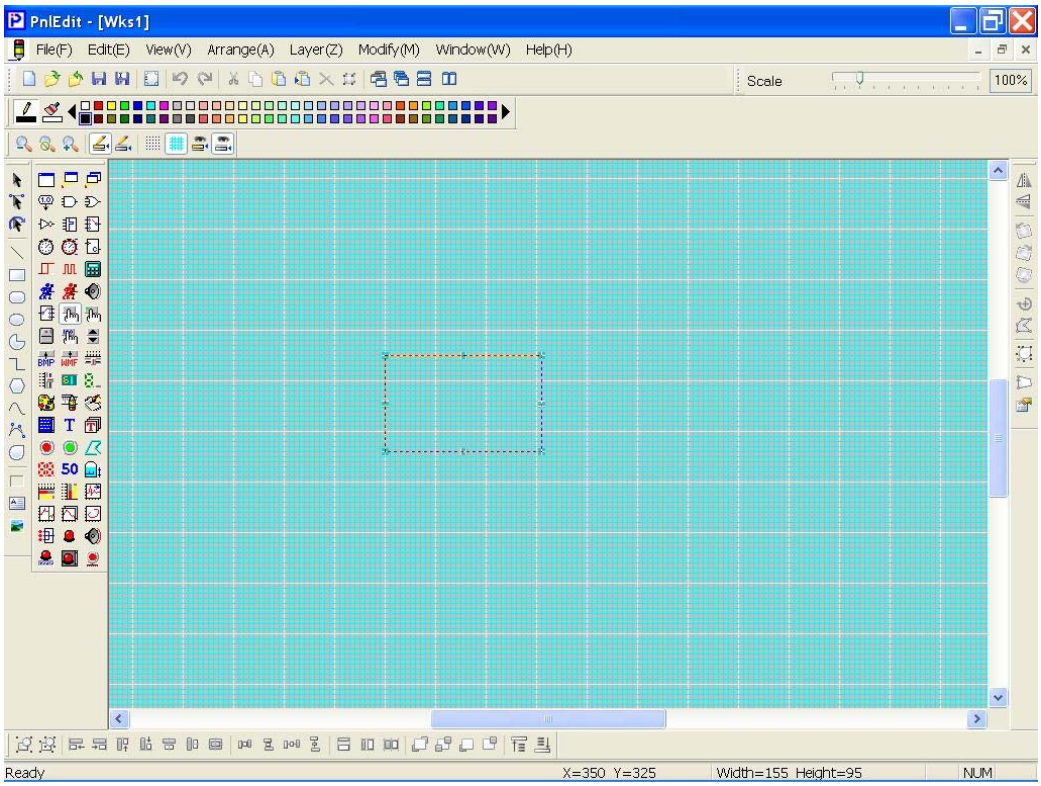
Example for the Tutorial

Open a New Project

Press **New** button on the tool bar of PAM to open a new project. Enter a project name and add a workstation by accepting its default name “Wks1” as requested by the **New Project Wizard**. A new project will be created and the **Project** windows is shown. Click on the **File** tab to select the **File** page in the **Project** window. Double click on **Panel File** node to expand it and shows the panel files. Double click on the root panel file “Wks1.pnl” to run Panel Editor to edit the panel file.

Create the First Object

A Button object will be created as the first object in our example. Move the cursor to the Genie Objects Toolbar and click on  icon to select it. The selected object icon will sink to indicate its selection. Move cursor to where you want to have the button the **Edit Area**. Click left mouse button and drag to right and lower direction and a black will appear and resize as you drag your mouse. The square indicates the size of the **Button** object. Release mouse button when the sized desired is shown and our first object is created on the **Edit Area**.

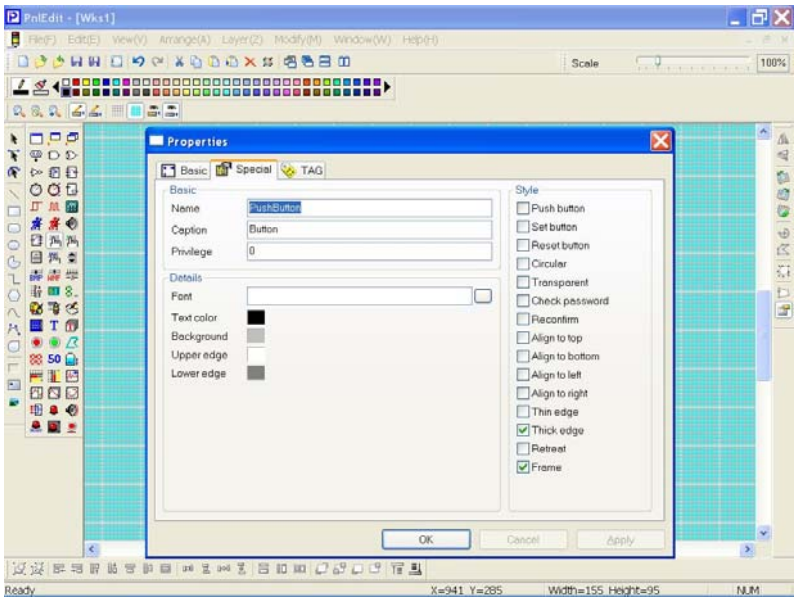


Add a Button object

Define Properties

After the creation of the **Button** object, double click it to open its Properties dialog. Click on the **Caption** field in the **Basic** area of the dialog box, an editing cursor appear to allow editing of this property. Erase the default text of "Button" by pressing "Backspace" key and then enter "Switch" to change the caption (that is the text shown on the button). Move the cursor to the **Close** button

in the dialog box and click on it. The dialog box will be closed and the text shown on the **Button** object can be seen to change to “Switch”.



Button Properties Dialog Box

Define Other Objects

Please select and create the following objects using similar methods described in the previous section.

- Indicator
- Vertical Slider
- Level
- Digit Meter
- Button

Double click on each object one by one to open their properties dialog to edit their properties described below:

❒ Vertical Slider：Change **Caption** in **Basic** area to “Level Adjustment” and check on the

Continuous check box in the **Style** area.

Digit Meter: Change the content of **Digits** in **Properties** area into "3" and **Dec. Digit** into "0".

- ❒ Button: Change **Caption** in the **Basic** area of the second button object into "Exit".

TAG Definition

Objects must be linked to tags to relate them to IO data. Two tags are used in our example: ***led*** represent the status of the indicator and ***level*** represents the height of some liquid in a tank.

Move the cursor to the Indicator object and right click on it. A **Tag Setting** dialog box will appear to allow definition of the tag linked to this object. Enter "led" into the **Index** field. Since the first Button object with "Switch" caption we created will be used to control this Indicator object, please right click on it and enter the same tag name of "led" into its **Target** field. Since tag name is case sensitive, please take care on your typing to avoid mistake.

Open Tag Setting dialog of the three objects related to tank level one by one and enter tag names as described below:

- ❒ Vertical Slider: Enter "level" into **Target** field.
- ❒ Level: Enter "level" into **Source** field.
- ❒ Digit Meter: Enter "level" into **Source** field.

A special system Tag named ***$EXIT*** will be used to end the execution of **Lab-LINK**. Whenever it's set to "1", it will cause Lab-LINK to end. Please right click on the Button object with Caption "Exit" and enter "$EXIT" into its **Target** field. This button will be used to end the ruuning of our example project.

Saving the Panel

After the editing of objects, save the panel file by selecting **Save** from the **File** Menu. After the saving is completed, end Panel Editor by select **Exit** from the **File** Menu and return to PAM.

Running the Example

Exit Panel Editor and return to PAM. Select **Generate** from **Run** Menu to generate the

configuration needed to run the project. Click **OK** button to close message box when generation completes successfully. Select **Run** from **Run** Menu to execute Lab-LINK runtime and load the project. The panel configured in this example will be shown on the screen and is ready for testing.

Move the cursor onto the button with caption “Switch”. The cursor will turn into the shape of a hand indicating that it is an operable object. Press the button by left clicking it and the button will sink. The indicator will be lit and its color becomes bright red. Click on the button again and the indicator will be turned off.

Move the cursor onto the slider, click on its marker and drag it upward or downward. The color bar on the Level object will change accordingly and the number on the Digit meter will also change.

The testing shows that your first panel is correctly built. Click on the “Exit” button to end the running of this project and return to PAM.

Chapter 4 Configure Genie Objects

A simple example is used to illustrate how a panel can be configured. The configuration of genie objects will be explained with further details in this chapter. Since there are many genie objects, and each genie object has its own unique functions and properties. This chapter will only discuss the usage of the panel editor user interface when creating objects and some of the properties common to most genie objects. Detail discussion of the unique functions and properties will be presented in later chapters.

Object Categories

SmartPanel provides more than fifty kinds of objects. These objects can be classified into seven categories:

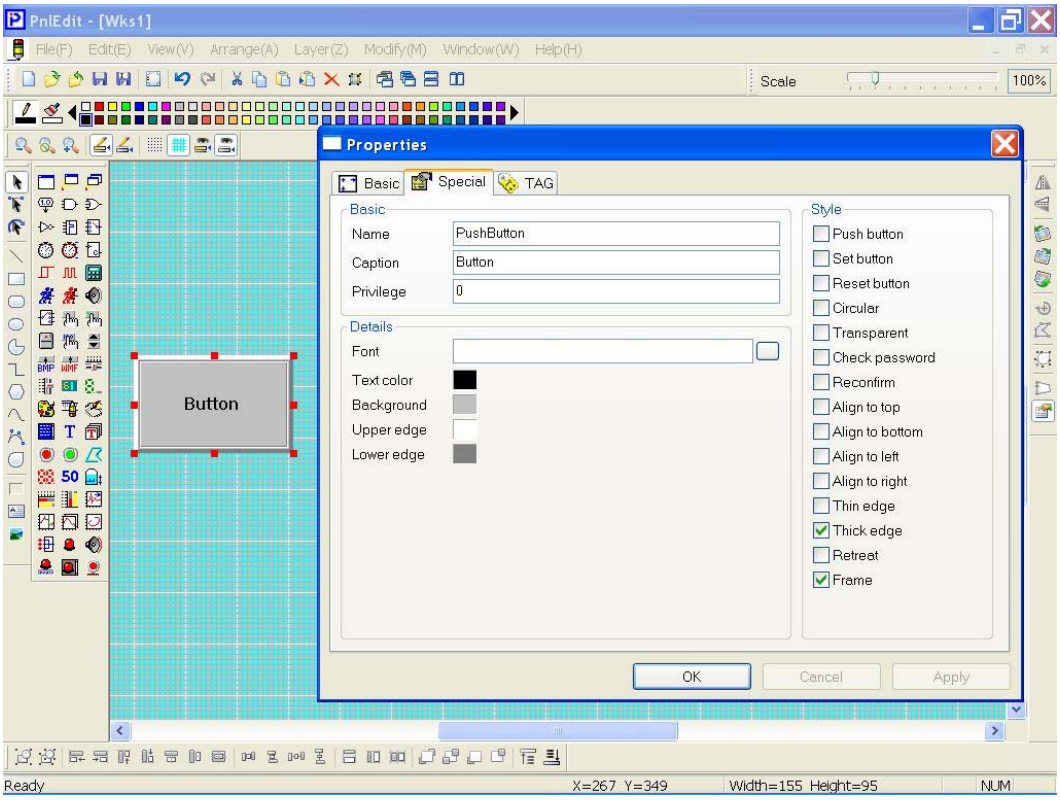
- Panel Objects: Use to control the display, hide or switch of panels.
- Action Objects: Provide logical operation such as math calculation, timing control, application execution…, etc. These objects are all invisible at runtime.
- Control Objects: Use to simulate the operational components on a control panel.
- Static Display Objects: Use to display static graphics or text.
- Dynamic Display Objects: The content they display may changed with Tag values
- Graph Objects: Provide several dynamic graph and chart display showing the change of tag values.
- Alarm Objects: Used to display alarm status of tags.

Despite the differences of their looks and features, all genie objects are configured in a similar manner using the properties dialog provided by panel editor.

Object Definition

Creating a genie object is a four-step process:

1. Select the object needed from the **Genie Objects Toolbar**.
2. Define the position and size of the object in the Edit Area.
3. Set object properties.
4. Set Tag linking to the object.



Selecting Objects

Objects are displayed as icons in **Genie Objects Toolbar**. Select the object needed by left clicking on the icon representing the object. The icon will sink to indicate the object is selected. An object will remain selected until another object or the Selector icon is selected.

Genie Objects Toolbar

Position and Size Definition

After the selection of object, move the cursor to where you want to put the object. Left click your mouse and drag to right and bottom direction. A square appears to indicate the size of the object. Release mouse button when the appropriate size is reached and a new object is created.

Some invisible objects such as action objects will be shown as icons and their size cannot be adjusted. The icons are only for the convenience of editing and they will be hidden during runtime.

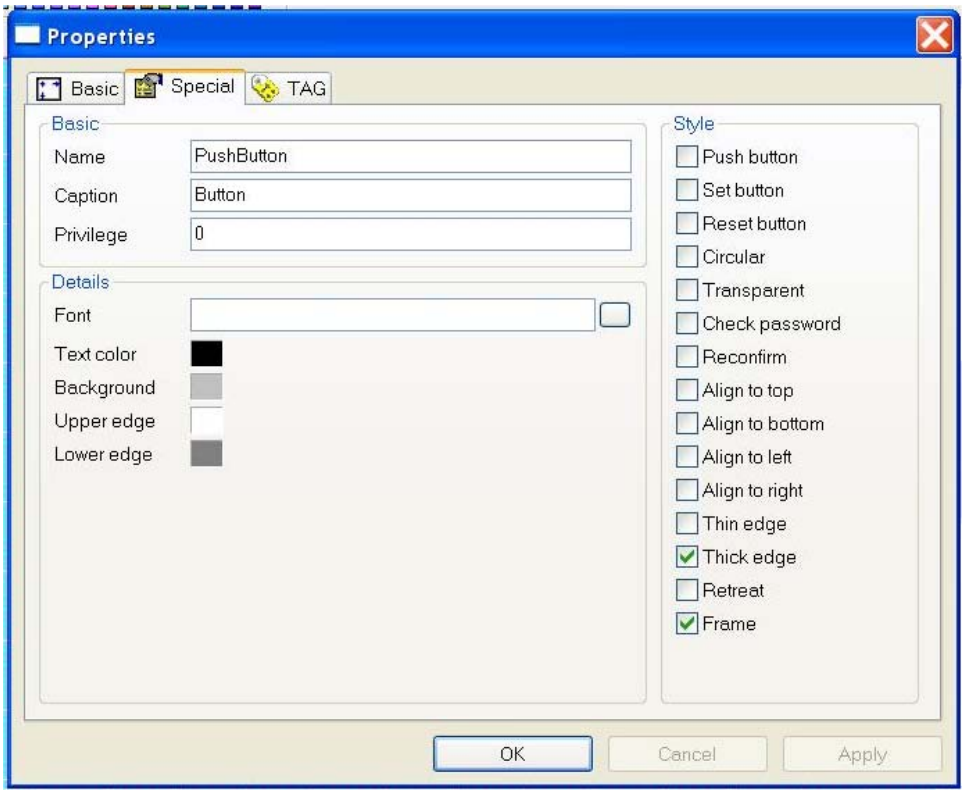
Object Properties Definition

Double click on a object to open its properties dialog box to define its properties. Properties vary among objects of different types. However, they can be classified into the following categories:

- ❒ Basic: Size and position of objects, disable and other options
- ❒ Special: Properties specific to each type of genie object. Depending on the type of genie objects, these property entries may need user to enter a value, select a file

or a color. They can be further divided into these subcategories:

- Basic: Basic information of the object including Name, Caption, size and privilege, etc.
- Details: Properties related to how an object looks and the characteristics of its functions.
- Style: Options related to how an object looks and the characteristics of its functions. They are defined using Check Box. An item is selected when the Check Box shows ☑。



Properties Dialog

❒ TAG: Define the Tags related to the object. Most genie objects need to be specified one or more tags that related to it. The usage of the tag reference differs among genie objects. For objects not related to any tags, the tag definition page may not appear in their properties dialog.

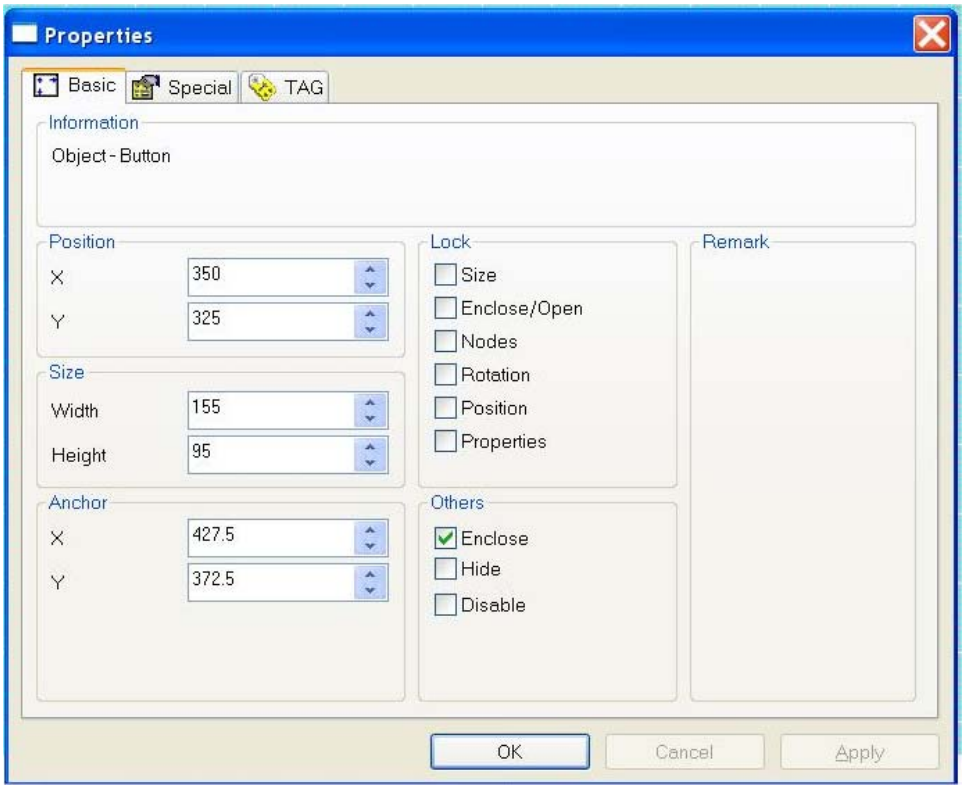
❒ Axes: Axes properties my include X Axis, Y Axis and XY Axes pages. These property pages appear only in the dialog of genie objects which will display one or more coordinate axes. The table below shows the genie objects with axes:

Genie Object	X Axis	Y Axis	XY Axes
Horizontal Slider	ˇ		
Vertical Slider		ˇ	
Horizontal Bar	ˇ		
Vertical Bar		ˇ	
Scroll Trend			ˇ
Horizontal Trend			ˇ
Data Trend			ˇ
X-Y Chart			ˇ

Different genie objects have different properties. The following sections will discuss some of the properties which are common to most objects. For those properties specific to certain kinds of genie objects, they will be discussed in later chapters.

Basic Page

In Basic page of the properties, only **Position**, **Size**, **Lock-Size**, **Lock-Position** and **Others-Disable** apply to genie objects. Other properties are used by graphic objects and need not to be set for genie objects.



Position

Position is defined by **X** and **Y** properties. They represent the coordinates of the upper-left corner of the object. The unit for the coordinates is pixel. At run time, since relative coordinates are used to fit **Lab-LINK** panel with the screen resolution, the object may be stretched in proportional to the panel window size. However, the relative location and size among objects will be automatically maintained.

Size

Width and **Height** define the size of the object. Similar to Position definition, their units are pixels, and the actual size may be stretched at runtime according to screen resolution.

Lock

Lock options are used to prohibit direct change of object properties in panel editors. This is to prevent careless operation mistakes to change object properties accidentally. These setting are only used in the Panel Editor, they have no effect at runtime. Due to object characteristics, only the following options apply to genie objects:

- Size: Prohibit the change of object size properties.
- Position: Prohibit the change of object position properties.

Others - Disable

If checked, the genie object will be disabled. When an object is disabled, it will be invisible and have no functions at runtime.

Special Page - Basic

Name

Name is a required property of all objects, but it is only for reference and uniqueness is not required or obligated.

Caption

Caption is used by several objects to show text on them. All alpha-numeric and most symbol characters can be used.

Privilege

Some operable objects such as those in the control category have this property. Privilege is related to Security Module and is used to determine whether an operator is permitted to operate an object or not. At runtime, each time such a object is operated, security module will compare the privilege of current logged-in user with this properties. Only those users with privilege greater than or equal to this setting can successfully operate this object.

User privilege has a value between 0 and 255 while higher value indicates higher privilege. A number between 0 and 255 should be entered into this property.

Special Page - Details

Details properties vary for object of different types, some of the commonly seen properties editing interface include:

- ❑ Number input
- ❑ Text input
- ❑ Font selection
- ❑ File designation
- ❑ Color designation
- ❑ Combo box selection

Number Input

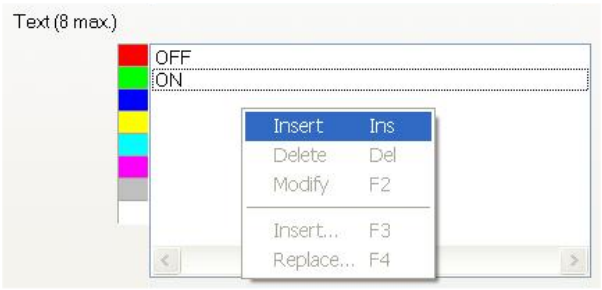
A number is needed. Meaning and range of the number depends on the property itself.

Text Input

A text string is needed. Meaning and length limit of the text depends on the property itself. Usually, all alpha-numeric and most symbol characters will be accepted.

Multiple Number or Text Input

Several text strings or numbers are needed. Meaning and limits depends on the property itself. Number or text is entered in an editor box, and buttons are used to insert, remove and replace a number or string.



To insert a new text entry at the end of the list, please right click on the list bottom and select **Insert** from the popup menu, an empty element appears in the list. Use keyboard to enter the new text and press enter key when finished. The new entry will appear at the end of the list. To insert a new entry before an existed entry, right click on the existed entry and select **Insert**. The new entry will appear right before the existed entry.

To modify an existing text in the list, right click on the entry and select **Modify** from the popup menu. Use keyboard to edit it, and press enter key after the new file path is entered.

To delete a text from the list, right click on the entry and select **Delete** from the popup menu.

To adjust the order of entries in the list, left click to select an entry and drag it upward or downward until the new position is reached.

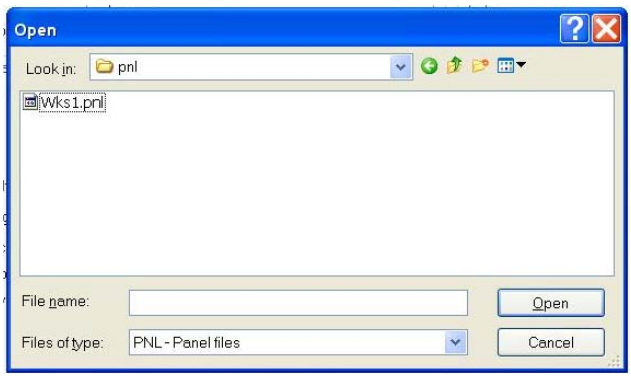
Font

Font is used to determine the font used to display text on the object, usually its caption. Press the button next to **Font** to open the **Font** dialog. Select font using the drop list in the dialog.

If a True Type font is selected, size of the text is controlled by the number of characters defined by **Number of char** field entry. This properties means the number of characters to be shown and will determined the width of each character.

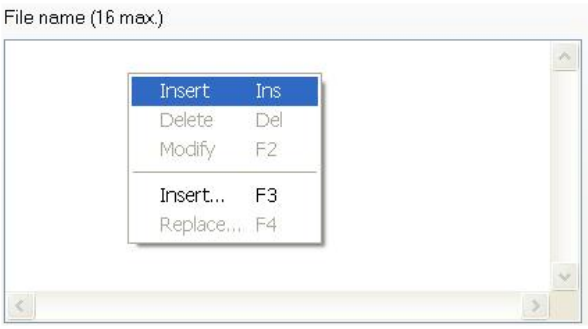
File Designation

Some objects require one or more file to be selected for some properties. Press the button next to the file name to open a dialog for selecting file. Reference path notation as discussed in the appendix of this manual is recommended when designating a file path.



If the property allows multiple files designation, the file property field should be a list. Please

right click on the list and select **Insert** from the popup menu, an empty element appears in the list. Use keyboard to enter the file path and press enter key when finished. The new entry will appear in the list. To insert a new entry before an existed entry, right click on the existed entry and select **Insert**. The new entry will appear right before the existed entry.



To modify an existing path in the list, right click on the entry and select **Modify** from the popup menu, and use keyboard to edit it. Press enter key after the new file path is entered.

To delete a file path from the list, right click on the entry and select **Delete** from the popup menu.

To adjust the order of entries in the list, left click to select an entry and drag it upward or downward until the new position is reached.

File path in the list can also be entered using the **Open** dialog. By selecting **Insert…** from the popup menu, the **Open** dialog will appear to allow the selection of a file path instead of entering it directing into the list.

To replace a file entry in the list using the **Open** dialog, right click on the entry to be replaced and select **Replace** from the popup menu. The **Open** dialog will appear to allow the selection of a new file path. The newly selected file path will replace the original file after the dialog is closed.

Please note that if the file selected by the **Open** dialog is located in one of the system defined reference path, panel editor will change the path into reference notation. For example, if a file in pnl subfolder in the project folder is selected, its path will be changed to "~1\" automatically. This is because the pnl folder is the path for panel files and its reference path notation is~1.

Reference paths and their notations are shown in the table below. For detail discussion on

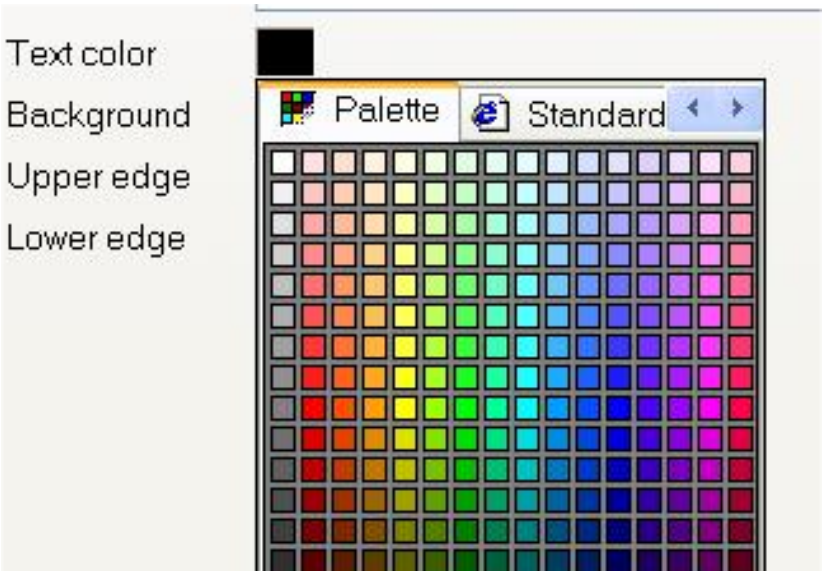
reference path, please see the appendix section.

Reference Path Notation	Path	Description
~1\	Project path\pnl\	Used to store panel files
~2\	Project path\bmp\	Used to store bmp files
~3\	Project path\wmf\	Used to store wmf files
~4\	Project path\wav\	Used to store wave files
~5\	Project path\txt\	Used to store text files
~6\	Project path\dat\	Used to store data files

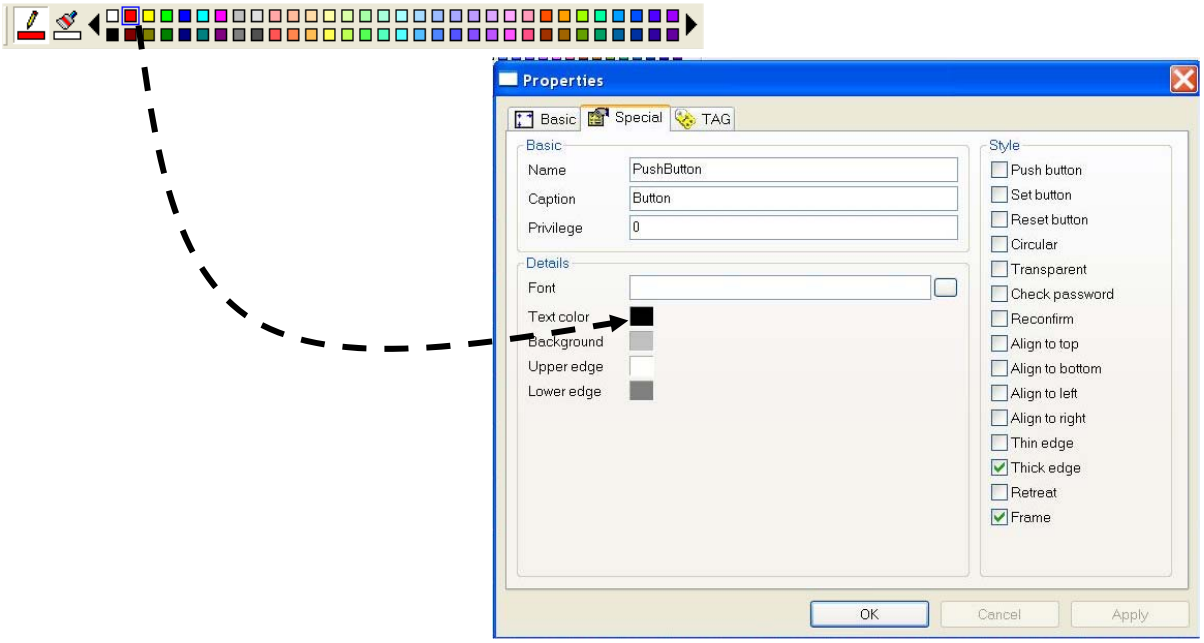
Color Designation

There are several ways to specify a color property:

- Use **Popup Color Tool**: Right click on a color box in the property dialog, and the **Popup Color Tool** will appear. The color tool includes four color pallets. Left click the tabs on top of the color tool to select pallet. When the color needed is found, left click on the color to select it, and the color tool will be closed and the selected color will appear in the color property.



❒ Drag color from **Color Toolbar**: Find the color needed in the **Color Toolbar**, left click on it and drag to the corresponding color box in the property dialog.



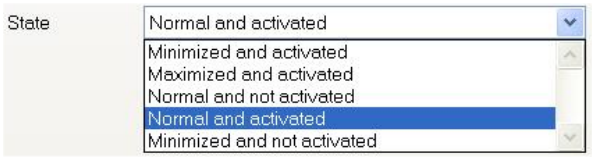
❒ Click on **Color Toolbar**: This is a convenient method to specify color without opening properties dialog. Select one or more objects whose color need to be modified, and the left click or right click on the color needed on the **Color Toolbar** to change the color properties of the selected objects. Depending on the type of genie object, the color properties modified by left click or right click operation are shown below:

Genie Object	Color Property changed by left click	Color Property changed by right click
Panel Box	—	Background
Popup Panel	—	Background
Panel Player	—	Background
Button	Text Color	Background
LED Button	Text Color	Lit Lamp Color
Rocker	Mark Color	Background
Set Button	Text Color	Background
Spin Button	Arrow Color	Background
BMP Button	—	Background

Genie Object	Color Property changed by left click	Color Property changed by right click
WMF Button	—	Background
Horizontal Slider	Mark Color	Background
Vertical Slider	Mark Color	Background
Edit Box	Text Color	Box Color
Number Pad	Lit Color	Ext color
Show BMP	—	Background
Show WMF	—	Background
Memo Box	Text Color	Box Color
Log Box	Text Color	Box Color
Static Text	Text Color (First)	Background
Dynamic Text	Text Color (First)	Background
Indicator	Text Color	Lamp Color(First)
Lamp	Text Color	Lamp Color(First Lit)
Shape	Color(First)	Color(Second)
Digit Meter	Lit Color	Ext Color
Text Meter	Text Color (First)	Background
Level	Liquid Color	Background
Horizontal Bar	Bar Color(First)	Chart Background
Vertical Bar	Bar Color(First)	Chart Background
Scroll Trend	Curve Color(First)	Data Window Color
Horizontal Trend	Curve Color(First)	Data Window Color
Data Trend	Curve Color(First)	Data Window Color
X-Y Chart	Curve Color	Data Window Color
Annunciator	Text Color	Normal Color
Alarm Bar	Normal Color	Background
Alarm Log	Normal Color	Log Box Color
Group Annunciator	Text Color	Normal Color

Combo Box Selection

Some properties are selected using a combo box.



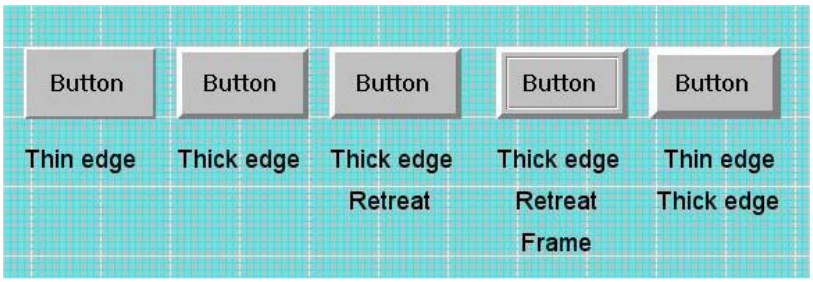
Special Page - Style

Some of the common style definitions used by many objects are discussed as follows.

Edge, Retreat and Frame

Many of the objects are 3D and have these style options:

- ❒ Thin Edge: Add thin edge around the object for 3D effect.。
- ❒ Thick Edge: Add thick edge around the object for 3D effect.。
- ❒ Retreat：Shrink the content such as graphics and text shown in the object so the background color will become visible.
- ❒ Frame: Add an extra 3D frame around the graphics or text shown in an object.



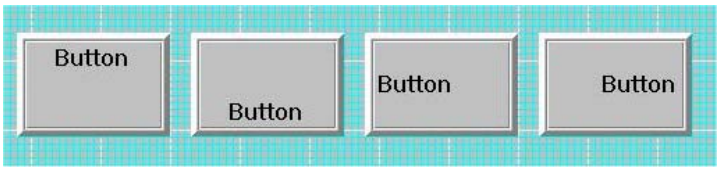
Three color properties are used to define the color of edge and frame:

❒ Background ❒ Upper Edge ❒ Lower Edge

Text Alignment

The following styles are used to define the alignment of text on an object:

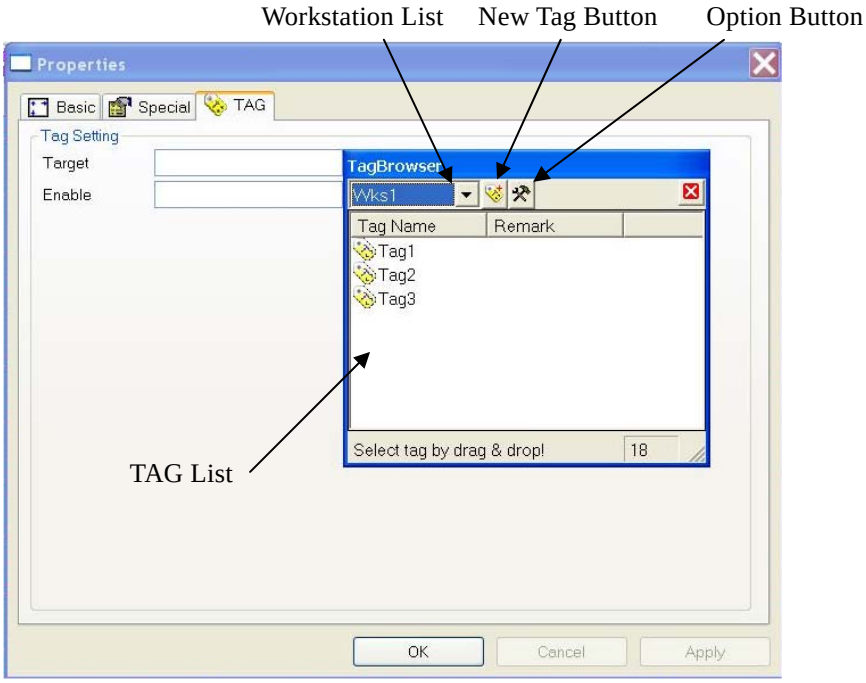
❒ Align to top ❒ Align to bottom ❒ Align to left ❒ Align to right



TAG Linking

Since object are mostly used to display or control the status or value of IO data, their configuration of objects is not complete without linked them to Tags. Meanings of the tags depend on objects.

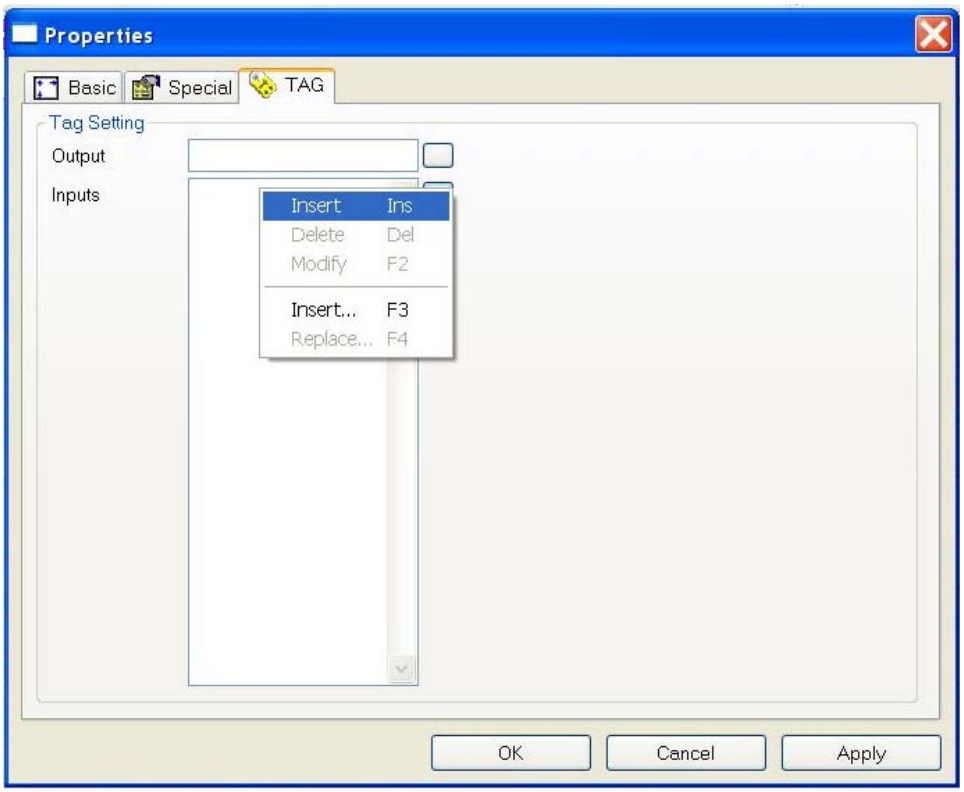
To define tags linking to an genie object, click on the **TAG** tab in the properties dialog to show TAG properties page. There are two ways to define tags. By left clicking a field, tag name can be entered directly using keyboard. Another method is to use the **Tag Browser** tool by clicking on the button next to each tag field. With Tag Browser, tags can be selected from the Tag database already created in the project and users need not to memorize the tag name.



Some genie object may need to define more than one tag in a single tag property field. Such field

will be shown as a list. To insert a tag name entry into the list, right click on the blank area in the list and select **Insert** from the popup menu. Use keyboard to enter the tag name and press enter key. To insert a tag name right before an existing entry, right click on the existing tag and select **Insert**. The newly added tag will appear before the existing tag.

Tags can also be inserted into a tag list using the Tag Browser tool by selecting **Insert…** from the popup menu..



To modify am existed tag name, right click on the tag and select **Modify** from the popup menu. Use keyboard to edit the tag and press enter key when finished.

To delete a tag from the tag list, right click on the tag and select **Delete** from the popup menu.

To adjust the order of tags in the list, left click on the tag to be moved and drag it to the new position.

Usage of **Tag Browser** tool will be explained in further details:

- **Workstation List**: It lists all the workstation names in the project. Use the drop down list to select a workstation, and the tag already created in its tag database will be shown in the **Tag List**. Besides workstation names, a **Panel Tag** entry also

appears in the workstation list. Selecting **Panel Tag** will show all the panel tags already created in the project.

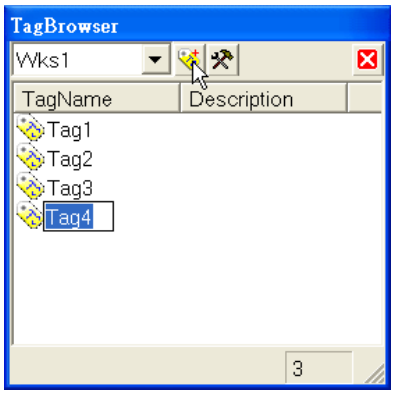
❒ **TAG List**: The list shows all the tag created for the workstation selected in the **Workstation List**. There are three way to show the tags: Icon View, List View and Report View. Press the **Option** button to select how the tags will be displayed.

Icon View

List View

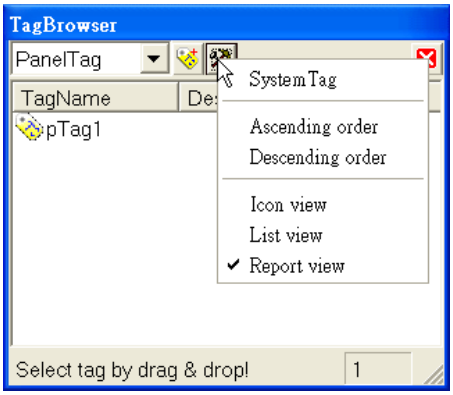
Report View

❒ **New TAG**: Press the **New TAG** button to create a new tag for the selected workstation. Use keyboard to enter a new tag name and press enter key when finished. The newly added tag will be added into the tag database of the workstation automatically.

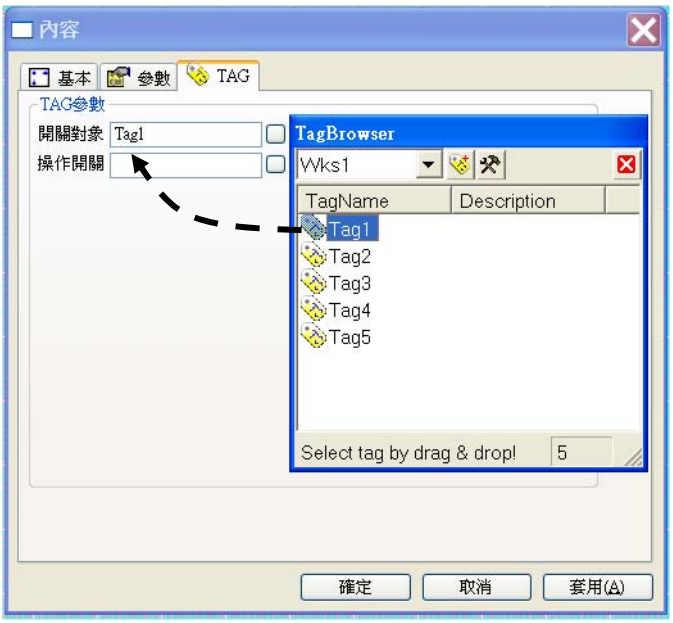


❒ **Option**: Press **Option** button to select display option in the **Tag Browser** tool. The options include:

- **System Tag**: Select this option to show system tags in the tag list.
- **Ascending order**: Selecting this option and tags will be display ascending alphabetic order.
- **Descending order:** Selecting this option and tags will be display descending alphabetic order.



- **Icon View**: Show tags as icons in the **Tag List**.
- **List View**: Show tags as a list of tag name entries in the **Tag List**.
- **Report View** Show tags as a list of tag name entries in the **Tag List** but with description of the tags.



To add a tag into a property field using the **Tag Browser** tool, simply left click on the tag name from the TAG List and drag it to the field. The selected tag will appear in the field when left mouse button is released.

Chapter 5 Configure Graphic Objects

Graphic Objects are new type of objects introduced by ***Panel Editor 4***. They can be used to create graphic in a panel. Graphic objects are not linked to any tags, and they are static at runtime. The following graphic objects are provided in ***Panel Editor 4***:

- Line
- Rectangle
- Rounded Rectangle
- Ellipse
- Pie
- Polyline
- Polygon
- Curve
- Bezier Curve
- Shape
- Frame
- Text
- Picture

Graphic Object Toolbar

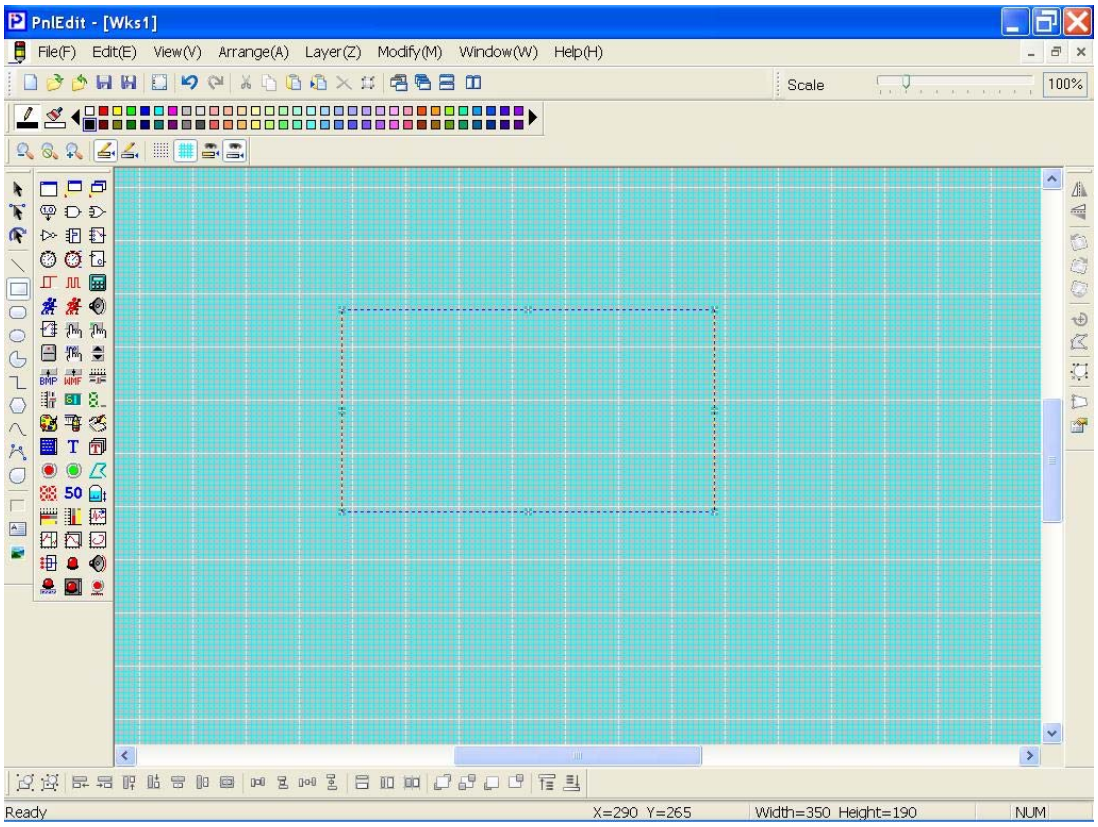
Adding Graphic Objects

In Panel Editor, graphic objects can be selected by left clicking it in the **Graphic Object Toolbar**. The selected object button will be highlighted.

After an object type is selected, it can be added into the panel. However, the method to add an object is different for different types of objects and will be discussed separately as follows:

- Line, Rectangle, Rounded Rectangle, Ellipse, Frame

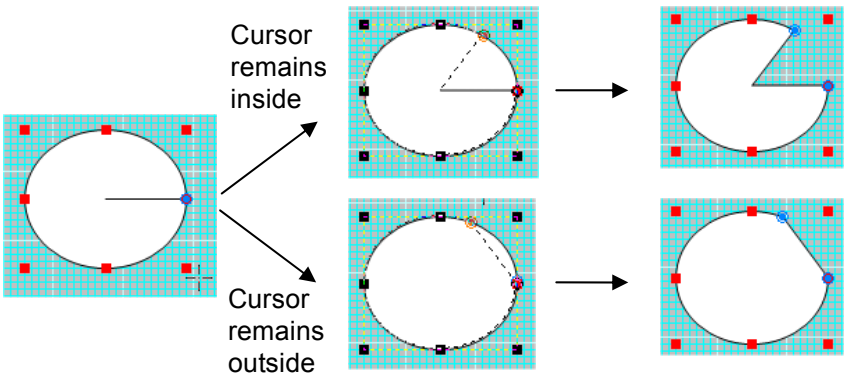
  Move the cross shape cursor to where the object will be added. Press left mouse button to drag rightward and downward. A dotted rectangle will appear to indicate the position and size of the object. When the required size is reached, release the mouse button and the object is added.



- Pie:

  Move the cross shape cursor to where the object will be added. Press left mouse button, drag rightward and downward, and release the mouse button. A 360° Pie shape appears. Left click on in the Graphic Toolbar to select the **Select Tool**. Left click on the newly

added pie shape to select it, and then left click on blue dot appearing at the end of the separating line on the pie. Drag the blue dot clockwise or counterclockwise to change the angular size of the pie. When the required size is reached, release mouse button. The position of cursor when dragging the blue dot will generate different shape. If the cursor remains inside the object during the dragging operation, it will generate a traditional concave pie shape. If the cursor remains outside of the object, the generated shape will be different as shown below.



- Polygon

Move the cross shape cursor to where the object will be added. Press left mouse button to drag rightward and downward. A dotted rectangle will appear to indicate the position and size of the object. When the required size is reached, release the mouse button and a hexagon will appear. The number of sides of the polygon can be changed by editing its properties, and will be discussed later.

- Polyline, Curve

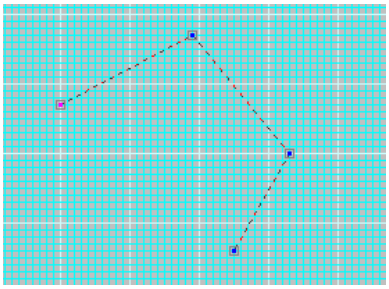
These graphic objects require the definition of multiple nodes. Two methods can used to define the nodes:

(1) Click method: Move the cross shape cursor to where the first node will be added and click left mouse button. The first node is added. Move the cursor to the position of the second node and left click again to add the second node. A line or curve will appear to connect the first and the second node. Continue this operation until all the nodes are added.

(2) Drag method: Move the cursor to where the first node will be added, press left mouse button and drag it to show the first segment of line or curve. Release mouse button when the first segment reached the required position and the first segment is

completed. Press left mouse button again on any position on the panel and drag to show the second segment. Drag the second segment until the required position is reached and release mouse button. Continue this operation until all the segments are added.

Press right mouse button to end the configuration of the object, and a completed line or curve object is shown. The adjustment of nodes will be discussed later.



- Bezier Curve:

A Bezier curve is consisted of multiple connected segments. A Bezier segment is composed of two nodes and two control points. Two connected segment share a common node. If the first control point of the second segment is at the mirror position of the second control point of the first segment, the two segments can be connected smoothly. With this concept in mind, a smooth and complex Bezier curve can be constructed by properly defining each node and control point.

Similar to the Drag method described in the previous section of the Polyline and cure object configuration, a Bezier curve object can be added by move curser to where the first node is and drag to show the dotted reference line formed by the first node and the first control point. Press left mouse button when the position of the first control point is reached. Move cursor to the location of the second node. Press left mouse button to set the second node. This is also the first node of the second segment. Drag to show the reference line formed by the first node and the first control point of the second control point. A mirrored second control point of the segment is automatically generated, and a dotted first segment is also shown. Continue this operation until all segments are constructed. Press right mouse button to end the configuration of the object, and a completed Bezier curve is shown. The adjustment of nodes and control points will be discussed later.

- Shape:

A Shape is a complex geometric shape consisted of multiple connected Bezier curve segment and/or line segments. To configure a shape object, please refer to the description

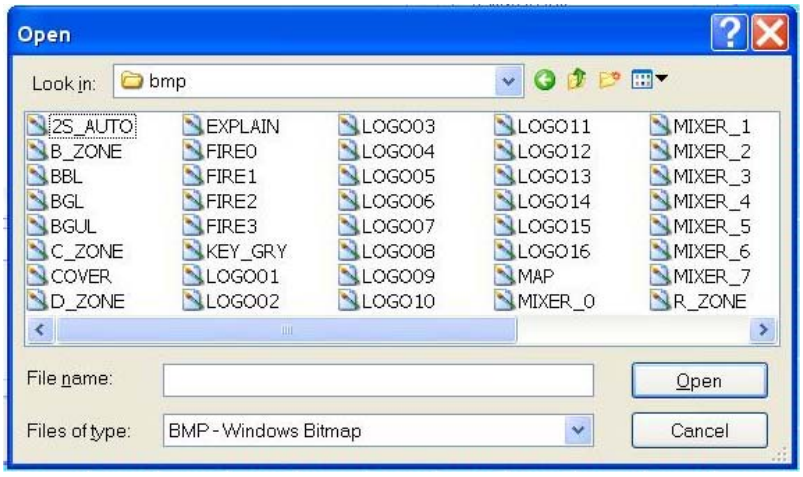
in adding Polyline objects and Bezier Curve objects. When a polyline segment is to be added, use the Click method. If a Bezier curve segment is to be added, use the Drag method. Continue the operation of adding polyline or Bezier curve segment until all segments are configured. Press right mouse button to end the configuration of the object, and a completed shape is created. The adjustment of nodes and control points will be discussed later.

- **Text**:

Move cross shape cursor to where the object will be added. Click left mouse button, and a text editing box appears. Use keyboard to enter text. Click on the **OK** button when finished. Text fonts, size and content can be edited using the properties dialog which will be described later.

- **Picture**:

Move cursor to where the object will be added and click left mouse button. An **Open** dialog will appear to allow a picture file to be chosen. Select a file using the Open dialog and press **Open** button to close the dialog. The selected picture will appear in the panel as a picture object.



Note that is the file selected located in one of the system defined reference path, its path will be replaced with the corresponding reference path notation. For example, if a picture file located in the bmp subfolder of the project is selected, its path will be covert to ~2\. Please refer to the appendix section of this manual for further discussion of reference path.

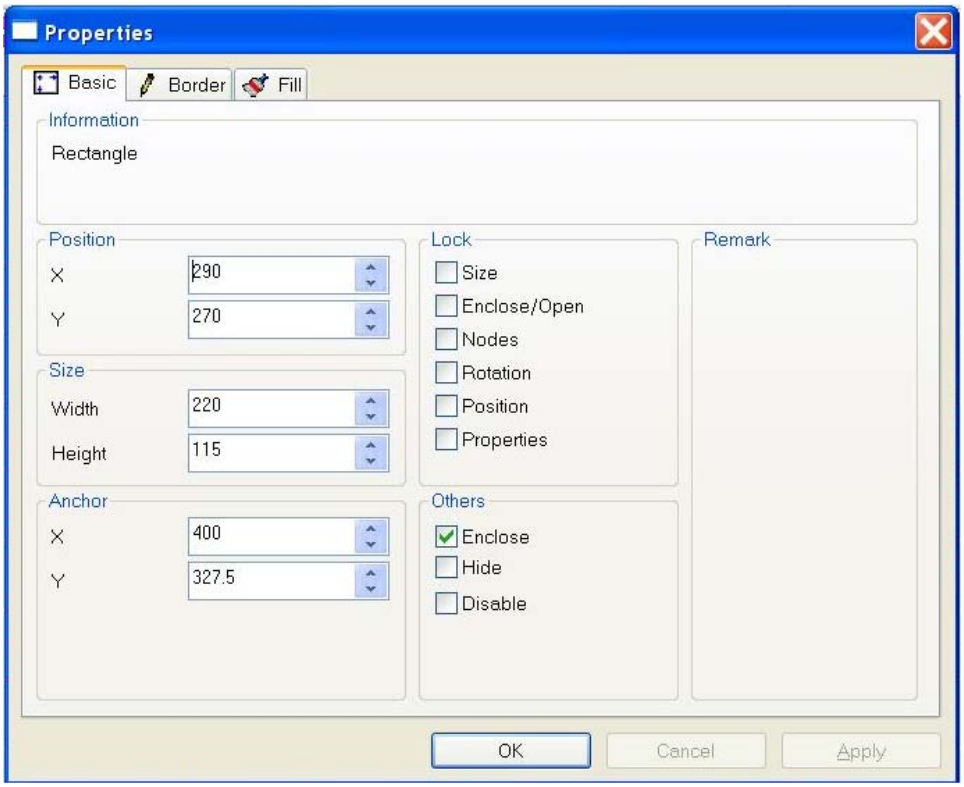
The standard reference path notation of picture files aer shown below:

Reference Path	Location	說明
~2\	Project folder\bmp\	Used to store bmp picture files
~3\	Project folder\wmf\	Used to store wmf picture files

Graphic Object Properties

Each graphic object has some properties, and the looks of the graphic object can be modified by editing its properties. Properties of graphic objects can only be edited in the panel editor, and they will remain static at runtime.

To modify properties, the object must be right clicked and select **Properties** from the popup menu. The properties dialog of the object will appear to allow editing.



There are three buttons at the bottom of the properties dialog: **OK**, **Cancel** and **Apply**. This provides three selections after the editing of properties is finished:

Button	Function
OK	The modified properties will take effect and the dialog will be closed.
Cancel	The modified properties will be discarded, and all setting will be reset to the values before editing. The dialog will remain opened.
Apply	The modified properties will take effect, but the dialog will remain opened. Users can continue to edit the properties of the object or select a different object for editing.

Note that after the editing of the properties of a object, either **OK** or **Apply** button must be press to apply the edited properties to the object. If another object is selected or any blank area in the panel is clicked, the edited properties will be discarded and no modification of the object is made.

Depending on the type of graphic objects, there are different pages in the properties dialog as shown below:

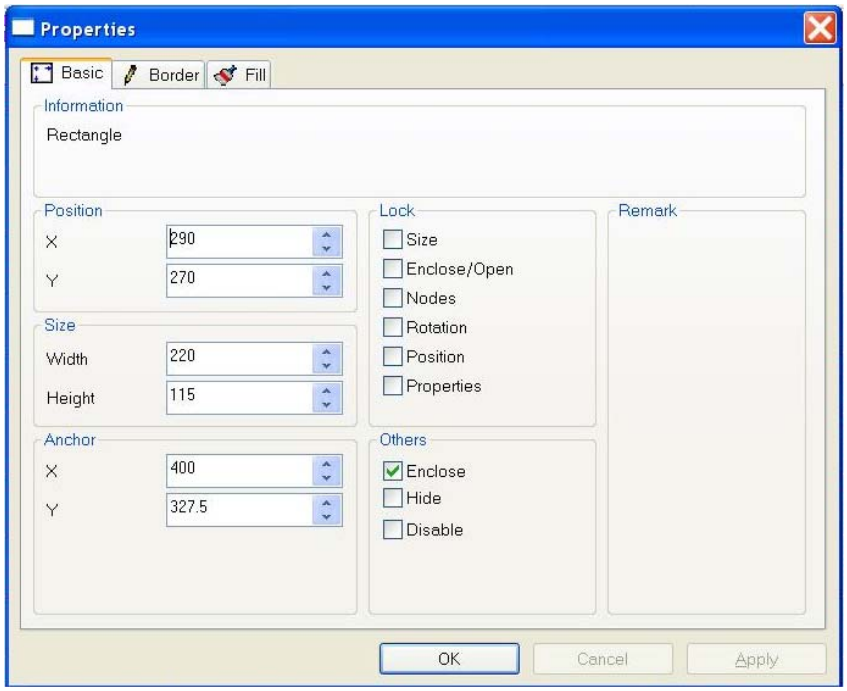
Object	Basic	Border	Fill	Polygon	Text	Picture
Line	X	X				
Rectangle	X	X	X			
Rounded Rectangle	X	X	X			
Ellipse	X	X	X			
Pie	X	X	X			
Polyline	X	X	X			
Polygon	X	X	X	ˇ		
Curve	X	X	X			
Bezier Curve	X	X	X			
Shape	X	X	X			
Frame	X	X	X			
Text	X				X	
Picture	X					X

Note: X indicates the type of object has this properties page.

Not all properties apply to every type of graphic objects

Basic Page

Click on the **Basic** tab on top of the properties to select the **Basic** properties page. This page is used to define position, size, anchor point, lock option and other basic properties.



- Information: A brief description about the object type.
- Position:
  - X: The horizontal coordinate of the upper left corner of the object. The unit is in pixel.
  - Y: The vertical coordinate of the upper left corner of the object. The unit is in pixel.
- Size
  - Width: The width of the object. The unit is in pixel.
  - Height: The height of the object. The unit is in pixel.
- Anchor point: The anchor point will be used the center of rotation when the object is rotated. Its position also affects the center of color filling when gradient fill is selected.
  - X: The horizontal coordinate of the anchor point of the object. The unit is in pixel.
  - Y: The vertical coordinate of the anchor point of the object. The unit is in pixel.
- Lock: Options in this area is used to prohibit users from using direct mouse operation or indirect menu or toolbar operation to change some of the object properties. The only way to modify the locked properties is by opening the properties dialog to edit them. This design is to prevent careless operation mistake from changing object properties

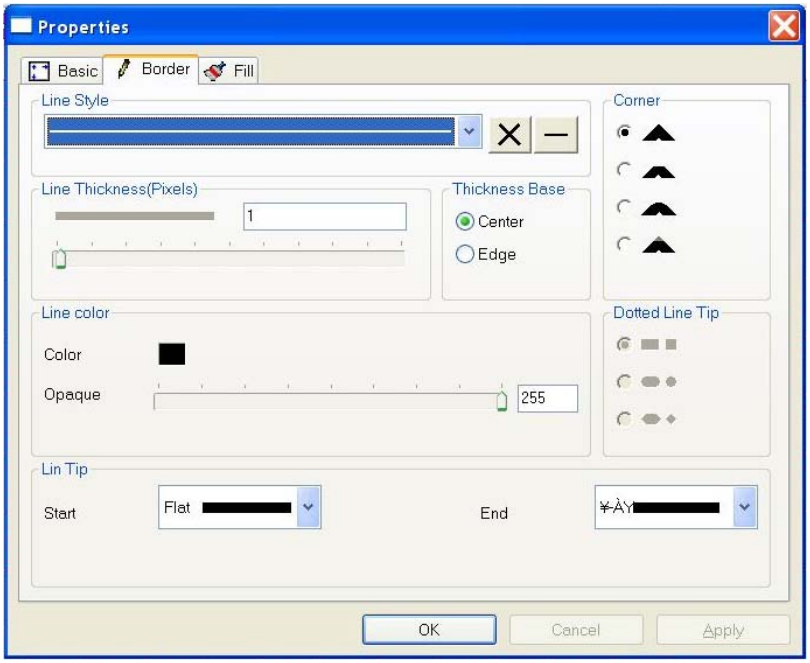
accidentally. For example, if the **Lock** option of Position is check, users will not be able to move the object by using mouse to drag it. All lock options are for panel editor operation only and have no effect at runtime.

- Size: Prohibit the change of object size.
- Enclose/open: Prohibit the change of enclose/open characteristic of the object.
- Node: Prohibit the editing of nodes.
- Rotate: Prohibit the rotation of the object.
- Position: Prohibit the moving of object position.
- Properties: Reserved and has no effect.

- Others
  - Enclose: Define whether the object is treated as an enclosed area or not. Unchecked the option will cause the object to become a open border without the interior area. This option only applies to polyline, curve, Bezier curve and shape. Other geometric graphic objects must be converted to shape for the option to take effect.
  - Hide: When the option is set, the object will become invisible. Although it can still be added, it will not be shown at runtime.
  - Disable: When the option is set, the object will become invisible. Although it can still be added, it will not be shown at runtime.

Border Page

Click on the Border tab in the properties dialog to switch to border property page. This page is used to define the border features of graphic objects.



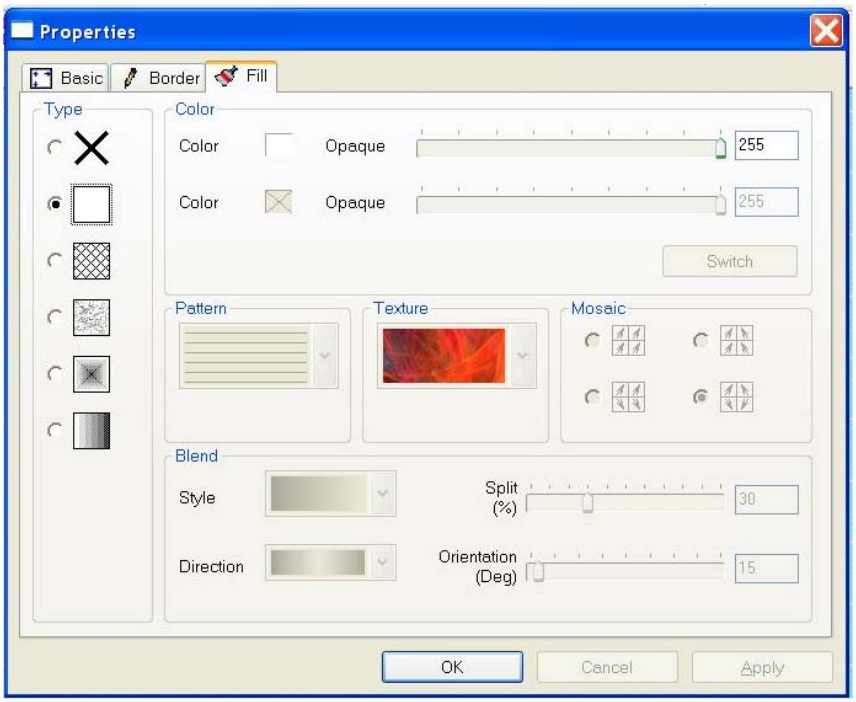
- Line Style: Use the drop down list to select the style of the border. If **Hidden** is chosen, the object will have no border.
- Line Thickness: Define the thickness of the border. The unit is in pixel. An integer value can be enter directly using keyboard. Alternately, users can also use mouse to drag the slider to adjust the thickness.
- Thickness Base: Define what the thickness is based on.
  - Center: Use the edge of the object as the center of the border and extend the border in both directions, inner and outer. It is possible for the border to exceed the edge of the object if the thickness is greater than 1.
  - Edge: The border extends only in inner direction. This setting guarantees that the border won't exceed the edge of the object.
- Line Color
  - Color: Define the color of the border.
  - Opaque: Define opaqueness of the border. It is an integer value between 0 and 255 and can be adjusted by entering a number or dragging the slider. The smaller the

number is, the more transparent the border becomes.

- Line Tip: Define the shape of both ends of the border. This property only affects objects that is not enclosed.
  - Start: The shape of the starting tip of the border.
  - End: The shape of the ending tip of the border.
- Corner: Define the shape of each corner of the border.
- Dotted Line Tip: If a dotted line is selected as the line style of the border, this property defines the shape of the tip of each line segment.

Fill Page

Left click on the **Fill** tab on top of the properties dialog to show the Fill page. The page is used to define the fill characteristics of the interior area of objects.



- Type: The type of color filling used.

Type	Description
✕	No filling. The interior area will be transparent.
□	Solid fill: Use the first (upper) color in color properties to fill interior area of the object.

Type	Description
	Pattern fill: Use the first (upper) color in color properties as background color to fill the interior area of the object, and use the second color to draw the selected pattern.
	Texture Fill: Use the selected texture tile to fill the interior area of the object. The direction the texture tiles are arranged depends on the Mosaic properties.
	Centered Gradient Fill: Use both color defined in color properties to create centered gradient fill. The center of the filling is the anchor point.
	Linear Gradient Fill: Use both color defined in color properties to create linear gradient fill. If the selected style isn't based on center or edges, the **Split** properties can determine the split position of both colors. The split point is defined as a percentage of the width or height of the object. If the **Direction** property is defined as **Custom**, the **Orientation** properties can be defined to adjust the inclined angle.

Note: If an object is set as  (No Filling), its interior area will not be considered as part of the object. Therefore, when selecting the object, its border must be clicked on. Clicking on its interior area will fail to select the object.

- Color: Define the color and opaqueness of the filling. The meaning of both color and opaque properties depends on the style of filling.
- Pattern: Used to select a pattern for filling. This property applies only when  (Pattern Fill) is selected as the filling style.
- Texture: Used to select a texture tile for filling. The property applies only when  (Texture Fill) is selected as the fill style
- Mosaic: Used to define the direction of the texture tile when forming texture filling. This property applies only when  (Texture Fill) is selected as the filling style.
- Blend: These properties are used to define how the two colors should be blended to create

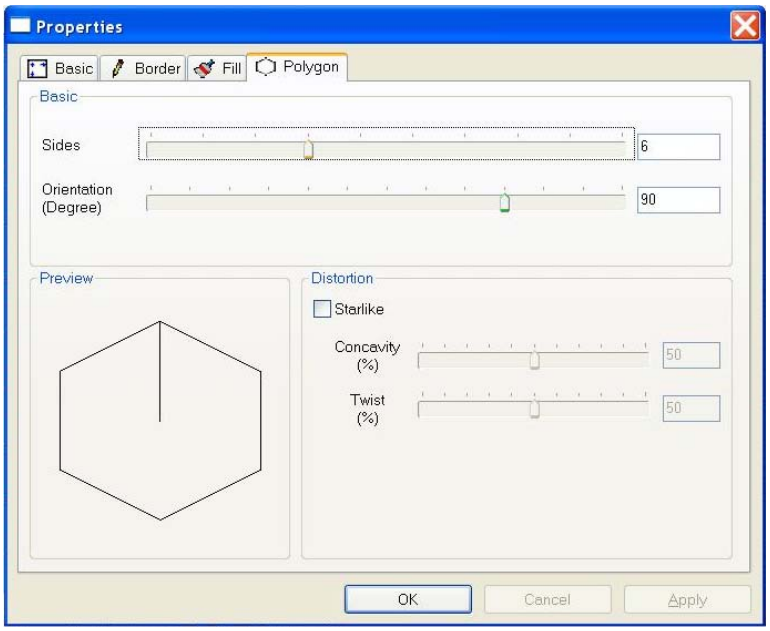
a gradient filling.

- Style: Used to define the blend style. This property applies only when  or  is selected as the filling style.
- Direction: Specify the direction of the gradient filling. This property applies only when  is selected as the filling style.
- Split: Specify the split point to blend the two colors. The unit is in percentage of the width or height of the object. This property applies only when the blend style is not based on center or both edges of the object.
- Orientation: Specify the inclined angle of the linear gradient fill. This property applies only when the **Direction** property is selected as **Custom**.

Polygon Page

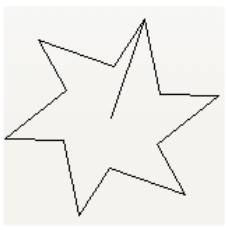
Only polygon objects have this property page. Left click on Polygon tag on top of properties dialog to show this property page.

- Basic
  - Sides: Specify the number of sides of the polygon object. It is an integer between 3 and 12. Users can enter a value directly in the field on the right, or drag slider to adjust it.
  - Orientation: Specify the rotation angle of the polygon object. Note that a polygon object cannot be rotated using the **Rotate** tool unless it is first converted into a **Shape** object.
- Preview: Properties modification will be shown immediately in this area as a preview.



- Distortion
  - Starlike: Checking this property will convert the polygon into a concave star shape, Two more properties can be set to control the extent of distortion of the object.
    Concavity: Specify the percentage of concavity of the star shape polygon object.
    Twist: Specify the extent of twisting.

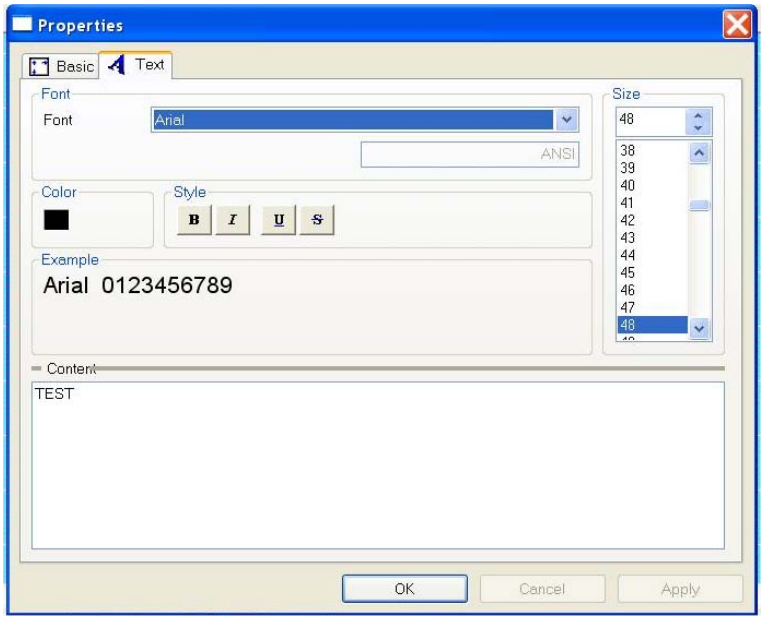
Concavity 50%, Twist 50%



Concavity 50%, Twist 25%

Text Page

Only Text objects have this property page. Left click on the Text tab on top of properties dialog to show this property page.



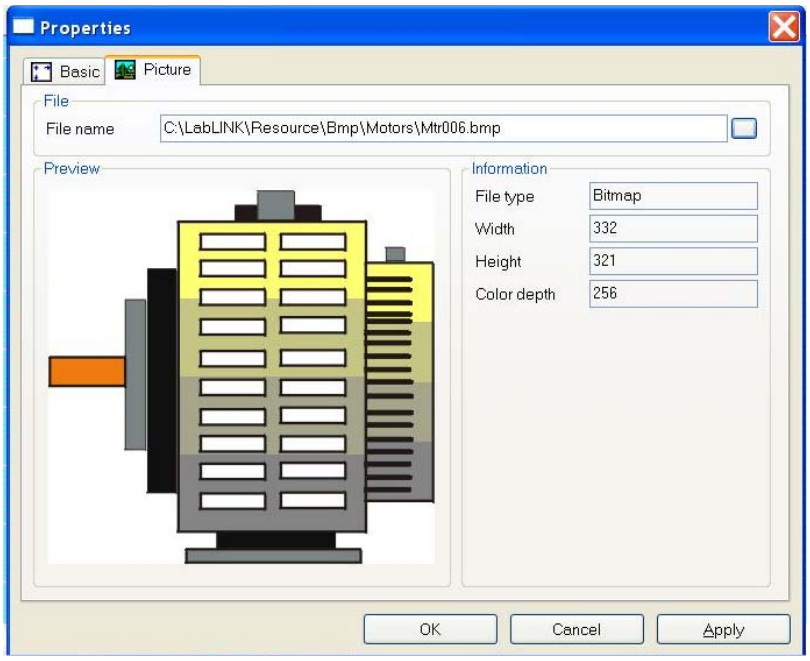
- Font
  - Font: Select the font used to display the text.
- Color: Select the color used to display the text.
- Style: Select the style applied to the text:

Style	Description
B	Bold
I	Italic
U	Underline
S	Cross line

- Size: Specify the size of the text. The unit is point.
- Example: Preview of the text format.
- Content: The text content to be displayed. Users can edit the text content directly in this area using keyboard. Multi-lines text is allowed.

Picture Page

Only Picture objects have this property page. Left click on the Picture tab on top of the properties dialog to show this property page.

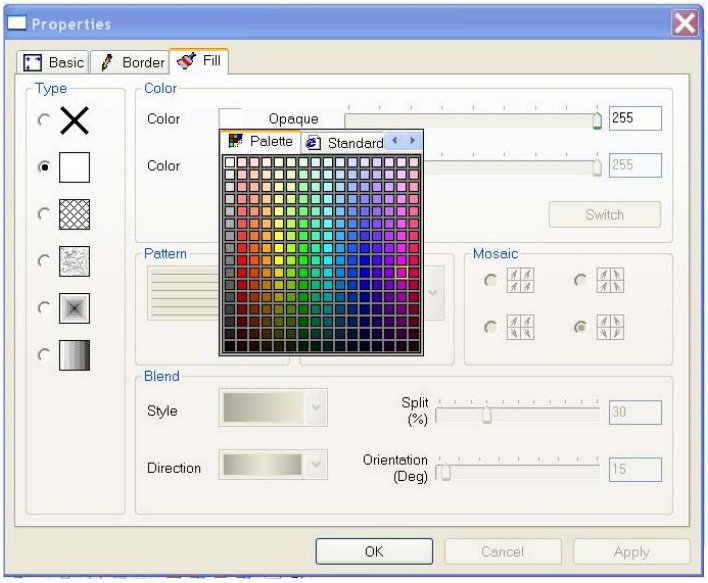


- File
  - File name: Specify the picture file to be displayed. A file path can be entered directly in the field. Alternately, users can press the button on the right to use the **Open** dialog to locate and select a picture file. Note that id a file located in the system defined reference path is selected, its path will be shown using the reference path notation/ For example, if a file located in the bmp folder of the project is selected, its path ill be converted into "~2\". See the appendix section of this manual for reference path details.
- Preview: The selected picture file will be displayed in this area.
- Information
  - File type: The file type of the selected picture file.
  - Width: The width of the selected picture file in pixels.
  - Height: The height of the selected picture file in pixels.
  - Color depth: the color depth of the selected picture file.

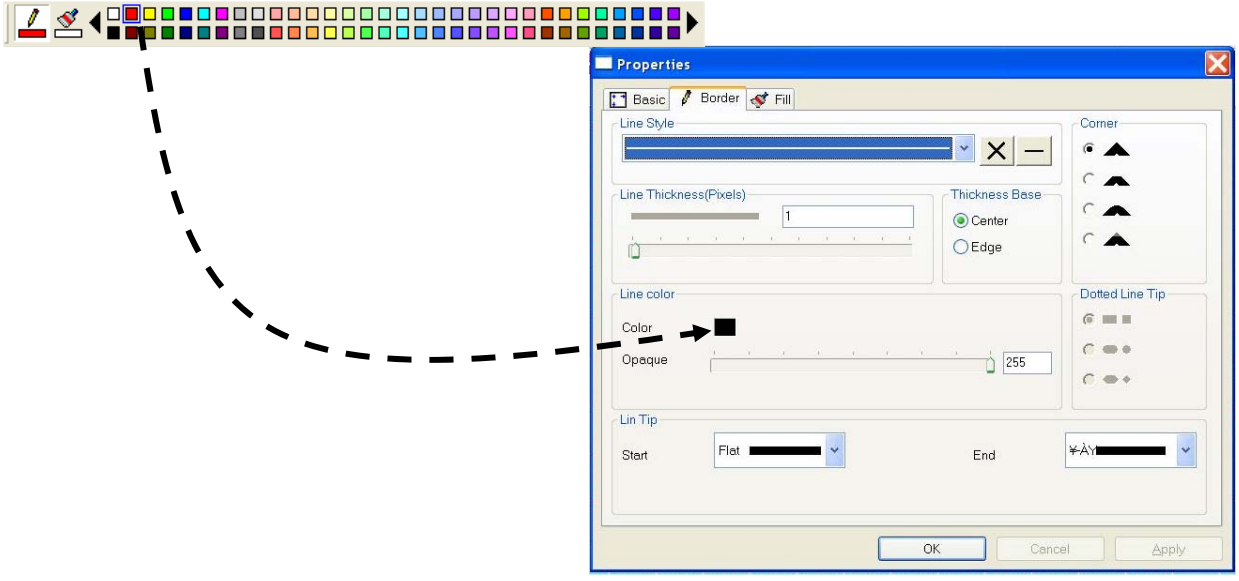
Defining Colors

When defining graphic objects, many property definitions involve color specifying. There are several ways to define a color property:

- Use **Popup Color Tool**: Right click on a color box in the property dialog, and the popup **Color Tool** will appear. The color tool includes four color pallets. Left click the tabs on top of the color tool to select pallet. When the color needed is found, left click on the color to select it. The color tool will be closed and the selected color will appear in the color property.



- Drag color from **Color Toolbar**: Find the color needed in the **Color Toolbar**, left click on it and drag to the corresponding color box in the property dialog.



- Click on **Color Toolbar**: This is a convenient method to specify color without opening properties dialog. Select one or more objects whose color need to be modified, and the left click or right click on the color needed on the **Color Toolbar** to change the color properties of the selected objects. Depending on the type of genie object, the color properties modified by left click or right click operation are shown below:

Object	Color Property changed by left click	Color Property changed by right click
Line	Border Color	—
Rectangle Rounded Rectangle Ellipse Pie Polyline Polygon Curve Bezier Curve Shape	Border Color	First Fill Color
Frame	Border Color (Left Upper edge)	First Fill Color (Right lower edge)
Text	Text color	—
Picture	—	—

The Click on **Color Toolbar** operation can be used to quickly change the color definition of multiple objects. Simply select all the objects need to be modified before proceed with this operation.

When no objects are selected, the "Click on **Color Toolbar**" operation can be used to determine the default color setting for all new objects to be added after this default color setting. The color selected by left mouse button click will appear on the **Border Color Default** on the left of the color toolbar, and the color selected by right mouse button click will appear on the **Fill Color Default**.

When a new graphic object is added, this default color setting will be applied automatically to define the new object. However, these default color settings do not apply to genie objects.

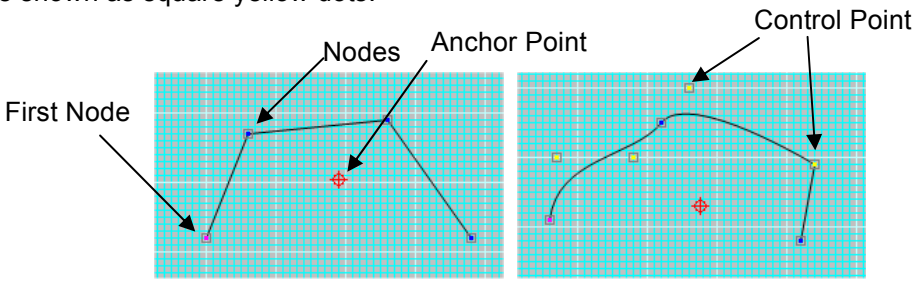
Node Editing

For graphic objects with multiple segments border, nodes are the end point of each segments. Panel Editor provide node editing tool to edit them after the objects are created. Graphic objects supporting node editing include polyline, curve, Bezier curve and shape. Line, rectangle, rounded rectangle, ellipse, pie and polygon objects must be converted to shape objects first, and they can then have nodes to be edited. Since frame and picture objects cannot be converted to shape objects, so node editing do not applies to these objects. For text object, despite that it is possible to convert them into shape objects, it is not recommended because it will be converted to extremely complex shape.

There are three methods to select the object whose nodes will be edited:

- Select the object by clicking on it with **Select** tool, and then select **Edit Node** from the **Modify** menu.
- Select **Node Tool** from the **Graphic Object Toolbar** by click on the  icon. The cursor will be shown as  . Left click on the object to edit its nodes.
- Right click on the object and select **Edit Node** from the popup menu.

The object selected for node editing will have show their nodes as blue dot with square edges, with the exception of the first node which is a red dot with square edge. The anchor point will be shown as a red circle with a cross mark on top of it. For Bezier curve objects, their control point will be shown as square yellow dots.



- Add a new node: Right click on the node where a new node next to it will be added and select **Add Nodes** from the popup menu. For every new node, two control points will also be added for a Bezier curve object. Since the newly added node will appear on top of the selected existing node, use mouse to drag the new node to its new position.

- Selecting a node: Before moving or deleting a node, it must be selected first. Multiple nodes can be selected to move or delete them altogether.
  - Select a node: Left click on a node to select it. The selected node will be shown as a solid blue square.
  - Select multiple nodes: To select multiple nodes, move cursor to a blank spot on the upper left side of all the nodes to be selected and drag the cursor to show a dotted rectangle. Keep dragging the cursor until all the nodes to be selected are enclosed by the rectangle and release the mouse button. All the nodes in the dotted rectangle will be selected. Another way to select multiple nodes is left click on the nodes while pressing the **Shift** key on the keyboard.
  - Unselect a node. To unselect all the selected nodes, simply click on a blank area in the panel. To unselect some of the selected nodes, left click the nodes while pressing the Shift key on the keyboard.
- Move nodes: Move cursor to any of the selected node, the cursor becomes  to indicate it is ready to move the node. Left click the node and drag it to the desired position. Release the mouse button and all selected nodes are moved. Anchor points and control points can also be moved using this operation.
- Delete nodes: Right click on a selected node and select **Delete Nodes** from the popup menu to delete all the selected nodes. Another way is simply press the **Delete** key on the keyboard, and all the selected nodes will be deleted. When a node on a Bezier curve is deleted, its corresponding control points will also be deleted.

Chapter 6 Manipulating Objects

Panel Editor provides convenient functions to help users modify objects after they are created and arrange the layout of objects in a panel. These features will be explained in this chapter.

Selecting Objects

Before modifying or operating on any objects, the target objects must be select first. This section will discuss how to select objects.

Select Tool

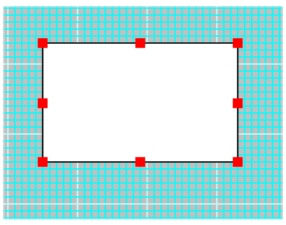
To select objects, Left click on the **Select Tool** icon in the **Graphic Object Toolbar**. After the action, the cursor will change to indicate that the **Select Tool** is used and system is ready for object selection:

Cursor	Description
	The cursor is on a blank area in the panel.
	The cursor is inside of an object
	The is on the border of an object.

Note: Another convenient way to select the Select Tool without clicking on the toolbar is to simply right click on a blank area in the panel.

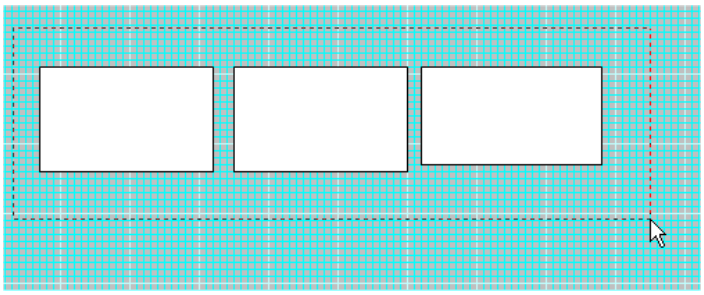
Select a Single Object

After the **Select Tool** is chosen, left click on any object to select it. Eight squares will appear around the object to indicate that it has been selected.

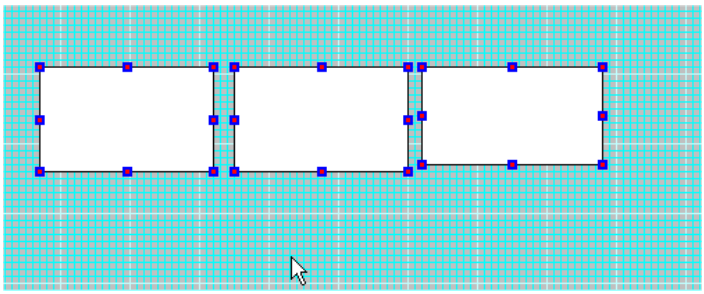


Select Multiple Objects

To select multiple objects, move cursor to the upper-left side of the objects, press left mouse button and drag lower-right direction. A dotted rectangle appears to indicate the selecting range. Drag the rectangle until all the objects to be selected are enclosed and release the mouse button. All the objects inside the rectangle will be selected,



Another way to select multiple objects is to press **Shift** key on the keyboard while left clicking on the objects. All clicked objects will be selected.



Select All Objects

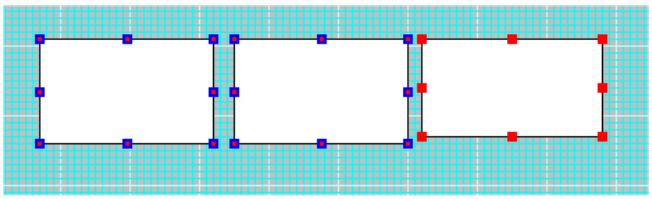
To select all objects in the panel, choose **Select All** from the Edit menu or press **Ctrl** and A keys on the keyboard at the same time.

Unselect Objects

To unselect all the selected objects, simply left click on a blank spot in the panel. To unselect some of the selected objects, left click these objects while pressing **Shift** key on the keyboard. The square around the clicked objects will disappear to indicate that they have been unselected.

Select the Base Object

Some object operations need to specify one of the selected objects as the base object. To specify the base object, left click on it and the squares around it will turn to solid red indicating that it is selected as the base object. When selecting multiple objects, the last selected object will always be set as the base object by default.



Operations on Objects

Operations can be conducted on selected objects include:

Moving Objects

- Mouse operation: Press left mouse button on any of the selected objects to drag all the selected objects to a new position. If **Ctrl** key on the keyboard during this operation, the movements of objects will be confined to horizontal, vertical and 45° diagonal directions only.
- Keyboard operation: Pressing direction keys ← and → on the keyboard can move selected objects horizontally to left or right. Pressing ↑ and ↓ keys on the keyboard can move the selected objects vertically upward and downward. The movement for each keystroke is defined by the **X minor grid** and **Y minor grid** properties in the **Panel Setup**. If the **Ctrl** key is also pressed when using the direction keys to move objects, the movement for each keystroke will be twice of the grid size. If **Shift** key is pressed while using the direction key to move objects, the movement will always be one pixel for each keystroke.

Cut Objects

Right click on any of the selected objects and select **Cut** from the popup menu to cut the selected objects from the panel. The cut objects will be removed from the panel and moved to the clipboard. This operation can also be conducted by choosing **Cut** from the **Edit** menu or  button from the **Standard Toolbar**. The shortcut key combination of pressing **Ctrl** and **X** on the keyboard at the same time has the same function, too.

Copy Objects

Right click on any of the selected objects and select **Copy** from the popup menu to copy the selected objects and store them in the clipboard. This operation can also be conducted by choosing **Copy** from the **Edit** menu or  button from the **Standard Toolbar**. The shortcut key combination of pressing **Ctrl** and **C** on the keyboard at the same time has the same function, too.

Paste Objects

Choose **Paste** from the **Edit** menu or click on  button on the **Standard Toolbar** can paste the objects stored in the clipboard to the panel. Since the pasted objects will appear at where they were original cut or copied, user may need to move the pasted objects to a new location. The shortcut key combination of pressing **Ctrl** and **V** on the keyboard at the same time has the same function, too. Panel Editor support cut, copy and paste feature across different panels.

Duplicate Objects

Duplicate operation combines the copy and paste operation without using the clipboard. Right click on any of the selected objects and select **Duplicate** from the popup menu, the selected objects will be copied and pasted on its original position. The duplicated objects can then be moved to a new location. This operation can also be conducted by choosing **Duplicate** from the **Edit** menu or  button from the **Standard Toolbar**.

Delete Objects

Right click on any of the selected objects and select **Delete** from the popup menu to delete the selected objects. This operation can also be conducted by choosing **Delete** from the **Edit** menu, clicking  button from the **Standard Toolbar**, or simply pressing **Delete** key on the keyboard. The difference between cut and delete operations is that a deleted object will not be moved to the clipboard and thus cannot be pasted to another panel.

Change the Size of an Object

To Change the size of an object, move the cursor to its border. The cursor shape will change to indicate the size changing feature allowed. Drag the border to change the size of the object. The location of the cursor on the border will affect the shape of the cursor and the sizing functions:

Cursor Location	Cursor	Sizing Feature
Left and right border		Chang the width of the object
Top and bottom border		Change the height of the object
Four corner of the object		Change the width and height of the object at the same time. If Ctrl key on the keyboard is pressed during the operation, the sizing action is confined to horizontal, vertical and 45° diagonal directions only.

Rotate an Object

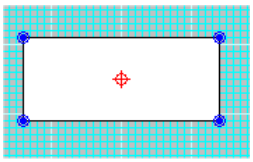
Among the graphic objects, Pie, polygon, frame, picture and text objects can only be rotated to three angles: 90° clockwise, 90° counterclockwise and 180° rotations. Other graphic objects can be rotate to any angle. Genie objects cannot be rotated.

When an object is rotated, its anchor point will be used as the center of rotation. The position of the anchor point can be moved by dragging it with the **Rotate Tool** if necessary.

Choose a Rotating Object

Left click on the button (**Rotate Tool**) in the **Graphic Toolbar**, and the shape of cursor will become . Move the cursor and left click on the object to be rotated. Four blue dots will appear on the four corners of the selected object indicating the rotating spot used to conduct free rotation with mouse dragging. The anchor point will also appear and is marked as a red circle with a cross on it. Another way to choose a rotating object is to select the object with the **Select Tool** first, and choose **Rotate Freely** from the **Modify** menu or click on the button in the Modify Toolbar.

Note that only one object can be rotate at a time. Since pie, polygon, frame, picture and text objects do not support free rotation, they cannot be selected as a rotating object.



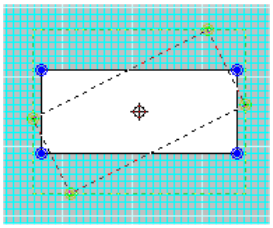
Move the Anchor Point

After a rotating objected is selected, press left mouse button on the anchor point and the cursor shape will change to . Drag the anchor point to a new position and release the mouse button. Another way to move the anchor point is to open the properties dialog of the selected rotating object, and edit its anchor point coordinates directly. This is also the only way to change the anchor point of pie, polygon, frame, picture and text objects since they cannot be operated by Rotate Tool.

Free Rotation

After a rotating object is selected, move cursor to one of the blue spot at the corners of the object and the cursor change to . Press left mouse button and drag clockwise or

counterclockwise around the anchor point to rotate the object freely. Release mouse button after the desired angle is reached,



Rotate 90°

After an object is selected, choose **Rotate 90°** from the **Modify** menu or click on button in the **Modify Toolbar** to rotate the selected object 90° clockwise.

Rotate -90°

After an object is selected, choose **Rotate -90°** from the **Modify** menu or click on button in the **Modify Toolbar** to rotate the selected object 90° clockwise.

Rotate 180°

After an object is selected, choose **Rotate 180°** from the **Modify** menu or click on button in the **Modify Toolbar** to rotate the selected object 180°.

Object Layout

Panel Editor provides many features to help user arrange the objects in a panel. Users can use Arrange menu and toolbar to properly layout the objects.

Group

To combine several objects to form a group, first select all the objects to be included in the group. Choose **Group** from the **Arrange** menu or click on the button in the **Arrange Toolbar**. The selected objects will be combined into a group. When objects are combined into a group, they can be move and resized as a single object. However all other individual properties of the object member in the group cannot be edited, and some arrange operation may no longer be possible.

Ungroup

After a group is selected, choose **Ungroup** from the **Arrange** menu or click on the button in the **Arrange Toolbar**. Another way to ungroup is right click the group and select **Ungroup** from the popup menu. After the ungroup operation, each member is a unique object again and

its properties can be edited independently.

Align to Left

After all the objects to be aligned are selected, left click on an object to select it as the base object. Choose **Align to Left** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The left edges of all the selected objects are aligned to the left edge of the base object.

Align to Right

After all the objects to be aligned are selected, left click on an object to select it as the base object. Choose **Align to Right** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The right edges of all the selected objects are aligned to the right edge of the base object.

Align to Top

After all the objects to be aligned are selected, left click on an object to select it as the base object. Choose **Align to Top** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The top edges of all the selected objects are aligned to the top edge of the base object.

Align to Bottom

After all the objects to be aligned are selected, left click on an object to select it as the base object. Choose **Align to Bottom** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The bottom edges of all the selected objects are aligned to the bottom edge of the base object.

Center Horizontally

After all the objects to be aligned are selected, left click on an object to select it as the base object. Choose **Center Horizontally** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The horizontal centers of all the selected objects are aligned to the horizontal center of the base object.

Center Vertically

After all the objects to be aligned are selected, left click on an object to select it as the base object. Choose **Center Vertically** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The vertical centers of all the selected objects are aligned to the vertical center of the base object.

Center

After all the objects to be centered are selected, left click on an object to select it as the base object. Choose **Center** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The vertical and horizontal centers of all the selected objects are aligned to the vertical and horizontal center of the base object.

Attach Horizontally

After all the objects to be arranged are selected, choose **Attach Horizontally** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The selected objects will be placed side by side in horizontal direction.

Attach Vertically

After all the objects to be arranged are selected, choose **Attach Vertically** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The selected objects will be placed side by side in vertical direction.

Even Space Horizontally

After all the objects to be arranged are selected, choose **Even Space Horizontally** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The selected objects will be placed together with even space in between in horizontal direction.

Even Space Vertically

After all the objects to be arranged are selected, choose **Even Space Vertically** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The selected objects will be placed together with even space in between in vertical direction.

Same Width

After all the objects to be resized are selected, left click on an object to select it as the base object. Choose **Same Width** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The widths of all the selected objects are resized to be the same with the width of the base object.

Same Height

After all the objects to be resized are selected, left click on an object to select it as the base object. Choose **Same Height** from the **Arrange** menu or click on the  button in the **Arrange Toolbar**. The heights of all the selected objects are resized to be the same with the height of the base object.

Same Size

After all the objects to be resized are selected, left click on an object to select it as the base object. Choose **Same Size** from the **Arrange** menu or click on the button in the **Arrange Toolbar**. The widths and heights of all the selected objects are resized to be the same as the same with the base object.

Modify an Object

Except for rotation, there are other operations can be used to modify an object.

Flip Horizontally

Select the object to be flipped, and choose **Flip Horizontally** from the **Modify** menu or click on the button in the **Modify Toolbar**. The selected object will be flipped horizontally and can be seen to become the mirrored image of the original object.

Flip Vertically

Select the object to be flipped, and choose **Flip Vertically** from the **Modify** menu or click on the button in the **Modify Toolbar**. The selected object will be flipped vertically and can be seen to become the mirrored image of the original object.

Convert to Shape

This feature can be applied to line, rectangle, rounded rectangle, ellipse, pie, polygon and text objects. To convert an object into a shape object, it must be selected with **Select Tool** first. After the object is selected, choose **Convert to Shape** from the **Modify** menu or click on the button in the **Modify Toolbar**.

Please note that this operation is irreversible. If a non-shape object is converted into a shape object, it can no longer be converted back to its original object type.

Enclose

Enclose is one of the basic properties of most types of graphic objects. An object whose **Enclose** property is not checked is an open object. An open object contains its border only and does not include the interior area circled by its border. Therefore, the **Fill** properties setting have no effect on an open object. An object whose **Enclose** property is set is an enclosed object. An enclosed object contains its border and the interior area inside the border. Rectangle, rounded rectangle, ellipse, pie, and polygon objects are enclosed object by default. By unchecking their **Enclose** property in the properties dialog, these object can become open objects. Polyline,

curve, Bezier curve and shape are open objects by default. They can be turned into enclosed object by setting their **Enclose** property. Line objects are one-dimensional object and its Enclose property has no effect.

To enclose an object, the object must be selected first. Choose **Enclose** from the **Modify** menu, click on the  button in the **Modify Toolbar**, or right click on the object and select **Enclose** from the popup menu can turn the object into an enclosed object. The same operation can also turn a enclosed object into an open object.

Foreground and Background

Panel Editor 4 introduces the Foreground/Background concept into the editing user interface. Users can choose to edit objects in the foreground or background. This design is convenient for arranging and modifying objects. For example, the configured objects that no longer need to be modified or arranged can be moved to background layer while users are editing in the foreground layer. Since the object in the background cannot be modified or moved in any manner, this can prevent careless action to ruin hours of work accidentally.

The following features are provided to work between foreground and background.

Edit Foreground

Select **Edit Foreground** from the **Edit** menu or click on the  button to switch to editing in the foreground mode. In this editing mode, only objects in the foreground can be operated.

Edit Background

Select **Edit Background** from the **Edit** menu or click on the  button to switch to editing in the background mode. In this editing mode, only objects in the background can be operated.

Show/Hide Foreground

This operation is used to determine whether the foreground will be displayed or not. Please note that the foreground cannot be hidden when the editing mode is set to be in foreground. There are two ways to show or hide the foreground:

- Menu operation: Select **Foreground** from the **View** menu to switch between showing and hiding the foreground. When the foreground is set to show, there will be a checked sign **V** in front of the menu item**.**
- Toolbar operation: Click on the  button in **View Toolbar** to switch the display of

foreground.

Show/Hide Background

This operation is used to determine whether the background will be displayed or not. Please note that the background cannot be hidden when the editing mode is set to be in background. There are two ways to show or hide the background:

- Menu operation: Select **Background** from the view menu to switch between showing and hiding the foreground. When the background is set to show, there will be a checked sign **V** in front of the menu item**.**
- Toolbar operation: Click on the  button in **View Toolbar** to switch the display of foreground.

Move to Foreground

This operation can move the selected objects to the foreground. After the objects to be moved are selected, choose **Move to Foreground** from the **Layer** menu or click on the  button in the **Arrange Toolbar** to send the selected objects to the foreground. Please note that this operation can only be applied when the editing mode is set to be in background. If the foreground is set to be hidden, the moved object will become invisible because they are sent to the hidden foreground.

Move to Background

This operation can move the selected objects to thebackground. After the objects to be moved are selected, choose **Move to Background** from the **Layer** menu or click on the  button in the **Arrange Toolbar** to send the selected objects to the foreground. Please note that this operation can only be applied when the editing mode is set to be in foreground. If the background is set to be hidden, the moved object will become invisible because they are sent to the hidden background.

Use of Layers

Besides the foreground and background operation, there are layer operation help determine which object is on top when objects are overlapped.

Send to Top

Move the selected objects to be on top of all objects in the foreground or background. To send the selected objects to top of other objects, choose **Send to Top** from the **Layer** menu or click

on the  button in the **Arrange Toolbar**.

Send to Bottom

Move the selected objects to be below all objects in the foreground or background. To send the selected objects to be below other objects, choose **Send to Bottom** from the **Layer** menu or click on the  button in the **Arrange Toolbar**.

Send Forward

Move the selected object one position forward in the object sequence in the foreground or background. After the object is selected, choose **Send Forward** from the **Laye**r menu or click on the  button in the **Arrange Toolbar** to send the objects one position forward.

Send Backward

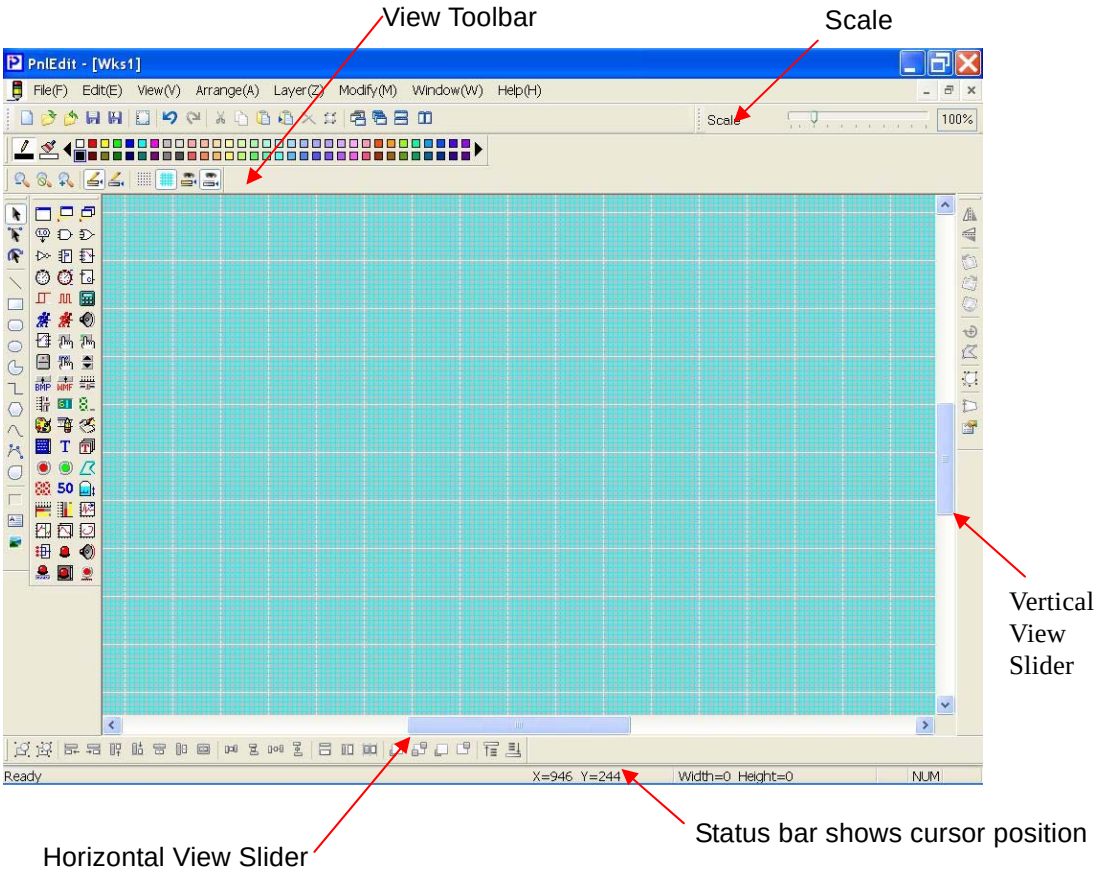
Move the selected objects one position forward in the object sequence in the foreground or background. After the object is selected, choose **Send Forward** from the **Laye**r menu or click on the  button in the **Arrange Toolbar** to send the objects one position forward.

All the layer operations are conducted independently in the foreground or background. In other words, the adjustment of sequence of objects in the background does not affect the sequence in the foreground, and vice versa.

When more than one object are selected for layer operation, only the sequence of the select objects as a whole are adjusted with respect to other objects. The sequential relations among the selected objects still remain the same.

View Control

For the convenience of user in object editing and layout, Panel Editor provides functions to control the view on panels. Users can zoom in or zoom out to adjust the scale of display, or pan to show different portions of the panel.



Scale

View scale can be adjusted by dragging the **Scale** slider. The percentage value on the right shows the view actual with respect to the screen resolution. The range of adjustment is between 20% and 500%.

Vertical and Horizontal View Slider

When the panel view is enlarged, the screen may be unable to show the whole panel. Use the sliders to pan horizontally or vertical to show portions of the panel that was outside of the screen.

1:1 View

Show the panel in 1:1 scale. Every pixel in the panel is displayed as a pixel on the screen. Select this 1:1 scale by choosing **1:1 View** from the **View** menu or click on the button in the **View Toolbar**.

Zoom In

Zoom in to enlarge the panel view scale by two times. Choose Zoom In from the View menu or

click on the button in the View Toolbar to double the view scale.

Zoom Out

Zoom out to shrink the panel view scale to half. Choose Zoom Out from the View menu or click on the button in the View Toolbar to half the view scale.

Status Bar

Status Bar shows the coordinates of the current position of the cursor.

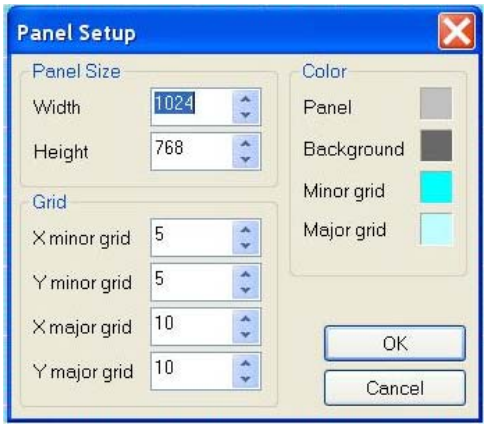
Other Tools

Panel Editor provides some other tools for more convenient editing besides those stated before.

Grid

Grids can help users locate the objects and adjust their size more easily and precisely. When panel editor is set to show grids, all mouse operations will locked to the grids automatically. For example, if the distance between minor grids in X and Y direction are set as 5 in Panel Setip, whenever an object is added, moved or resized, the minimum mouse movement is 5 pixels in either X or Y direction. In other words, it will impossible to move an object for a distance of 3 pixels horizontally or vertically. With proper grid setting, it is easy to align objects and arrange the panel layout.

Although mouse movement is restricted as always aligned to the grids, it is still possible to change the position and size freely by directly them in the properties dialog disregard the grid limitation.



To change grid intervals, please select **Panel Setup** from **File** menu or **Standard** toolbar to open the **Panel Setup** dialog. X minor grid and Y minor grid in the Panel Setup dialog define the

distance between grids in horizontal and vertical direction. The units are in pixels. X major grid and Y major grids define between how many grids a thicker grid line will be drawn and are simply used for better grid reading. They have no effect on the grid locking feature of mouse movement.

Show and Hide Grid

There are two way to display the grids on the panel: grid lines and grid marks. Grid lines indicate the grids as crossed straight lines and grid marks indicates the grids as dots. Whether grid lines or grid marks are selected, the grid locking feature is the same. The grid display option can be set as described below:

- Grid Marks: Select **Grid Marks** from **View** menu, a checked sign ✓ will appear before the item in the menu to indicate the selection. Another way of doing so is to left click on the  button in the **View Toolbar**, the button will appear as  to indicate the selection.
- Grid Lines: Select **Grid Lines** from **View** menu, a checked sign ✓ will appear before the item in the menu to indicate the selection. Another way of doing so is to left click on the  button in the **View Toolbar**, the button will appear as  to indicate the selection.
- No Grid: Left click on either **Grid Marks** or **Grid Lines** in **View** menu again to deselect them. The checked signed before the items will disappear. Alternatively, the grids can be set to hidden by clicking on the  or  button in the **View Toolbar**, the button will appear as  and  to indicate no grid will be shown.

When grids are hidden, the grid locking feature will be turned off and mouse can be moved freely to adjust the location and size of objects.

Color Setting for Multiple Objects

When more than one object is to be changed to have the same color settings, a convenient method can be used. Refer to the discussion about color setting for graphic objects and genie objects in Chapter 4 and 5. Color properties of selected objects can be changed by left or right clicking on the **Color Toolbar**. This operation can change the colors of multiple objects concurrently.

To change the color settings of multiple objects to the same color, select these objects first and then left click on the desired color in the **Color Toolbar**. This will change the corresponding left

mouse button color properties the selected objects to the color chosen. Similarly, by right clicking on the desired color in the **Color Toolbar** can change the corresponding right mouse button color properties of the selected objects. The colors corresponding to left and right mouse button clicks are different for each type of objects. Please see Chapter 4 and 5 of this manual for details.

Copy Properties of Genie Objects

For genie objects, panel editor provide another convenient tool modify their properties quickly. To modify **Special** properties of multiple genie objects of the same type, one of the object can selected as the base object. Edit the properties of the selected base objects as desired and then all other object can be modified by copy the properties of the base object to other objects. This copy operation applies to **Special** properties of genie objects only, excluding the basic parameters in the **Special** properties. I will not affect the Tag properties of the selected objects, either.

To use this operation, select all genie objects of the same type to be modified, and left click on one of the object to select it as the base object. Select **Copy Properties** from the **Edit** menu and the properties of the base object are copied to all other selected objects.

This operation can be applied to genie objects of the same type. It will have no effect on the selected objects which is not of the same type of the base object. This operation cannot be used with graphic objects.

Chapter 7 Panel Objects

Panel

Each graphic screen is called a panel in Lab-LINK. User can design as many panels as he or she wishes and use panel objects to open and close panels to show operator different graphic screens.

There are tree types of panel objects:

 Panel Box

 Popup Panel

 Panel Player

Popup Window and Child Window

There are two type of window controlled by panel objects:
Popup Windows: Their coordinate system and size are with respect to the whole screen.
Child Windows: Their coordinate system and size are with respect to their parent windows.

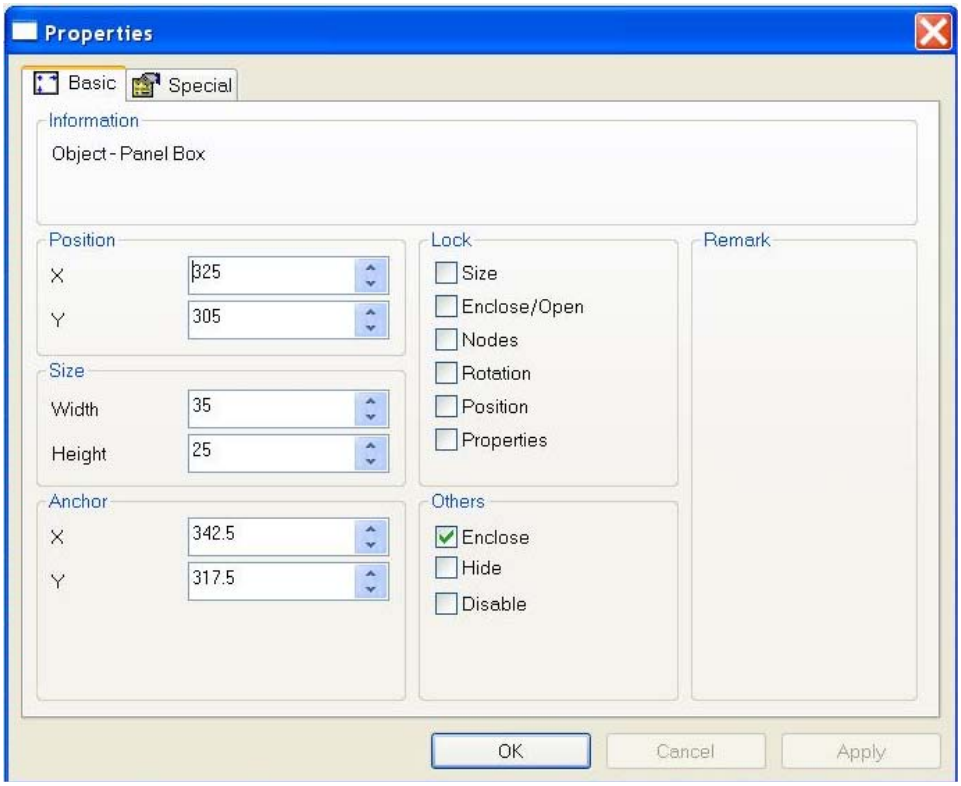
If **Window Title** Style is set to show the window title of a panel it can be moved around the screen by dragging its title. A child window can not be seen if moved out of its parent, but a popup window can.

Popup window will always stay on top of other panel, but child window might be cover by other panel or object.

Due to the characteristics described above, popup windows are mostly used as a floating operation panel or as a popup message window. Child window are more offend used a subpanel as part of larger parent panel since it is easier to layout the objects and control its location with respect to the objects on the parent panel.

Panel Box

Macro Box is a static panel object. It always displays the content of the specified panel file. The panel opened is always treated as a child window.



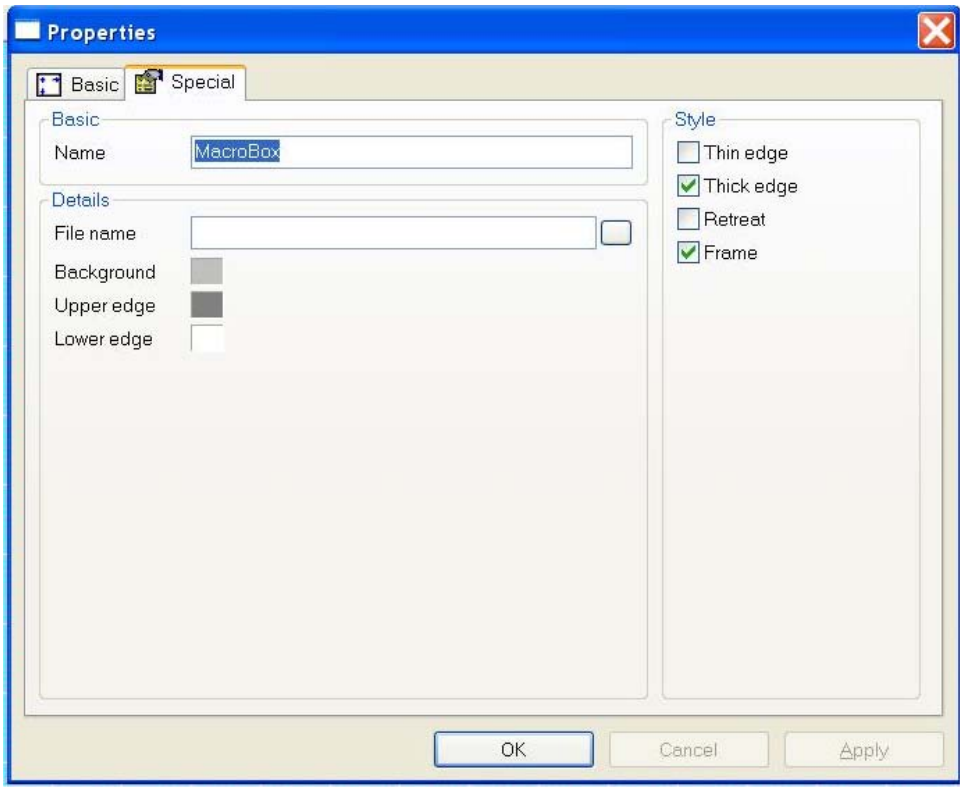
Basic Properties

- ❒ X, Y: Position of top-left corner.
- ❒ Width, Height: Size of the object.

Special Properties

Basic

- ❒ Name: Name of the Object.



Details

- File name: The path of the panel shown in the Macro Box.
- Background: Panel background color.
- Upper edge: Upper edge color.
- Lower edge: Lower edge color.

Style

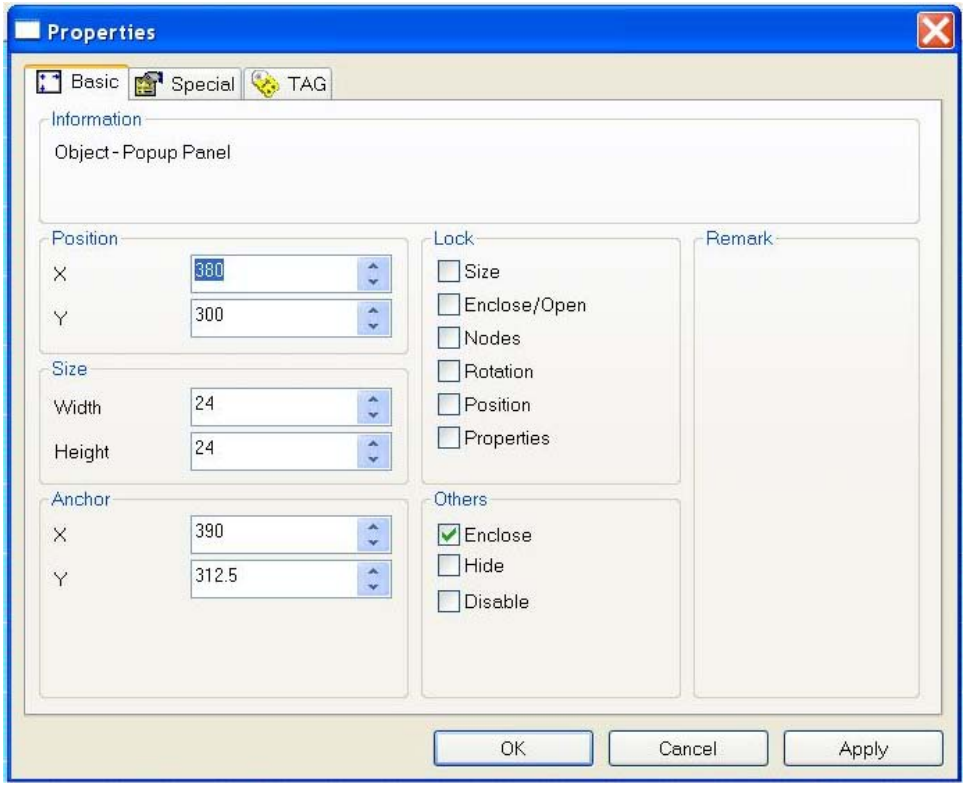
- Thin Edge
- Thick Edge
- Retreat
- Frame

Comments:

- Panel containing this object is the parent panel of the panel opened by this object. If the parent panel closed, the child panel, the panel open by Panel Box, is also closed.

Popup Panel

Popup Panel can be used to open or close a specified panel by setting its **Control** Tag to "1" and "0" respectively. Wwhen a panel is closed, all object it contain will also be closed and cease functioning. If the objects need to keep functioning even when the panel is closed, please set **Always Open** style.



Basic Properties

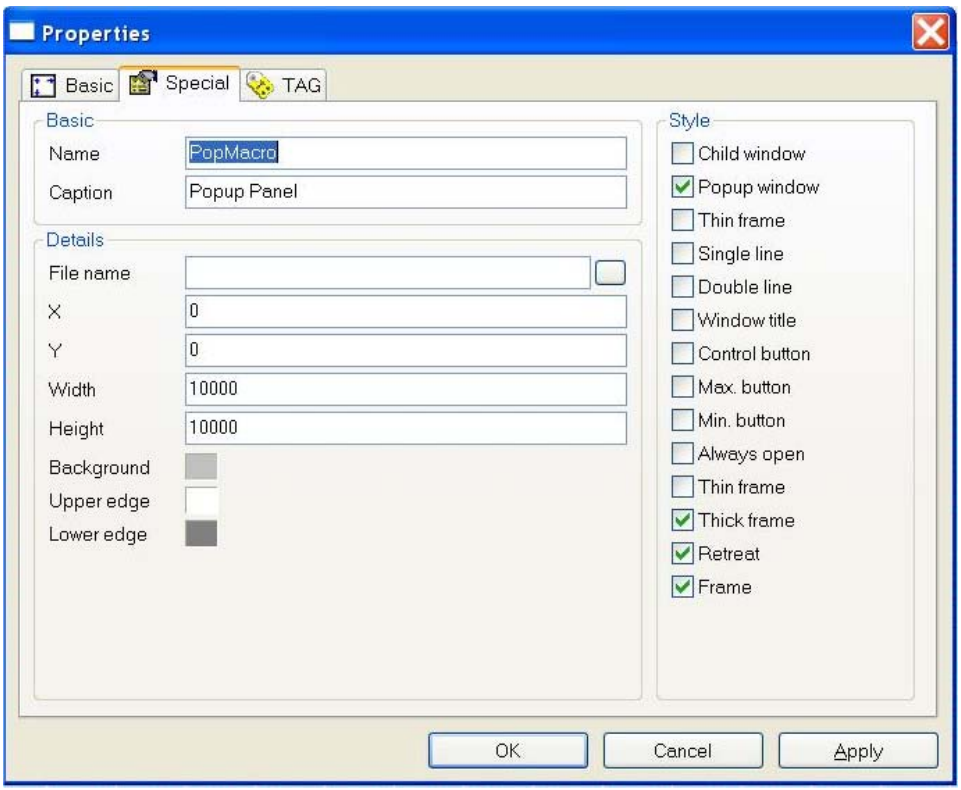
- X, Y: Position of top-left corner. If **Child Window** style is set in Special properties page, the parameters specify position of the panel it opens in the coordinates system based on the upper-left corner of its parent panel. Otherwise these properties simply specify the location of the object icon in this panel, and have no effect on the actual position of the panel it opens.
- Width, Height: Size of the object. If **Child Window** style is set in Special properties page, the parameters specify the size of the panel it opens corresponding to the coordinates system based on the upper-left corner of its

parent panel. Otherwise these properties have no effect on the actual position of the panel it opens.

Special Properties

Basic

- ❒ Name
- ❒ Caption: Text shown on window title of the panel.



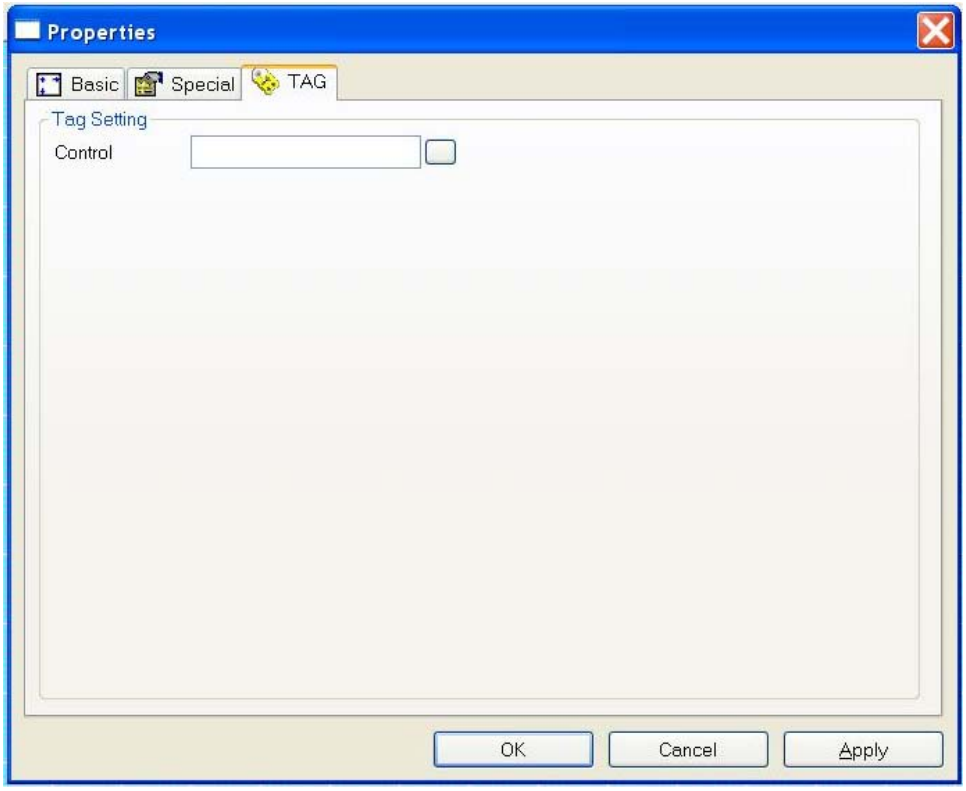
Details

- ❒ File name: The path of the panel shown in the Macro Box.
- ❒ X, Y: Position of top-left corner of the panel opened by this object. If **Child Window** style is set in Special properties page, the parameters has no effect.
- ❒ Width, Height: Size of the panel opened by this object. If **Child Window** style is set in Special properties page, the parameters has no effect.
- ❒ Background: Panel background color.
- ❒ Upper Edge: Upper edge color.
- ❒ Lower Edge: Lower edge color.

Style

- ❒ Child Window: The opened panel is a child window.
- ❒ Popup Window: The opened panel is a popup window.
- ❒ Thin Frame: Show thin frame around panel. Setting this style enable resizing of the panel during runtime.
- ❒ Single Line: Show single line around panel.
- ❒ Double Line: Show double line around panel.
- ❒ Window Title: Show window title. Setting this style enable moving of the panel during runtime.
- ❒ Control button: Show control button of the panel. With this style set, it is possible for operator to close the panel using window control button to close the panel during runtime.
- ❒ Max. button: Show Maximize button of the panel. With this style set, it is possible for operator to maximize the panel using window control button to close the panel during runtime.
- ❒ Min. button: Show Minimize button of the panel. With this style set, it is possible for operator to minimize the panel using window control button to close the panel during runtime.
- ❒ Thin Edge
- ❒ Thick Edge
- ❒ Retreat
- ❒ Frame
- ❒ Always open: The panel is only hidden when it is closed. All objects it contains will remain functioning.

Tag Properties



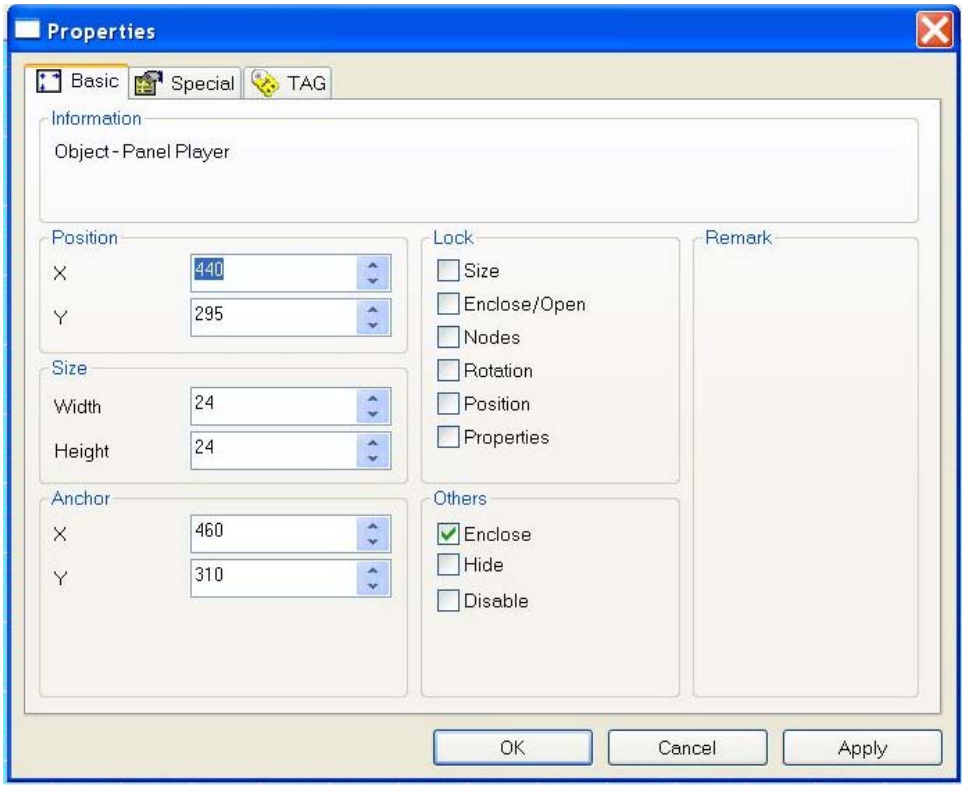
- Control: The Tag to control the open and close of the panel. Setting this tag to “1” will open the panel, and “0” will close the panel.

Comments:

- Panel containing this object is the parent panel of the panel opened by this object. If the parent panel closed, the child panel, the panel open by Popup Panel, is also closed.

Panel Player

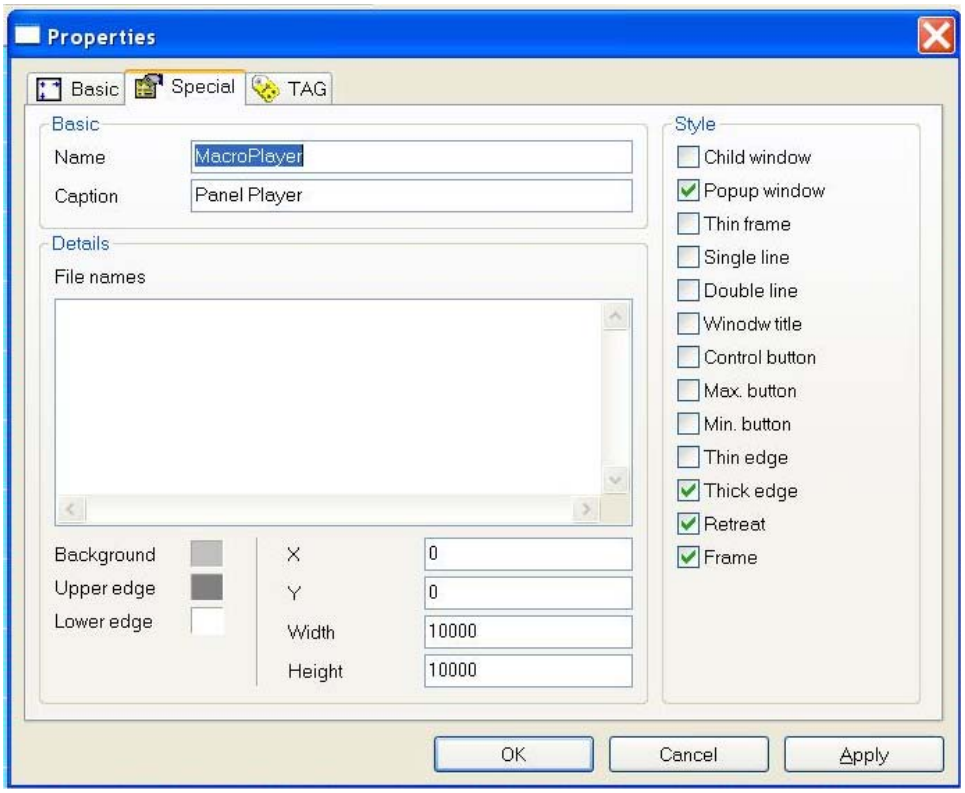
Panel Player will show one of the specified panel files based on the value of its **Index** Tag.



Basic Properties

- X, Y: Position of top-left corner. If **Child Window** style is set in Special properties page, the parameters specify position of the panel it opens in the coordinates system based on the upper-left corner of its parent panel. Otherwise these properties simply specify the location of the object icon in this panel, and have no effect on the actual position of the panel it opens.
- Width, Height: Size of the object. If **Child Window** style is set in Special properties page, the parameters specify the size of the panel it opens corresponding to the coordinates system based on the upper-left corner of its parent panel. Otherwise these properties have no effect on the actual position of the panel it opens.

Special Properties



Basic

- Name
- Caption: Text shown on window title of the panel.

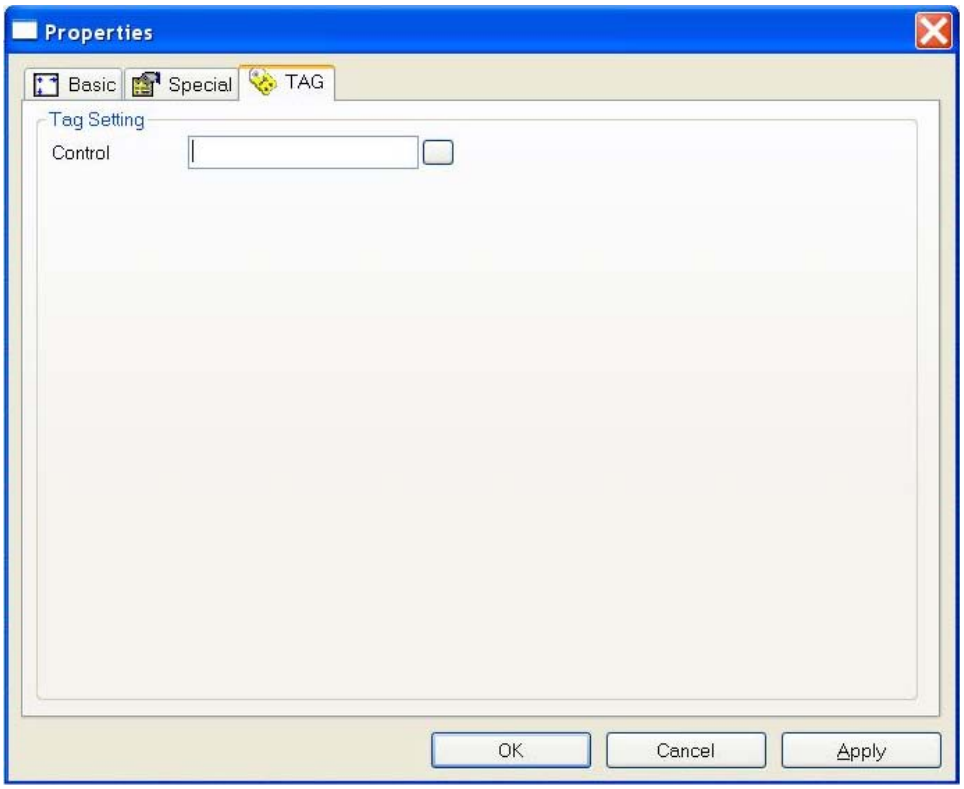
Details

- X, Y: Position of top-left corner of the panel opened by this object. If **Child Window** style is set in Special properties page, the parameters has no effect.
- Width, Height: Size of the panel opened by this object. If **Child Window** style is set in Special properties page, the parameters has no effect.
- File names: The path of a list of panel files that can be shown in the object.
- Background: Panel background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- ❒ Child Window: The opened panel is a child window.
- ❒ Popup Window: The opened panel is a popup window.
- ❒ Thin Frame: Show thin frame around panel. Setting this style enable resizing of the panel during runtime.
- ❒ Single Line: Show single line around panel.
- ❒ Double Line: Show double line around panel.
- ❒ Window Title: Show window title. Setting this style enable moving of the panel during runtime.
- ❒ Control button: Show control button of the panel. With this style set, it is possible for operator to close the panel using window control button to close the panel during runtime.
- ❒ Max. button: Show Maximize button of the panel. With this style set, it is possible for operator to maximize the panel using window control button to close the panel during runtime.
- ❒ Min. button: Show Minimize button of the panel. With this style set, it is possible for operator to minimize the panel using window control button to close the panel during runtime.
- ❒ Thin Edge
- ❒ Thick Edge
- ❒ Retreat
- ❒ Frame

Tag Properties



- Index: The tag used to select which panel to be shown.
  First panel in the **File names** list will be show if the Tag is set to “0”
  Second panel in the **File names** list will be show if the Tag is set to “1”
  …

Comments

- Panel containing this object is the parent panel of the panel opened by this object. If the parent panel closed, the child panel, the panel open by Popup Panel, is also closed.

Chapter 8 Action Objects

All action objects are invisible during runtime. However, they are designed to perform some kind of logic, computation or control function. Action objects are represented as icons in Panel Editor.


Initiator


AND


OR


Inverter


ExIndex


Multiplexer


Scanner


Counter


Timer


Multi-Timer


Delay Timer


Clock


Calculator


Runner

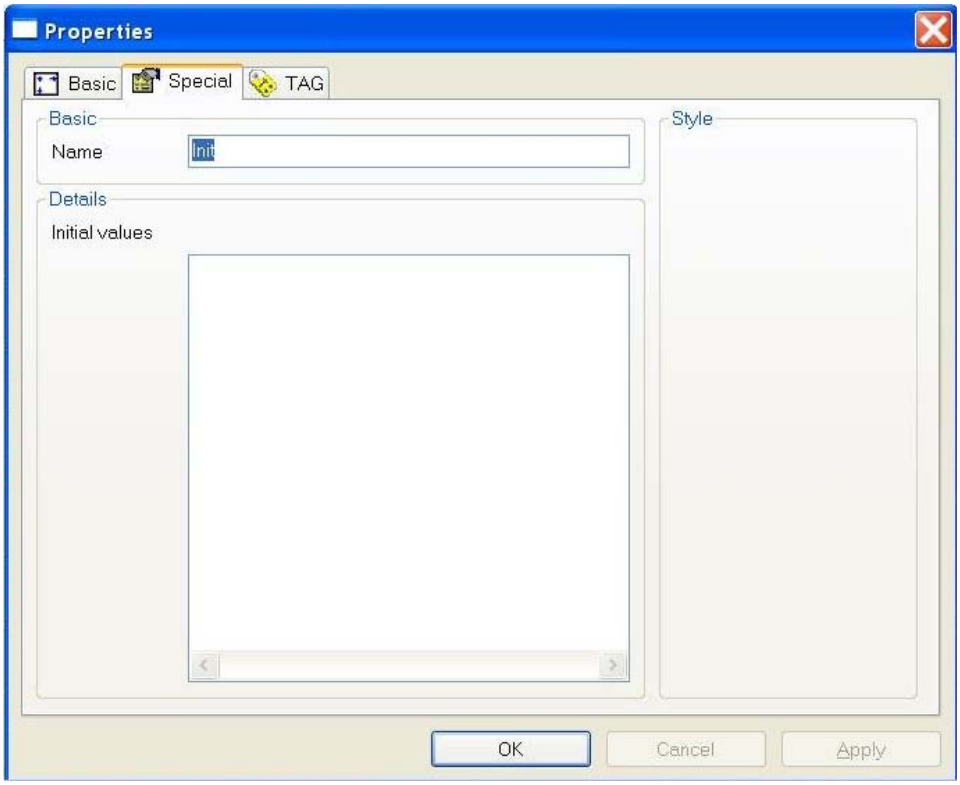

Executer


WAV Player

Since **Basic** properties are the same for all genie objects and have been described in chapter 4, they are omitted and will not be discussed again here.

Initiator

Initiator is used to set the initial values of Tag when the panel containing it is opened.



Special Properties

Basic

- Name

Details

- Init. Value: Value set to **Init. Tag**s.
  Right click on the list and select **Insert**, **Delete** or **Modify** from the popup menu to add, remove edit value entries. Drag an entry to move its position in the list.

Tag Properties

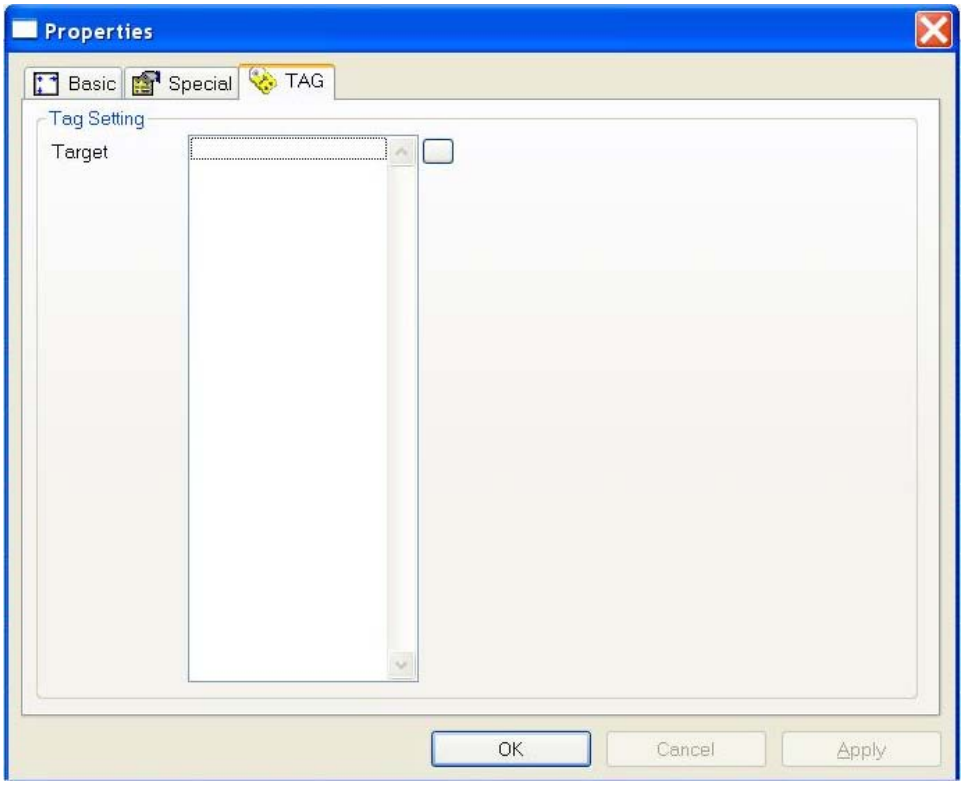
- Init. Tag: Tags to be set initial values.

  The first tag will be assigned the first value in the Init. Value list.

  The second tag will be assigned the second value in the Init. Value list.

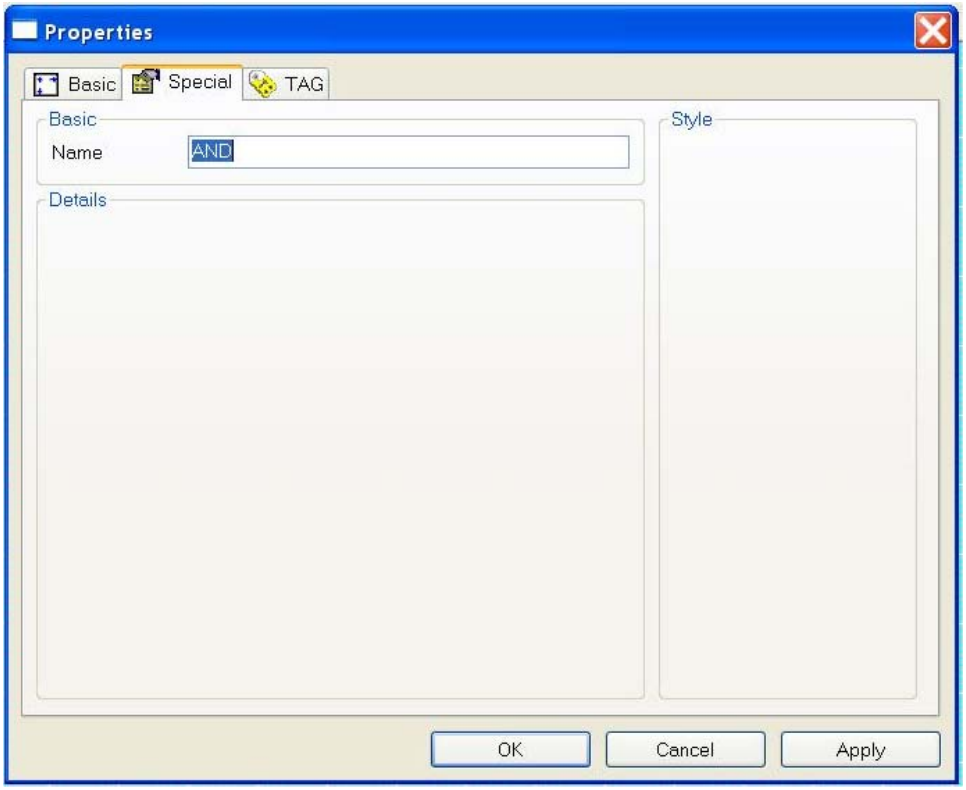
  …

  The Nth tag will be assigned the Nth value in the Init. Value list.



AND

Execute AND calculation upon all **Input** Tag and send the result to **Output** Tag.



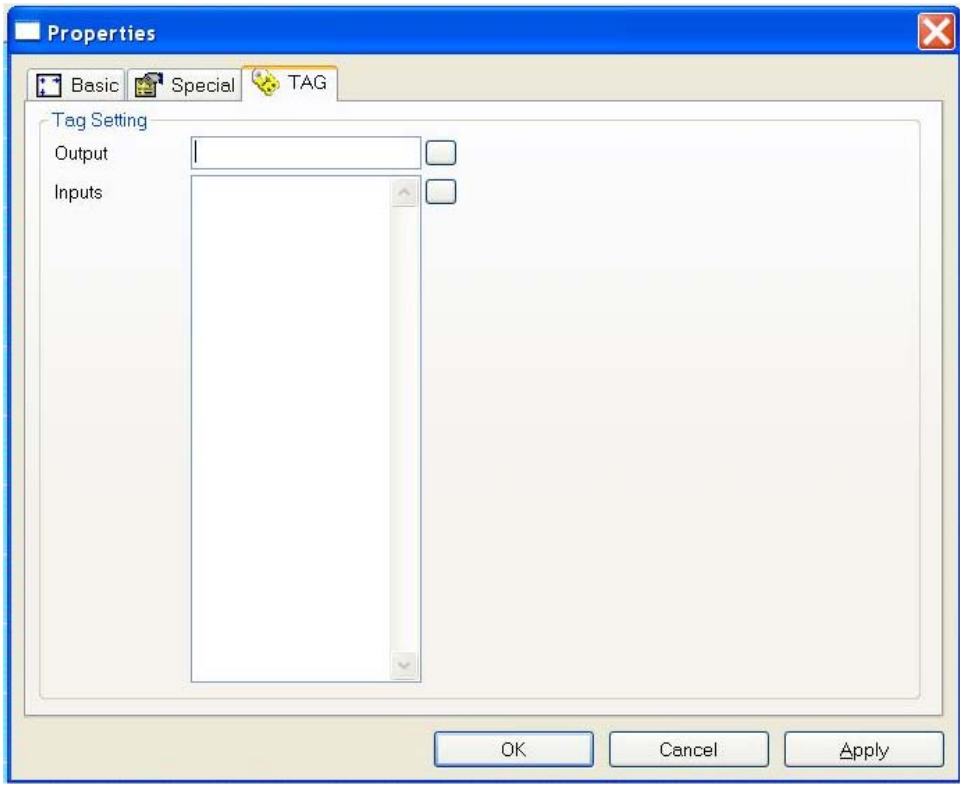
Special Properties

Basic

- Name

TAG Properties

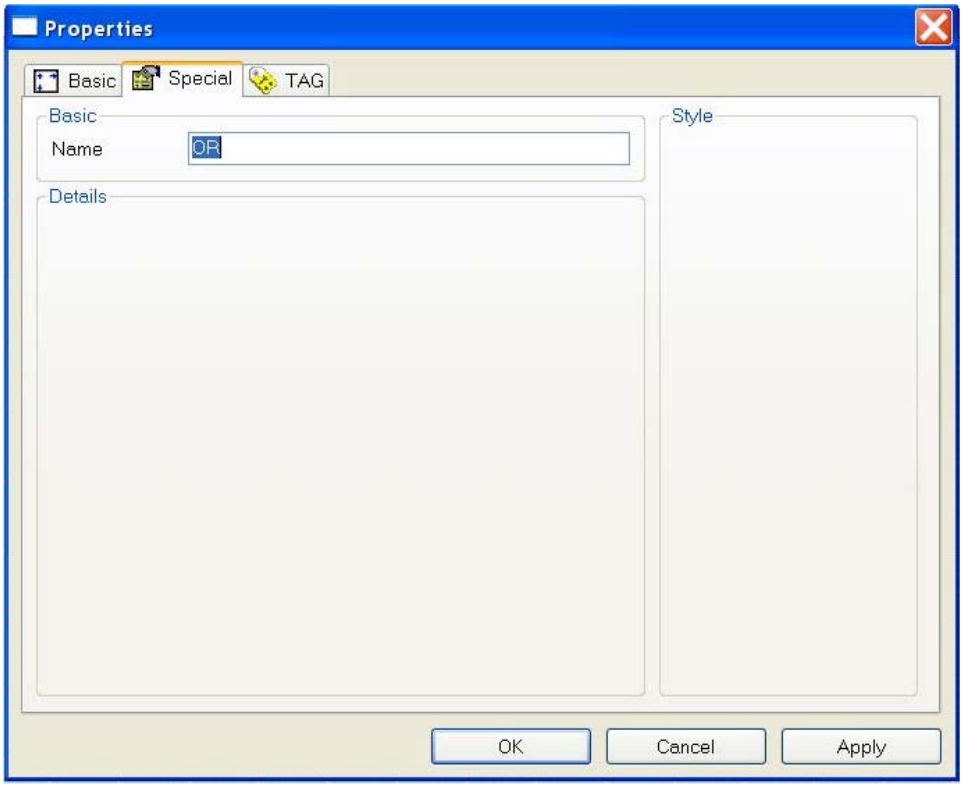
If any of the **Input** Tag is “0”, the **Output** Tag will be “0”. Only when all the **Input** Tags are “1”, the **Output** Tag is “1”.



- Input: Tag used as AND inputs.
- Output: Result of AND calculation.

OR

Execute OR calculation upon all **Input** Tag and send the result to **Output** Tag.



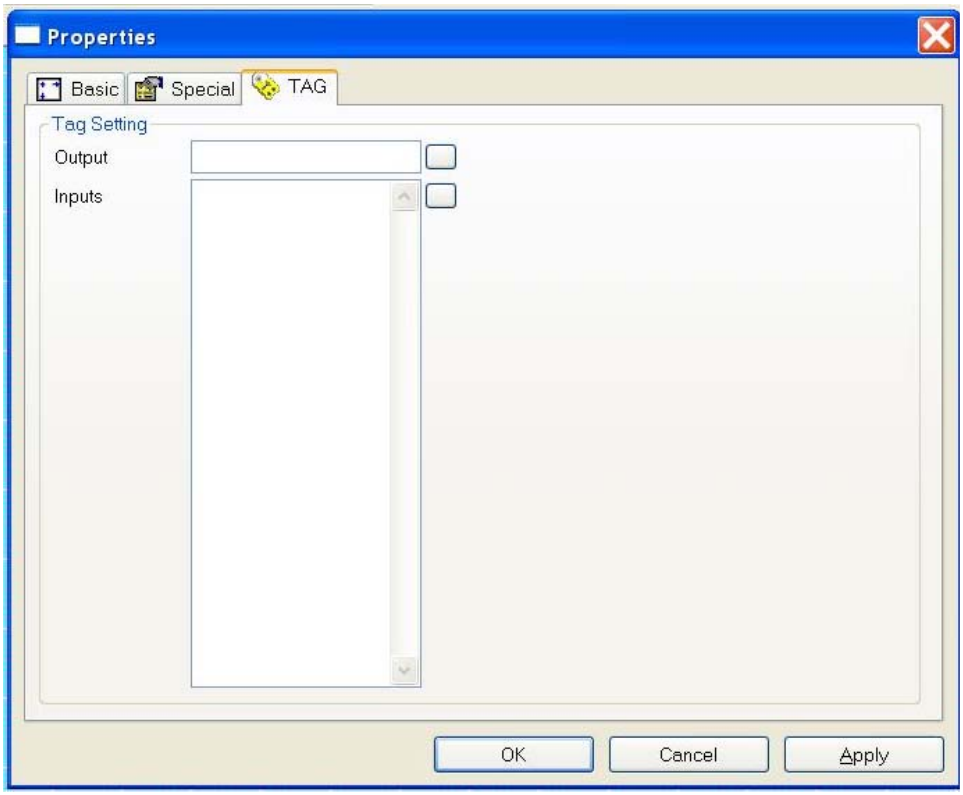
Special Properties

Basic

- Name

TAG Properties

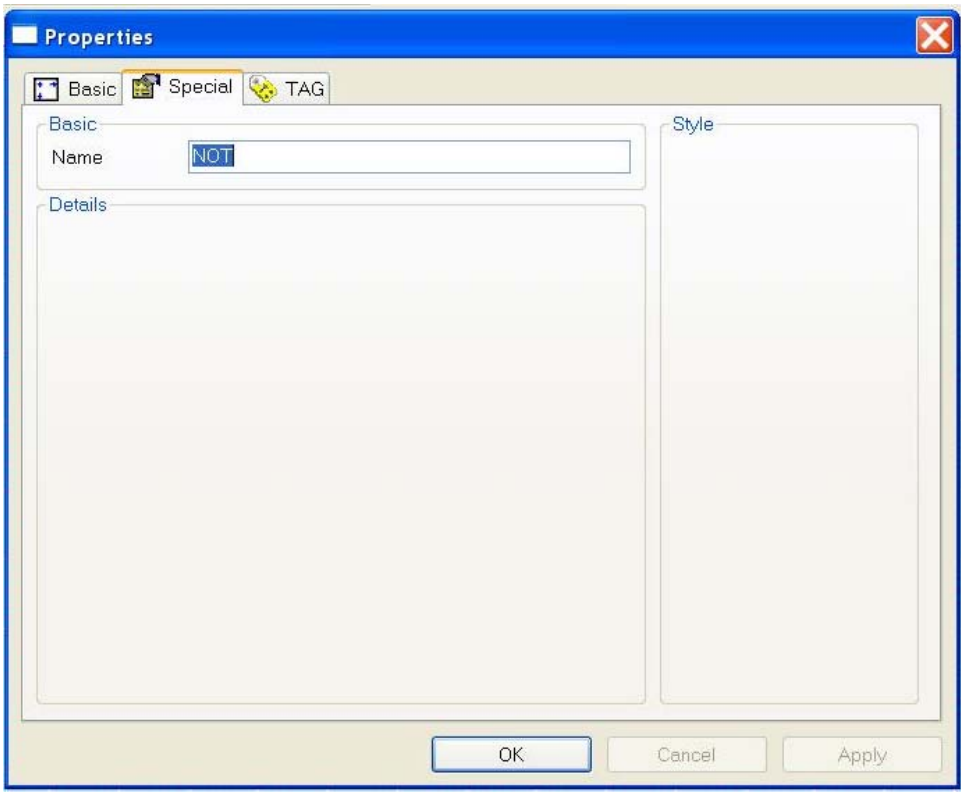
If any of the Input Tag is “1”, the Output Tag will be “1”. Only when all the Input Tags are “0”, the Output Tag is “0”.



- Input: Tag used as OR inputs.
- Output: Result of OR calculation.

Not

Invert the value of **Input** Tags and send the result to **Output** Tags. More than on set of input and output Tags can be defined in a single Inverter object.



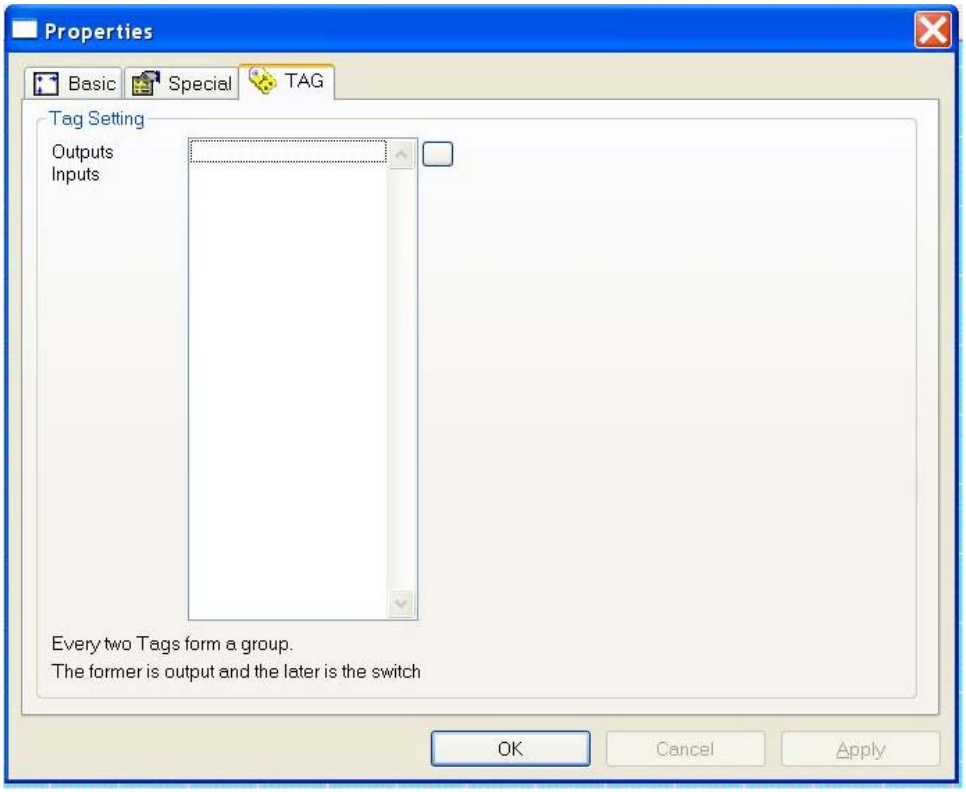
Special Properties

Basic

- Name

TAG Properties

Output is “1” when Input is “0”, and Output is “0” when Input is “1”.

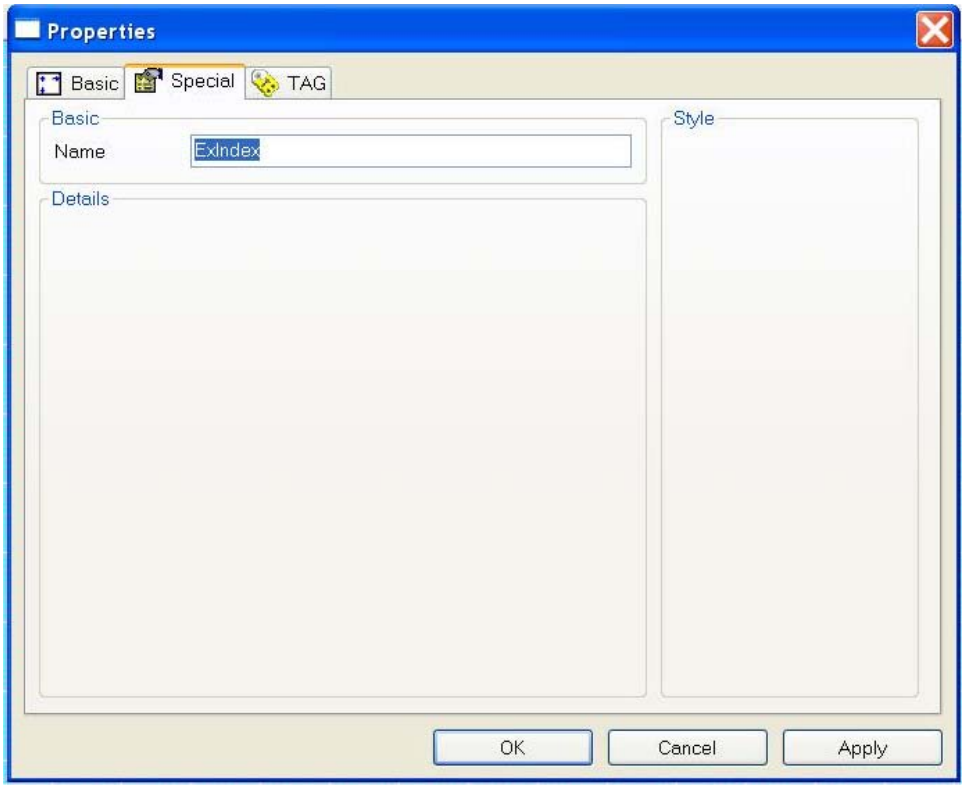


- Input: Tags to be inverted.
- Output: Result of Inverting.

Every two tags in the list is a set with the previous one is the output and the later one is the input. For example, the first tag in the list is the NOT output of the second tag, the third tag in the list is the NOT output of the forth tag…, etc.

ExIndex

If any of the **Member** Tags is set to "1", all other **Member** Tags are set to "0", and **Index** Tag is set to the sequence of the Tag set to "1".

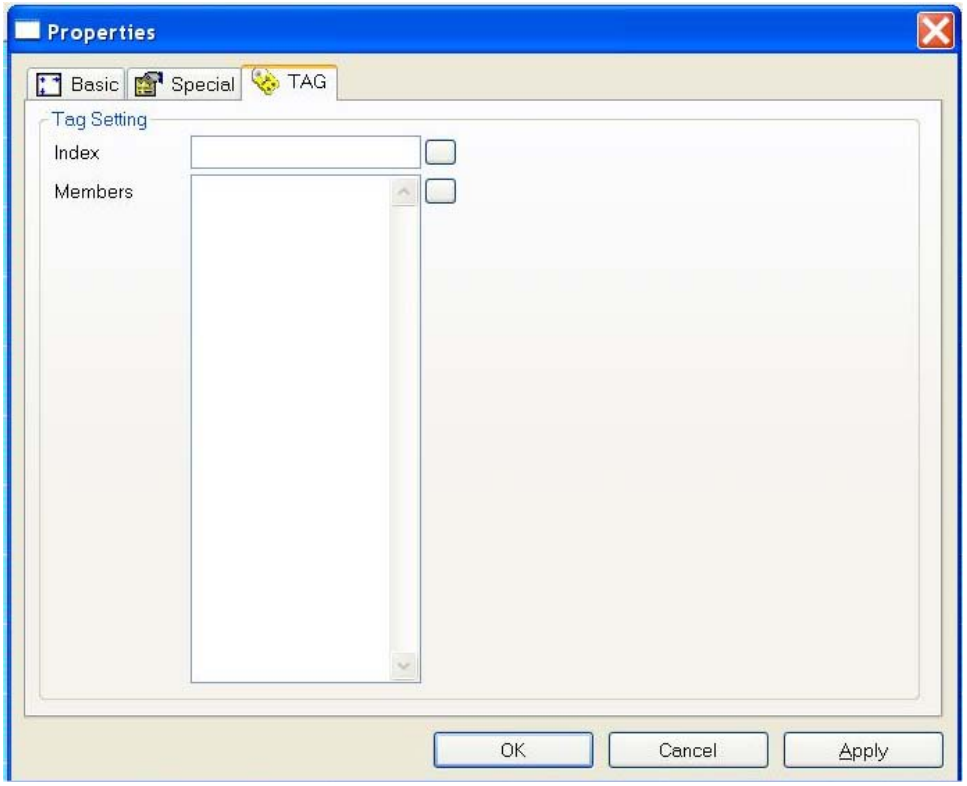


Special Properties

Basic

- Name

TAG Properties



- Index: the sequence number of the Tag set to “1”

  Its value is “1” if the first **Member** Tag is set to “1”

  Its value is “2” if the second **Member** Tag is set to “1”

  Its value is “3” if the third **Member** Tag is set to “1”

  …

  Its value is “0” if all Member Tags are “0”.

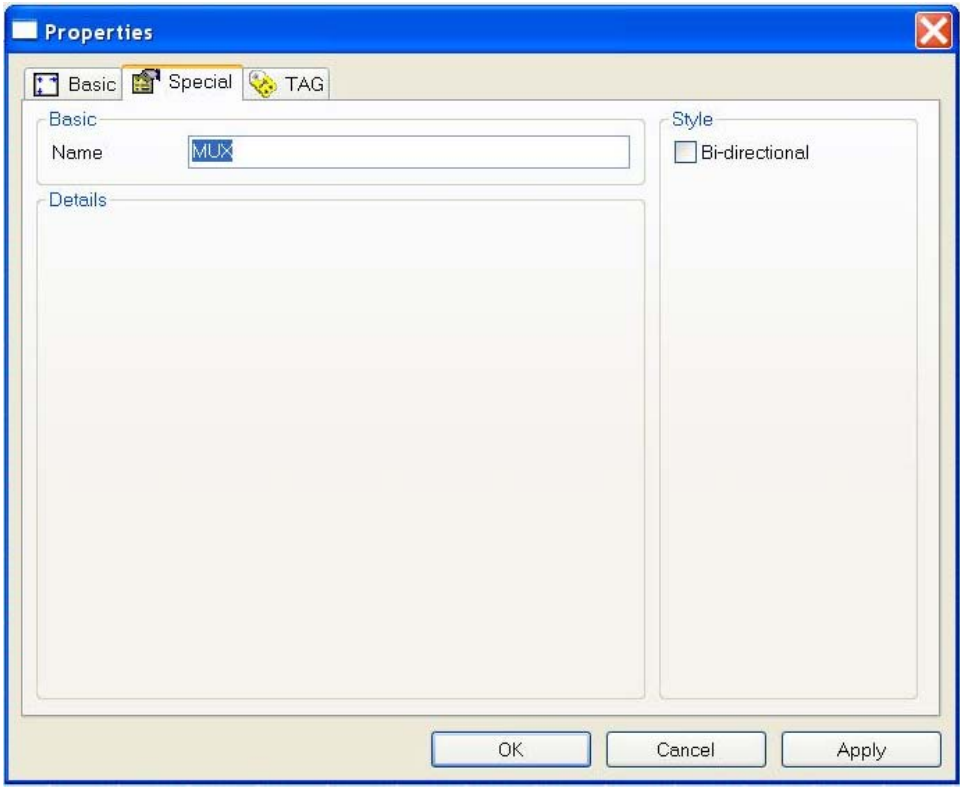
- Members: Only one member Tag can be set to “1”. Setting any member Tag to “1” will cause other member Tags to be set to “0”.

Multiplexer

Send the value of one of the **Input** Tag selected by **Index** Tag to the **Output** Tag.

If the value of **Index** Tag exceeds the number of **Input** Tags, the value of **Output** Tag will be locked and stop changing with any of the **Input** Tag.

Is Style **Bi-directional** is set, not only the value of **Output** Tag changes as the value of the **Input** Tag specified by Index changes, but the specified **Input** Tag also change as the **Output** Tag does.



Special Properties

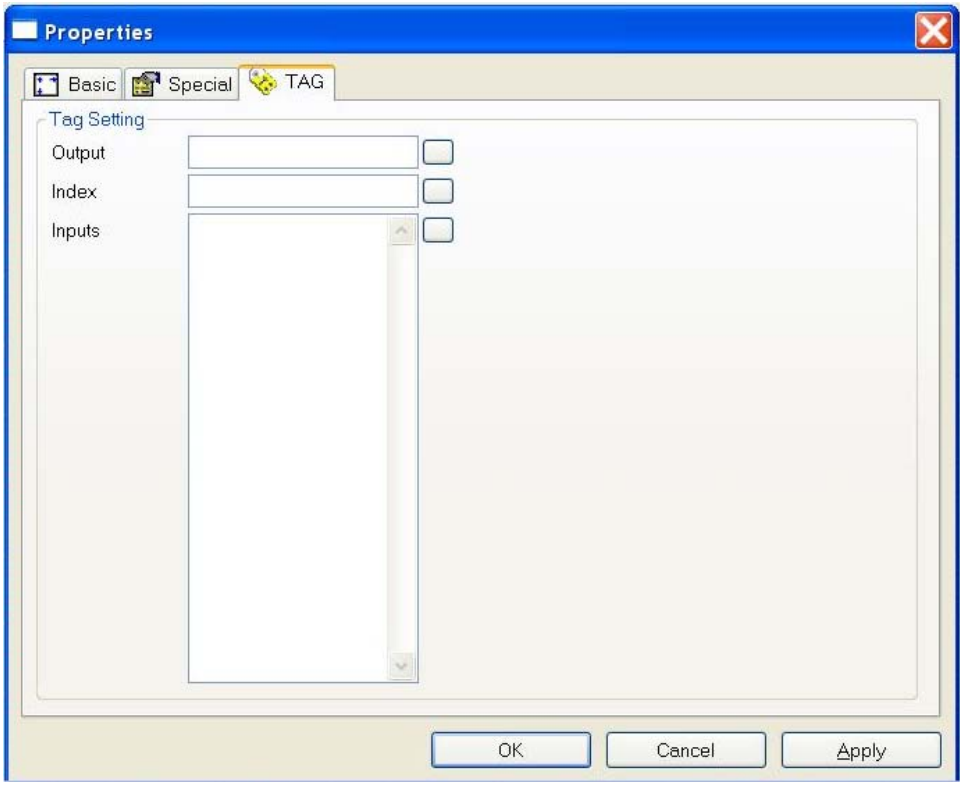
Basic

- Name

Style

- Bi-direction: Data transmission between **Output** and **Input** Tag specified by **Index** Tag is Bi-directional. That is, if the **Input** Tag changes, the **Output** Tag changes with it; if the

Output Tag changes, the **Input** Tag also changes with it.



TAG Properties

- Output: The Tag acts as the output.
- Index: The Tag used to specify which of the input Tag is connected with the output Tag.
- Inputs: Tags used as input.

If Index is “0”, the first Input Tag is the input,

If Index is “1”, the second Input Tag is the input,

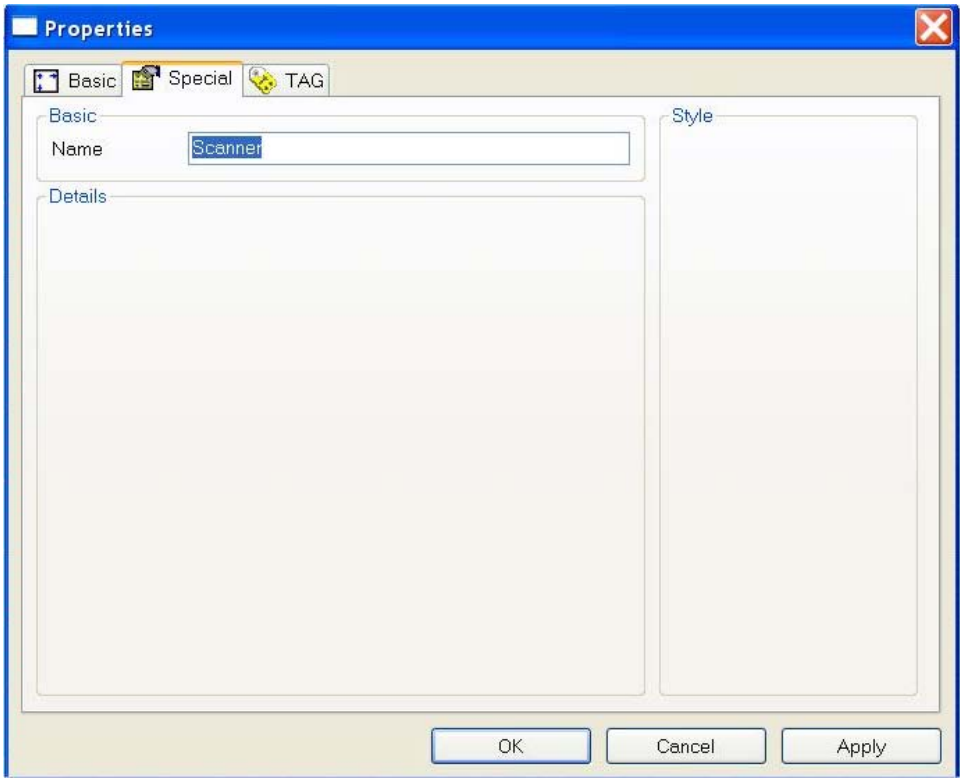
If Index is “2”, thethird Input Tag is the input,

…I

Scanner

Multiple sets of **Controls** and **Outputs** Tags can be assigned to a Scanner object. Scanner will determine whether to send the value of the **Input** Tag to the **Output** Tag based on the value of the corresponding **Control** Tag. For example, if the first **Control** Tag is "1", **Input** value will be set to the first **Output** Tag; if the value of the first **Control** Tag is "0", the value of the first **Output** Tag won't change with the **Input** Tag.

Special Properties

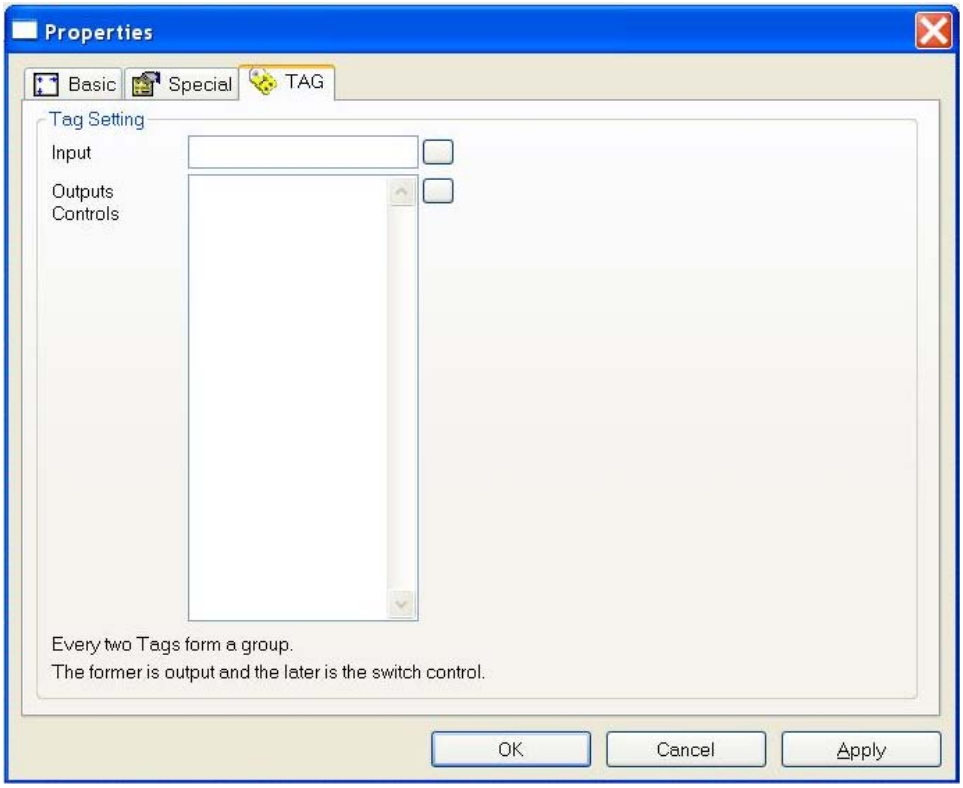


Basic

- Name

TAG Properties

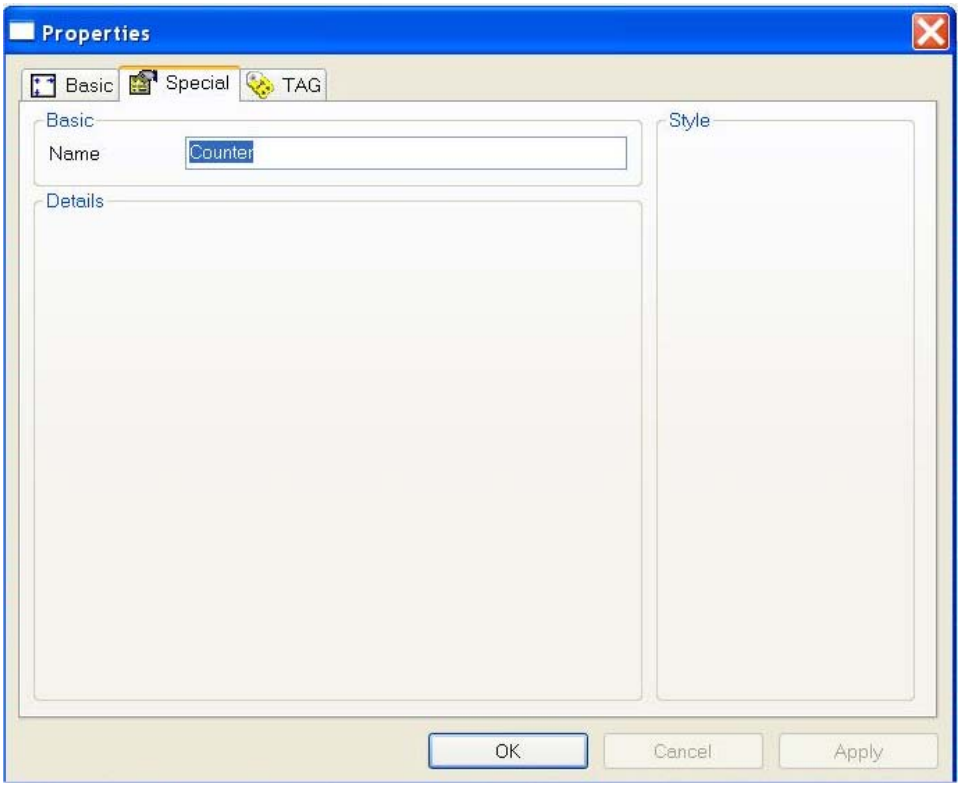
- Input: The Tag used as the input data source.
- Outputs: The output Tags.
- Controls: Tags used to control the change of Outputs. Their value should be either “0” or “1”.



Counter

Counter object is used to Count the number of value changes from "0" to "1" of **Input** Tags and send the number to **Output** Tag. A Counter object can be used as the counter for multiple **Inputs**. Every two Tags in its Tag setting is a group with the former Tag as output and the latter one is input.

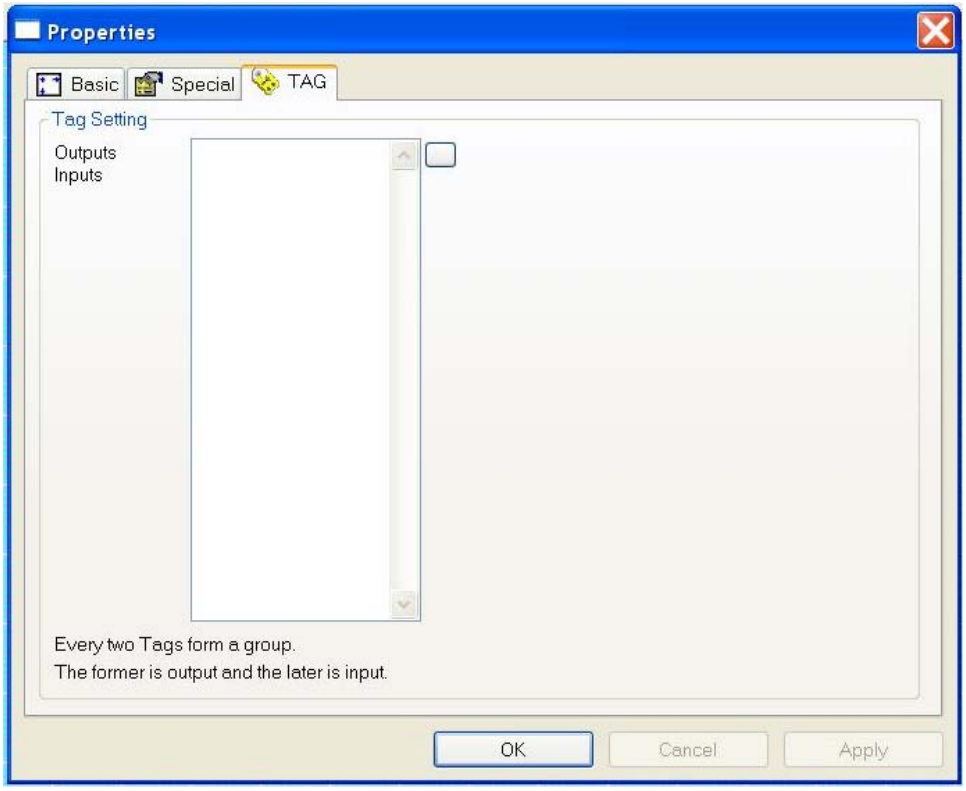
Special Properties



Basic

- Name

TAG Properties

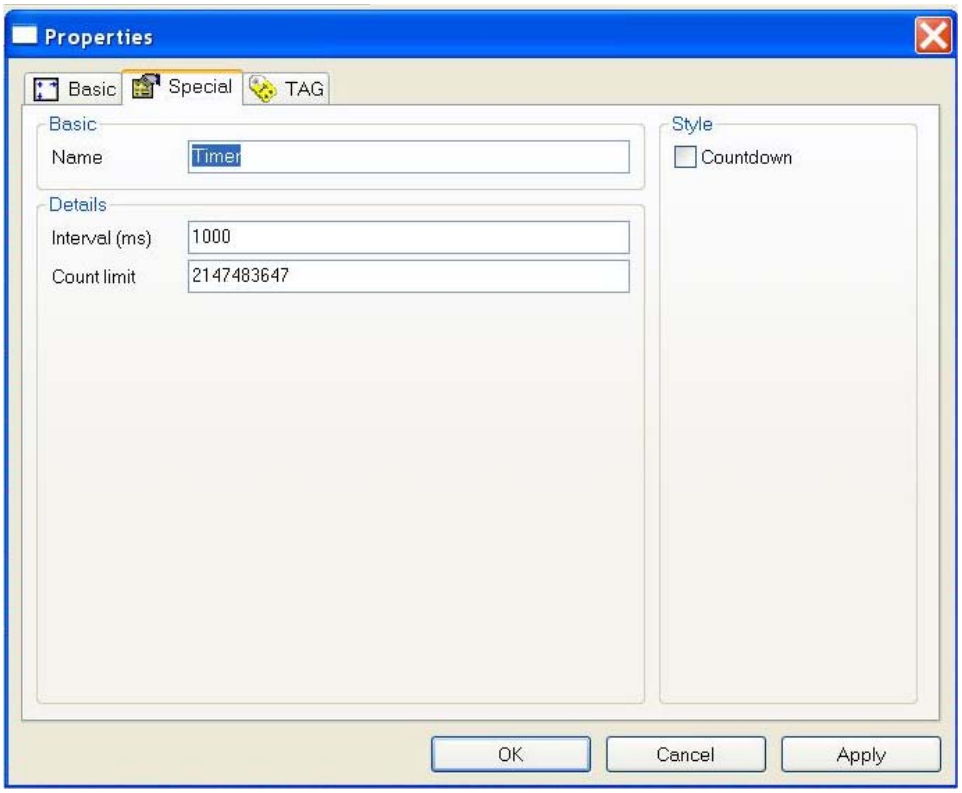


- Outputs: Counting result. Increased by one each time the corresponding Input Tag changes from “0” to “1”.
- Inputs: Input Tags to be counted.

Timer

Timer increases or decreases the value of **Output** Tag by 1 at the specified time interval when its Control Tag is "1", and stop increasing or decreasing output when control Tag is "0". When the **Count Limit** of the output is reached, it will be reset to "0" (if **Countdown** is set, the **Output** will be set to **Count Limit** when "0" is reached).

Special Properties



Basic

- Name

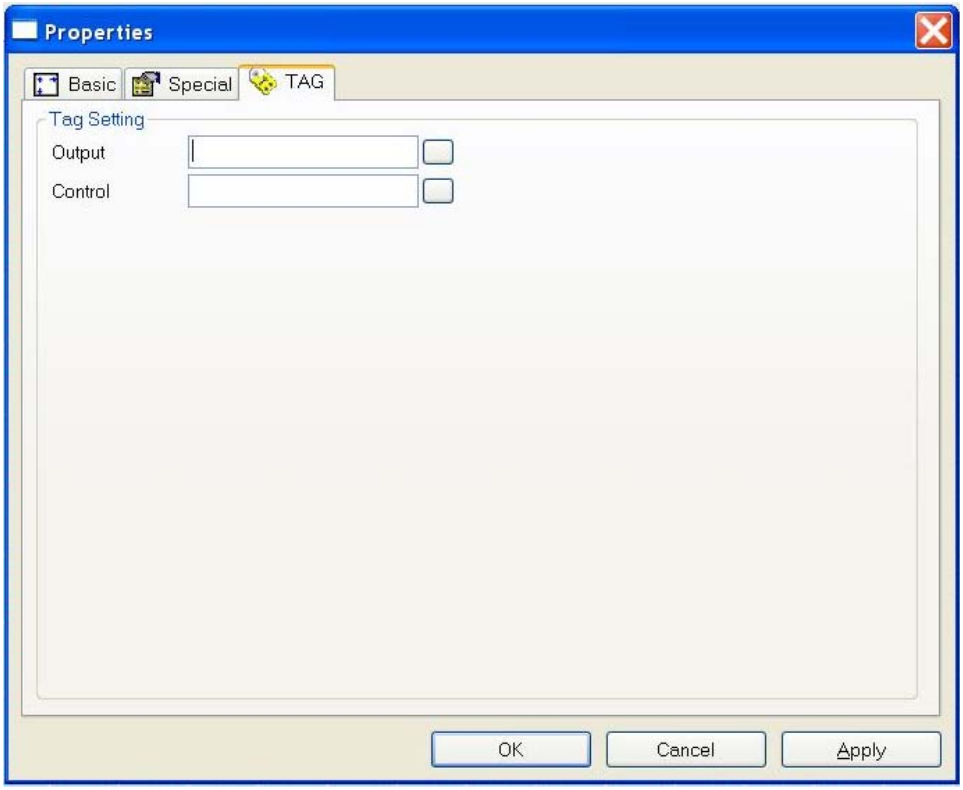
Details

- Interval: **Output** is increased or decrease at this time interval. The unit of **Interval** is ms.
- Count Limit: When the value of output reaches this number, it will be reset to "0". If **Countdown** is set, **Output** will be set to **Count Limit** when "0" is reached.

Style

- Countdown: Output is decreased instead of increased when the style is set.

TAG Properties



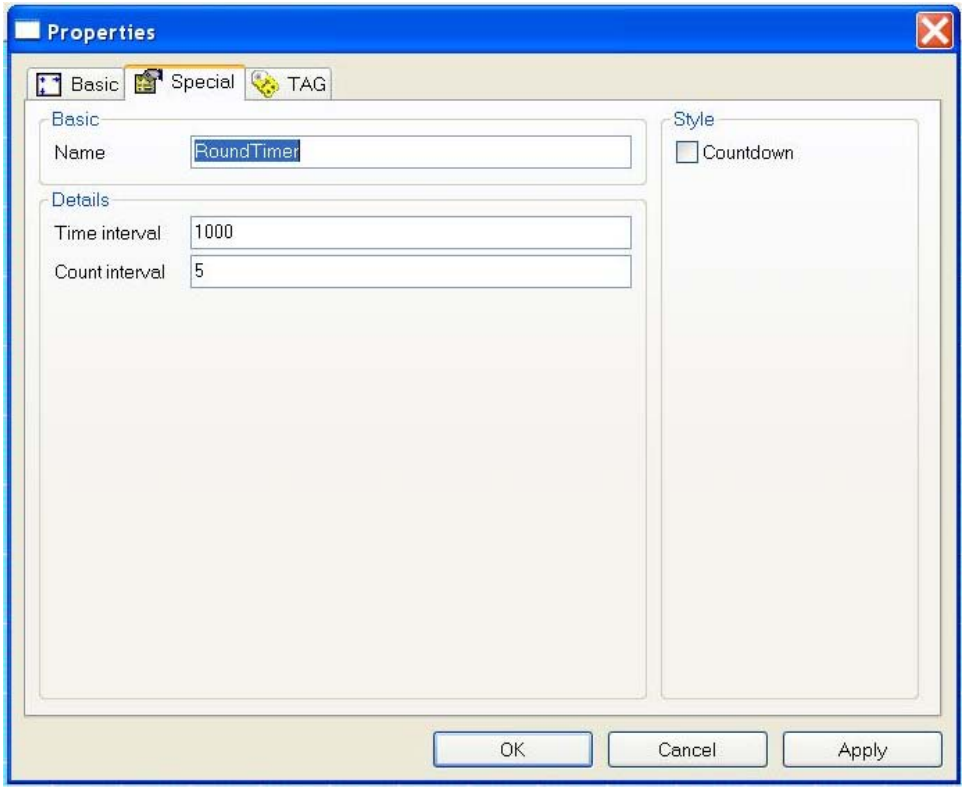
- Output: Timer output increased or decrease at specified interval.
- Control: Tag use to control the running of Timer. If no Tag is set, the Timer will always be functioning, that is **Output** will keep increasing or decreasing at the specified interval.

Multi-Timer

Multi-Timer increase or decrease a counting value at the specified **Time Interval** within the limits determined by the value of **Control** Tag and **Count Interval**, and send the result to **Output** Tag.

For example, if **Time Interval** is set to "1000" and **Count Interval** is "3":
When Input is "0, Output is "0",
When Input is "1", Output changes every 1 second (1000 ms) cyclically among "1", "2" and "3";
When Input is "2", Output changes every 1 second (1000 ms) cyclically among "4", "5" and "6";
When Input is "3", Output changes every 1 second (1000 ms) cyclically among "7", "8" and "9";
…

Special Properties



Basic

- ❒ Name

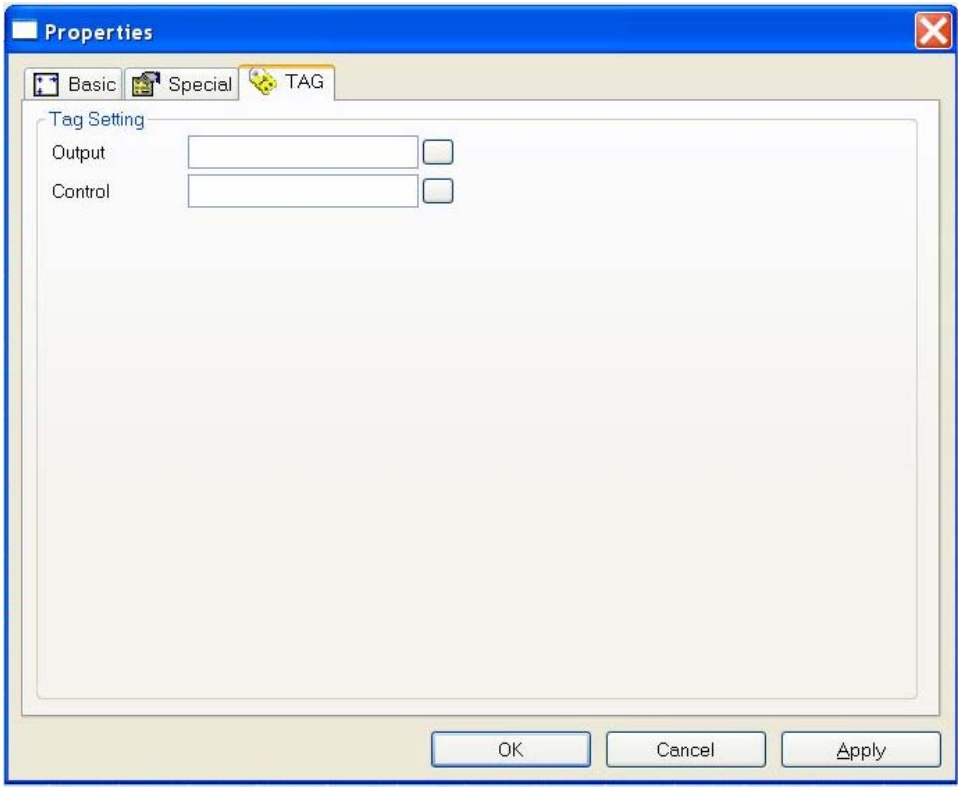
Details

- ❒ Time Interval: The time interval at which **Output** changes. Its unit is ms.
- ❒ Count Interval: Used with **Control** Tag value to determine the range of **Output**'s increment or decrement.

Style

- ❑ Countdown: Output is decreased instead of increased when the style is set.

TAG Properties

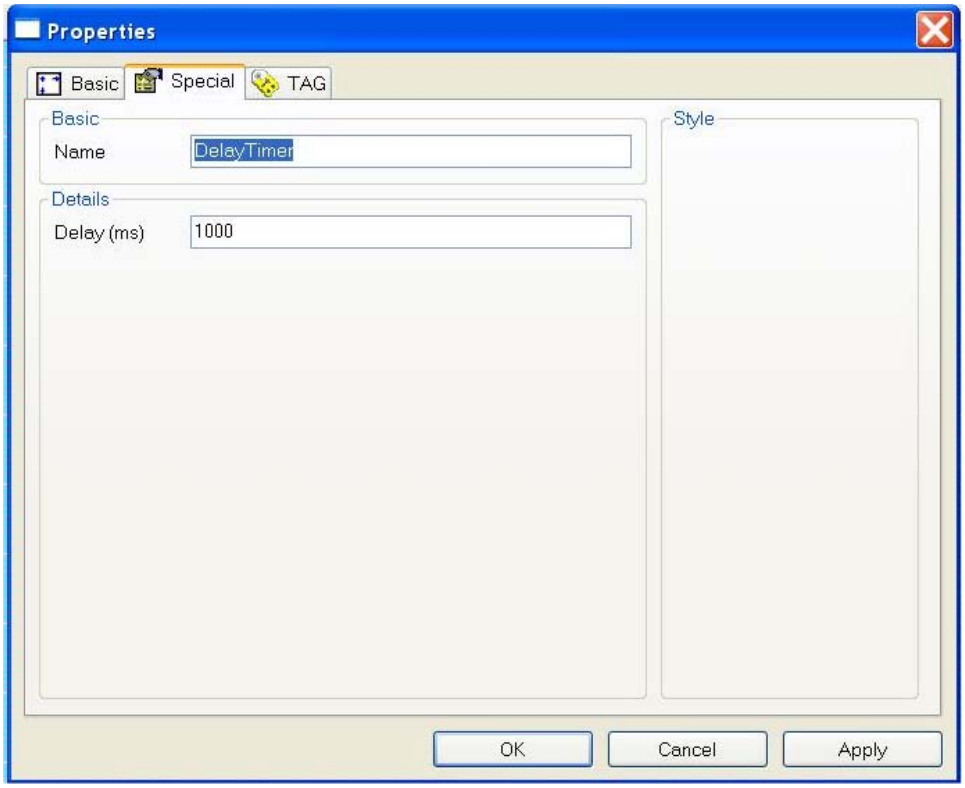


- ❒ Output: Output of Multi-Timer.
- ❒ Control: Used to start and stop Multi-Timer. It also determine the range of the increment or decrement.

Delay Timer

When **Control** Tag changes from "0" to "1", Delay Timer starts timing. After a specified **Delay** period, Delay Timer will change the value of **Output** Tag to "1". When **Control** Tag changes from "1" to "0", Delay Timer will change **Output** Tag from "1" to "0" immediately.

Special Properties



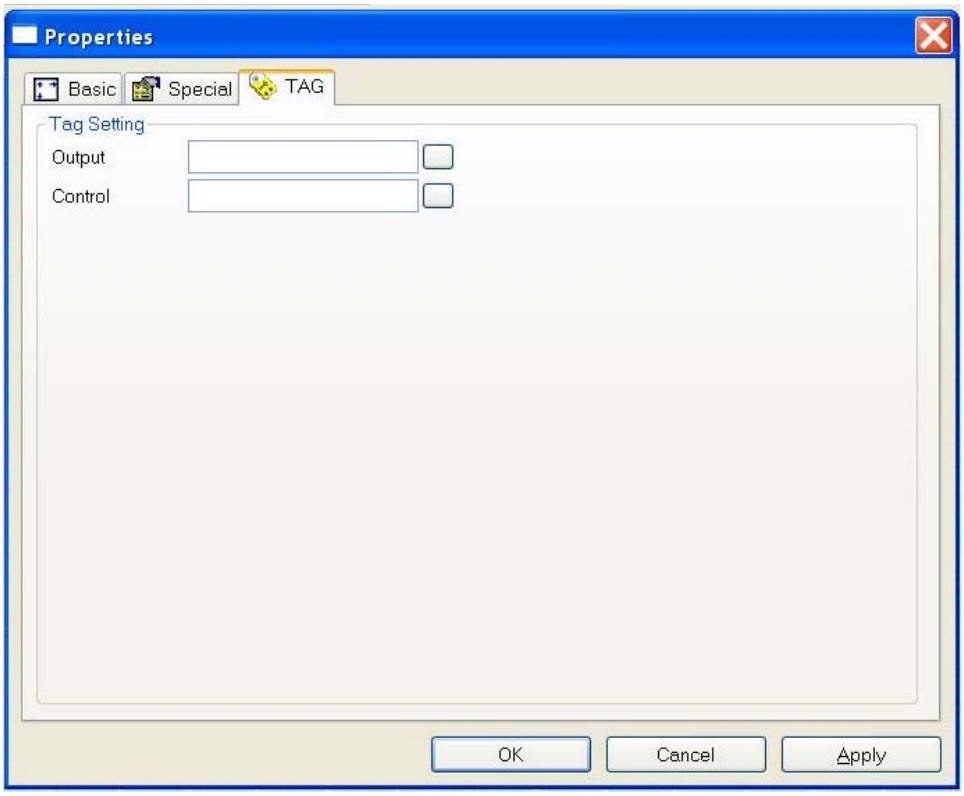
Basic

- Name

Properties

- Delay: The delay time from the activation of **Control** Tag (set **Control** to "1") until **Output** Tag is activated (set **Output** to "1").

TAG Properties

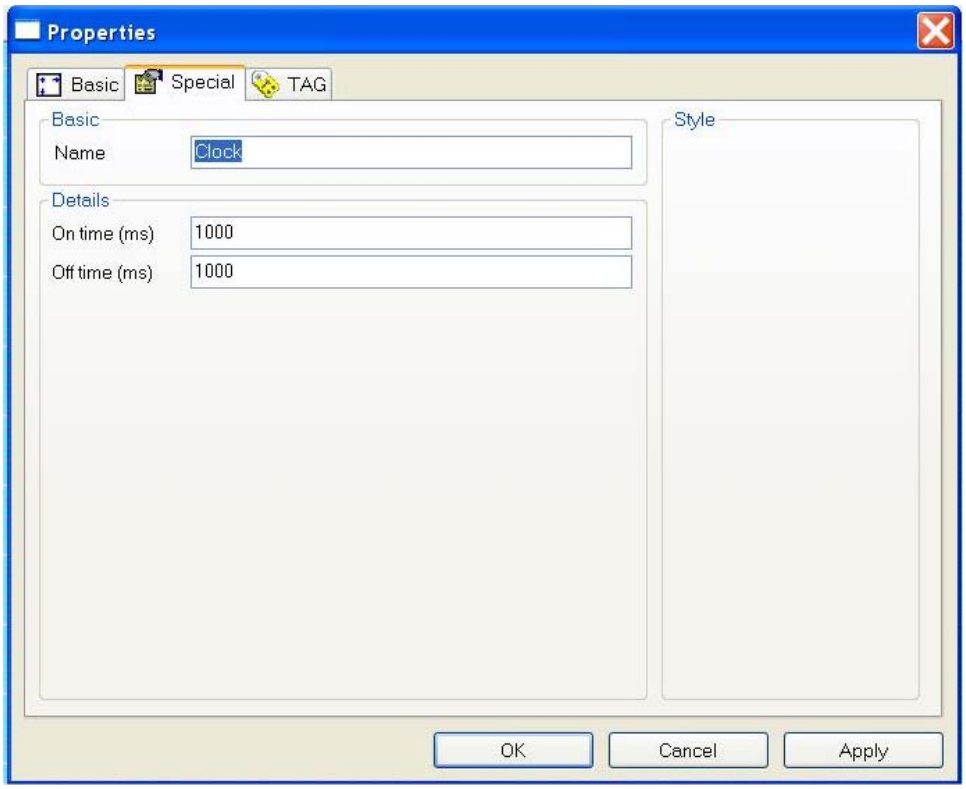


- Output: Output Tag of the delayed signal.
- Control: Tag controlling the delayed Output. If this tag is not set, Delay Timer will start timing since the panel containing the object is opened.

Clock

Clock send a sequence of "0, 1, 0, 1…" pulses at the specified period to the **Output** Tag when **Control** Tag is set to "1". When **Control** Tag is set to "0", **Output** Tag will remain unchanged by Delay Timer. The length of time for **Output** Tag to be "0" and "1" when Clock is activated can be set separately.

Special Properties



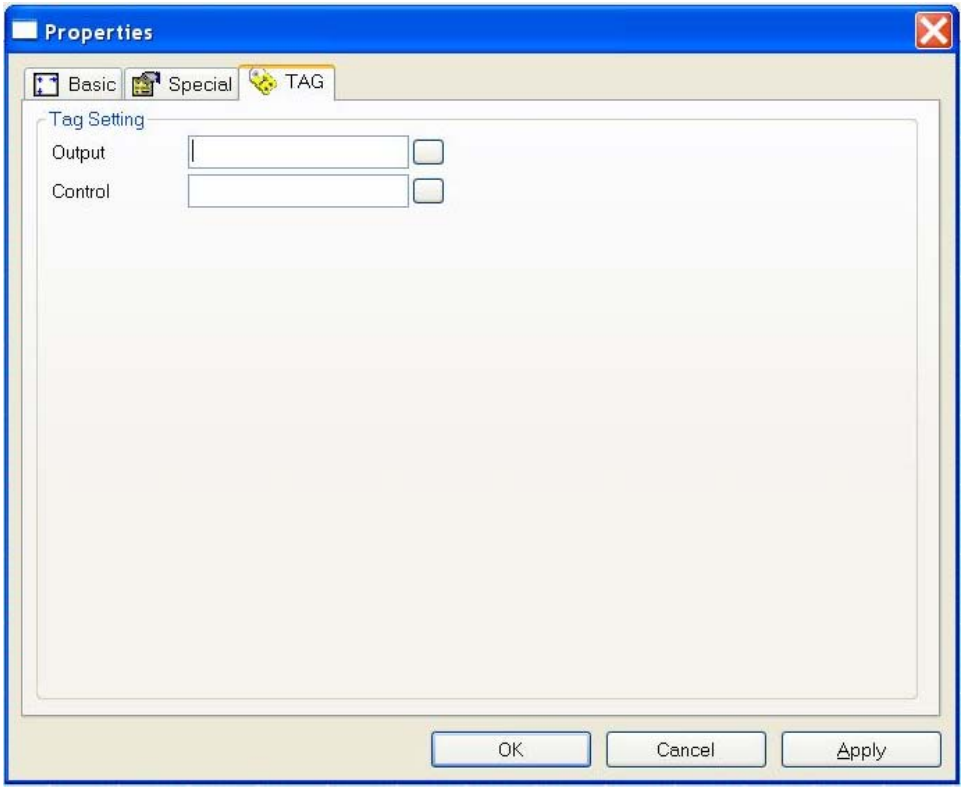
Basic

- Name

Properties

- On Time: The time of Output being "1".
- Off Time: The time of Output being "0".

TAG Properties



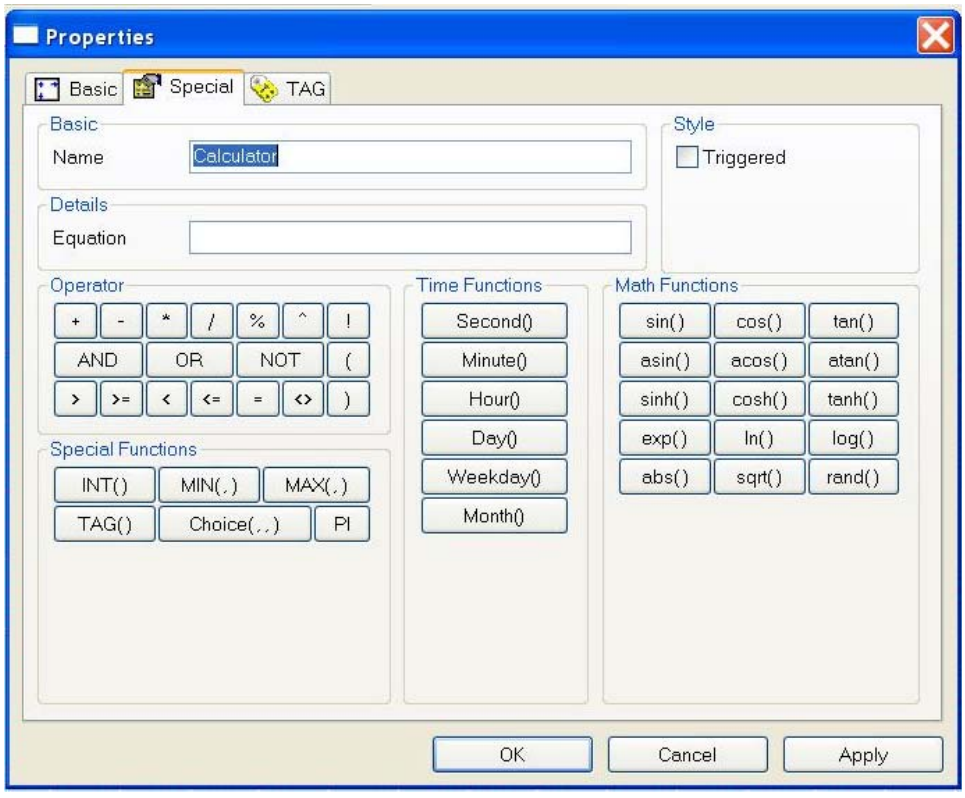
- Output: Tag used for Clock output.
- Control: Tag used to control activation Clock output. If the Tag is not set, Clock is always functioning and keeping sending output.

Calculator

Calculator uses **Arguments** Tag values as inputs and apply them into the specified **Equation**, calculate the result and send the result to **Output** Tag. The equation will be evaluated whenever any of the **Argument** Tag changes unless **Trigger** Style is set. If **Trigger** is set, only the change of the last **Argument** Tag will trigger the Calculator to calculate the result of the **Equation**.

Tag names are not used directly in the Equation, a special function TAG(*n*) is used istead to represent the value of the *n*th **Arguments** Tag.

Special Properties



Basic

- Name

Style

- Triggered: If this style set, only the change in the value of the last **Argument** Tag will

trigger the reevaluation of the **Equation**. Note that the last **Argument** Tag can be unused in the **Equation** and only used for trigger.

Details

- Equation: Equation of the calculation performed on the **Argument** Tags. An equation string should be entered in this field. The limit on the length of the equation string is 255 characters. Operators and functions list below can be used in the equation. Tag value should be referenced indirectly in the equation string using special function TAG(*n*).

Operators

- Arithmetic operators: +, -, *, /, %(modulus), ^(exponential), !(factorial), 。
- Logic operators: AND, OR, NOT
- Comparison operators:>, >=, <, <=, = , <>(not equal)
- Parentheses (“(“ and “)”)can be used in the equation.

Mathematical Functions

- Trigonometric functions: sin(x), cos(x), tan(x)
- Anti-trigonometric: asin(x), acos(x), atan(x)
- Hyperbolic functions:sinh(x), cosh(x), tanh(x)
- Logarithmic functions: exp(x), ln(x), log(x)
- Others: abs(x)(absolute value), sqrt(x)(square root), rand(x)(this function generate a random number with value between 0~x)

Special Functions

- INT(x): This function transfers the value of x into an integer.
- MIN(a, b): This function returns the smaller number between a and b.
- MAX(a, b): This function returns the larger number between a and b.
- TAG(n)($1 \leqq n \leqq N$): This function represents the value of the nth **Argument** Tag. If n=0, it represent the value of **Output** Tag before this calculation.
- **Choice(c, t, f)**: **c** is the condition expression, **t** and **f** are both expressions. If the result of c is true, this function will return the value of **t** expression. Otherwise, if **c** is false, the function will return the value of **f** expression.

  Example1：Choice(**TAG(1)>=TAG(2)**,1,0)

Comments: If TAG(1)>=TAG(2), set **Output** Tag to "1", otherwise set it to "0"

Example 2：Choice(TAG(1)=1, TAG(0)+1, TAG(0))

Comments: if TAG(1)=1, calculate TAG(0)+1 and set the result to Output Tag, otherwise Output will remain its previous value.

Example 3：Choice(Second()<=30, 1, 0)

Comments: It Second()<=30 (The second s of current absolute time is less than or equal to 30), set Output Tag to "1", otherwise set it to "0".

Example 4：Choice(TAG(1)>=80 AND TAG(2)=1,1,0)

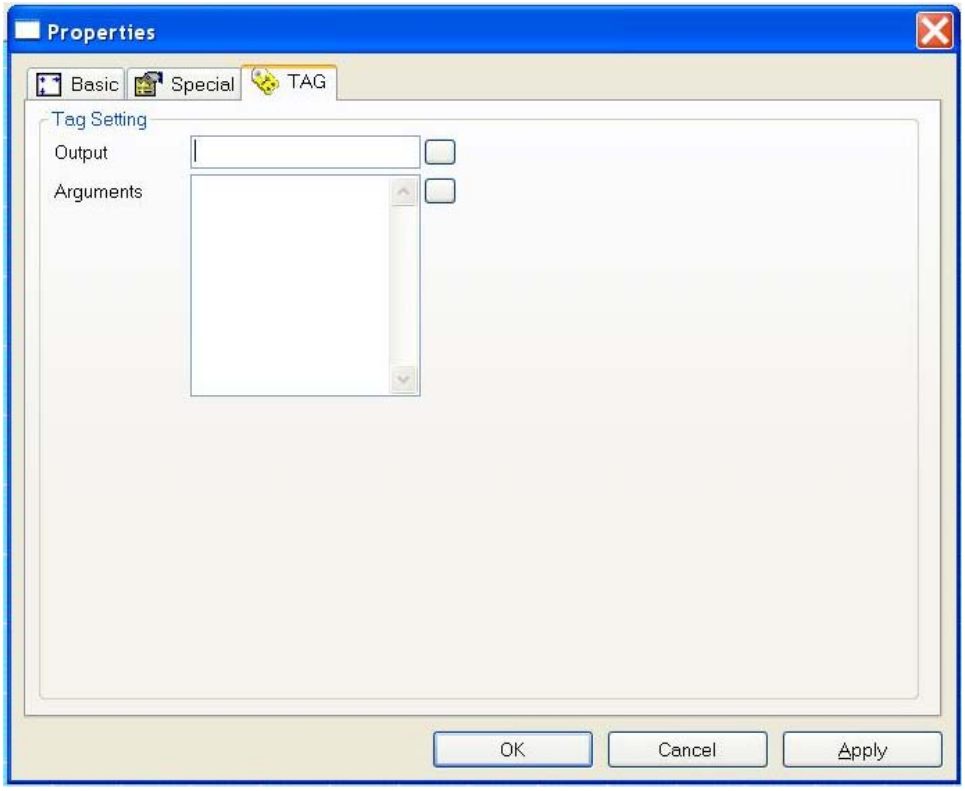
Comments: It TAG(1)>=80 AND TAG(2)=1, set Output Tag to "1", otherwise set it to "0".

- PI: The mathematical constant π (3.141592653589793).

Time Functions

- Second(): Return the second part of current system time.
- Minute(): Return the minute part of current system time.
- Hour(): Return the hour part of current system time.
- Day(): Return the day part of current system time.
- Weekday(): Return the day of the week part of current system date.，0 represent Sunday, , 1 indicates Monday, …, etc.
- Month(): Return the month part of current system date.
- Year(): Return the month part of current system date.

TAG Properties

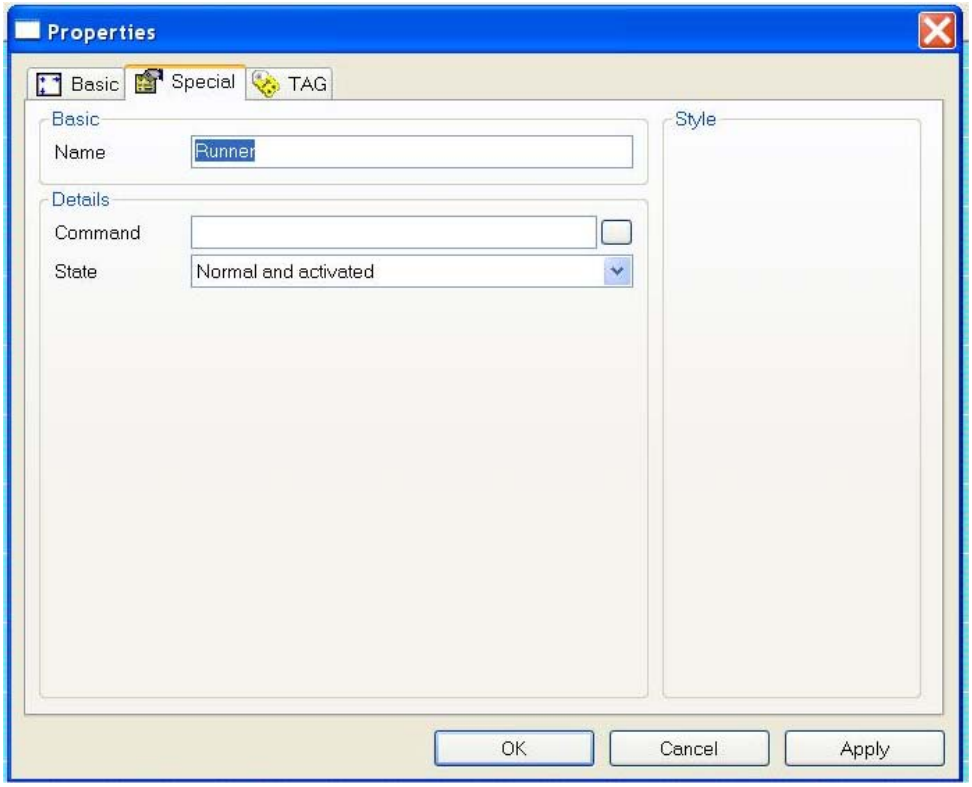


- Output: Tag to be set as the result of the **Equation**.
- Arguments: Tags used as arguments in the **Equation**.

Runner

Runner is used to run an external application program. When its Control Tag is set from "0" to "1", the command specified in Command is run. Command can include path and parameters required to run the specified application. This object is from the older version of Lab-LINK and only kept for compatibility. It is recommended to use a new object Executer to replace this object.

Special Properties



Basic

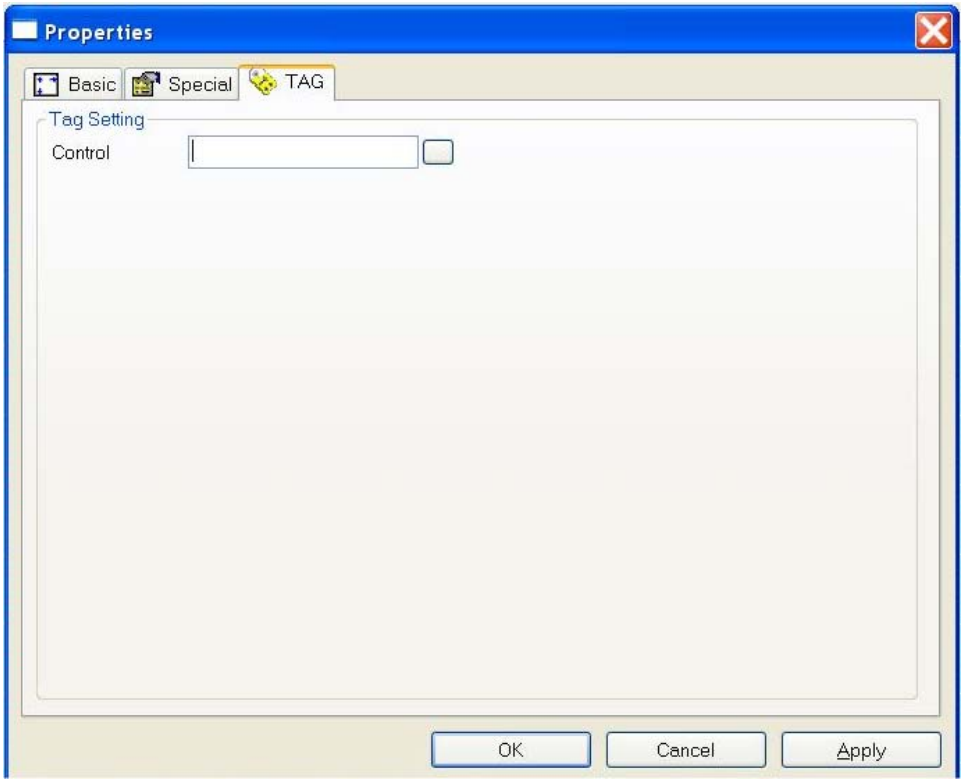
- Name

Details

- Command: the command line of the application program to be run. Command line can include all the required path and parameters the application needs.
- State: : The state of the application program when run.

- Minimized and activated
- Maximized and activated
- Normal and not activated
- Normal and activated
- Minimized and not activated

TAG Properties

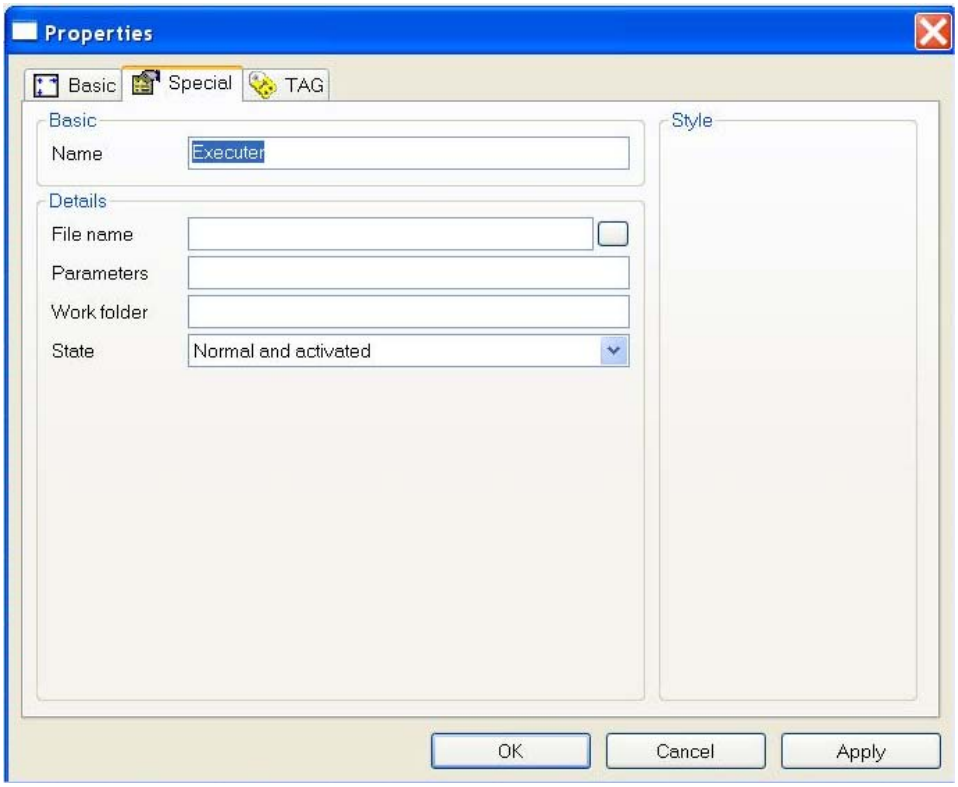


- Control: Tag used the control the running of the specified application.

Executer

Executer is used to execute an external application program or to open an existing document. When the Control Tag is set from "0" to "1", Executer will run the specified application. If the application specified is a document file, it will activate the appropriate application to open the document.

Special Properties



Basic

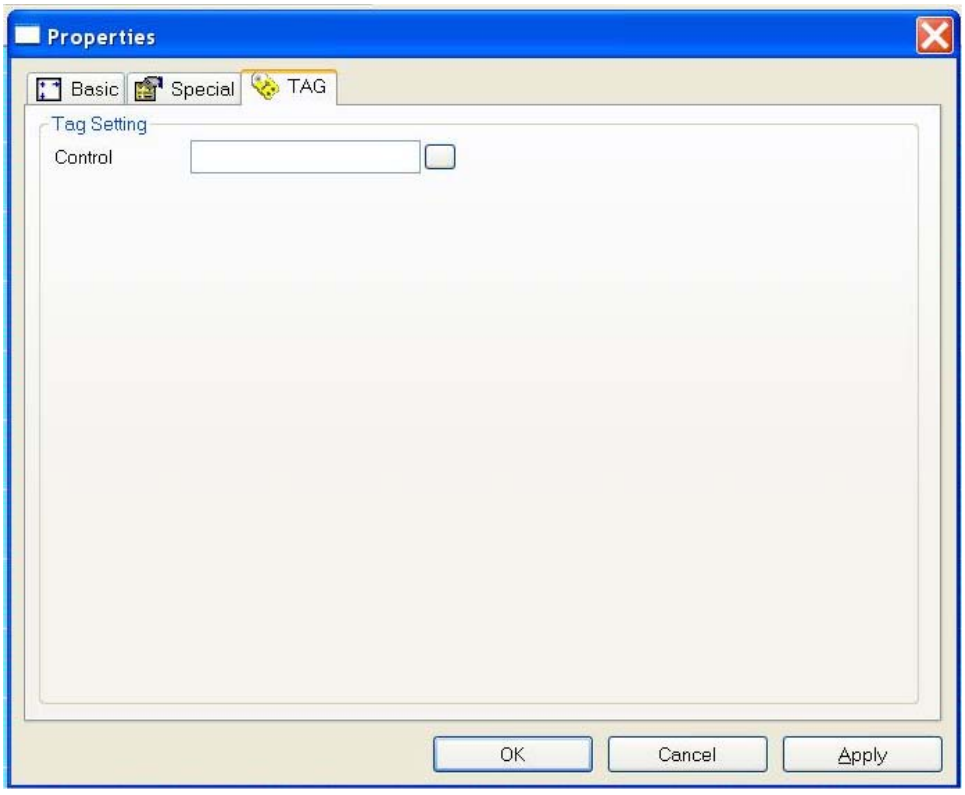
- Name

Properties

- File name: The file to be executed. It can be either an executable program file or a document file which is referenced to an appropriate application.
- Parameters: Parameters needed by the File.
- Work folder: the working folder of the specified File.

- State: : The state of the application program when run.
  - Minimized and activated
  - Maximized and activated
  - Normal and not activated
  - Normal and activated
  - Minimized and not activated

TAG Properties



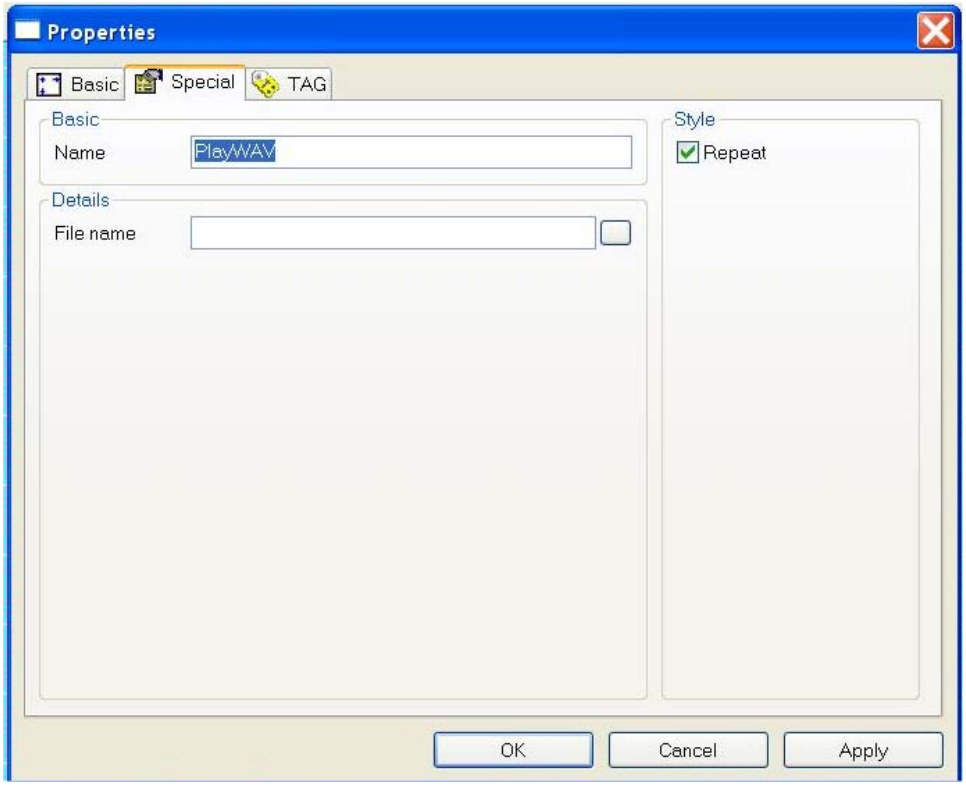
- Control: Tag used to control the execution of the specified File.

WAV Player

WAV player can be used to play a Wave file. When **Control** Tag is set to "1", WAV Player uses **Index** Tag as the index to choose from a group of Wave files and play the file. When **Control** Tag is set "0", it stop playing.

Wild card character "?" can be included in the WAV file name in the **WAVE File** field. They will be replaced by the value of **Index** Tag to specify the Wave file to be played. For Example, "ALARM-???.WAV" represent any one of the possible 1000 Wave files: "ALARM-000.WAV" ~"ALARM-999.WAV". When Index is "1", the Wave file to be played will be "ALARM-001.WAV". If the file specified by **Index** doesn't exist, no wave file will be played.

Special Properties



Basic

- Name

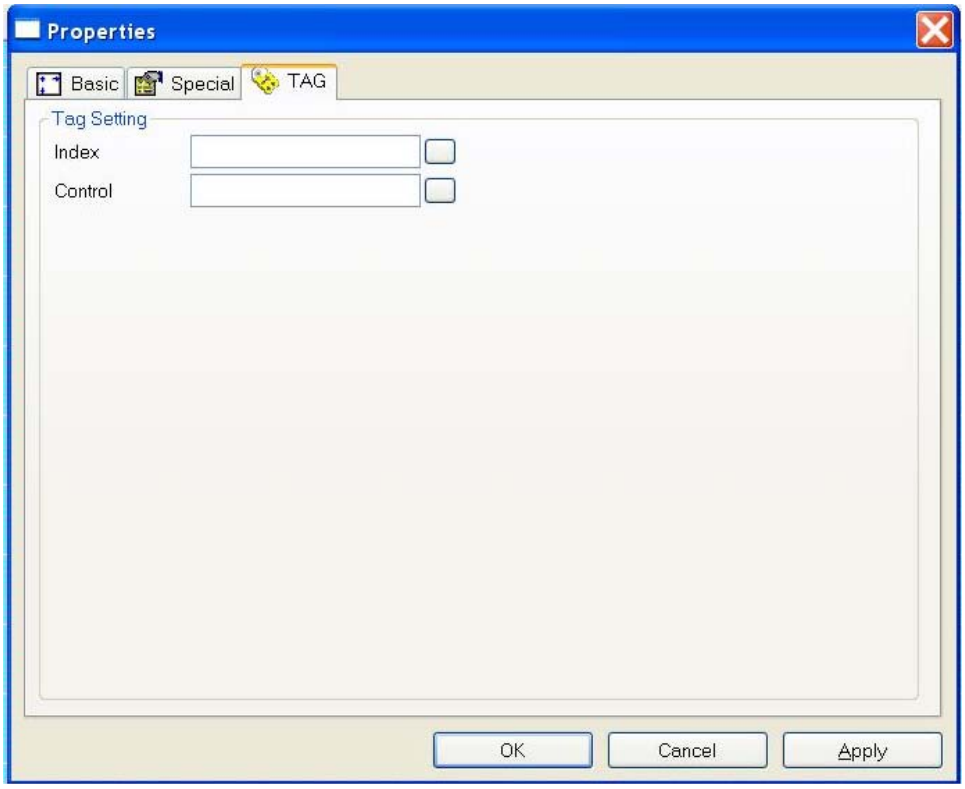
Details

- File name: The wave file to be played. File name may include valid path designation. Use “~4” in path to indicate the reference path for wave files. “?” in Wave File will be replaced by **Index** Tag value.

Style

- Repeat: Play the specified repeatedly until **Control** Tag is set to “0”.

TAG Properties



- Index: Tag used to select which wave file to play. Value of the tag will be used to replace “?” in Wave File path.
- Control: Tag controlling wave file playing. Start play when the Tag is set to “1” and stop playing when it is set to “0”.

Chapter 9 Control Objects

Control objects are used to alter the values of Tags. They are operable during runtime and may subject to protection of Check password and privilege.

 Button

 LED Button

 Rocker

 Vertical Slider

 Edit Box

 Number Pad

 WMFButton

 Horizontal Slider

 Set Button

 Spin Button

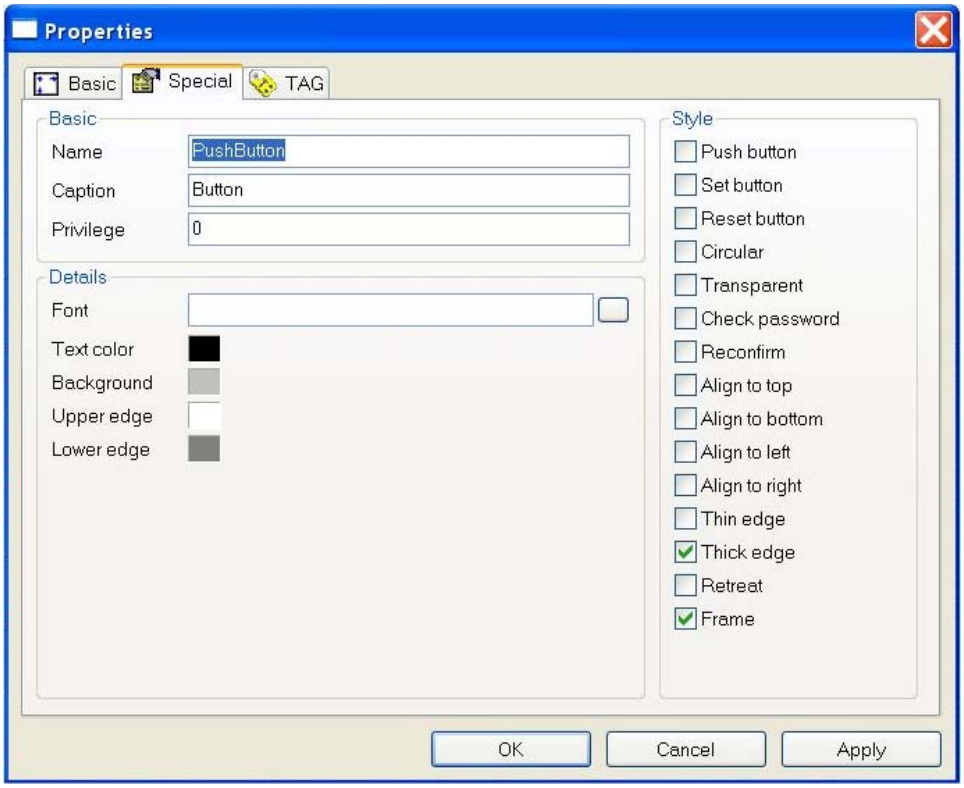
 BMPButton

Since **Basic** properties are the same for all genie objects and have been described in chapter 4, they are omitted and will not be discussed again here.

Button

Button is one of the most used control objects. It can be used to turn on or turn off an equipment, to switch to a different panel…, etc. When users click on a Button, the value of its **Target** Tag is altered.

Special Properties



Basic

- Name
- Caption: Text display on top of the Button.
- Privilege: The privilege a user must have to operate on this object. Range of privilege is between 0 and 255.

Details

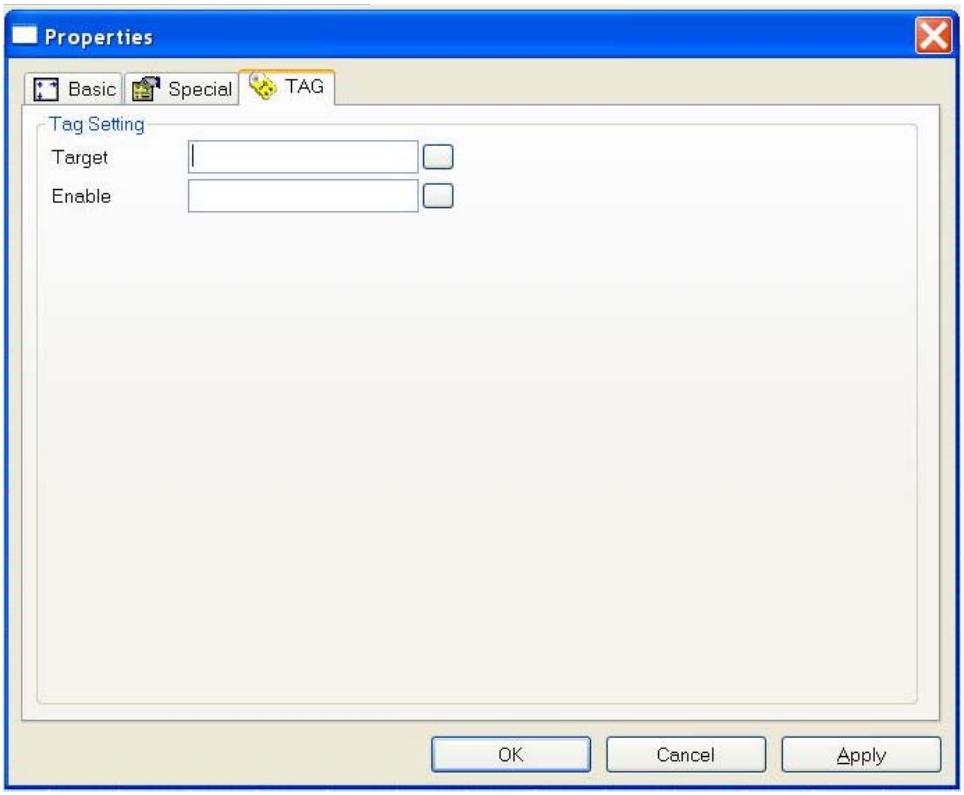
- Font: Font used for **Caption**.

- Text: Color of the **Caption** text.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Push Button: The button is a push button. Its Target Tag is “1” when the button is pressed and is “0” when released.
- Set Button: The button can only be only used to set **Target** Tag to “1” when pressed. The button will remain pressed until the **Target** is set to “0” with other mechanism.
- Reset Button: The button can only be only used to set **Target** Tag to “0” when pressed. The button will remain pressed until the **Target** is set to “1” with other mechanism.
- Circular: Set the shape of the button to be circular. The button is rectangular unless this style is set.
- Transparent: The button is transparent.
- Align Top: Align the caption to the top of object.
- Align Bottom: Align the caption to the Bottom of object.
- Align Left: Align the caption to the left of object.
- Align Right: Align the caption to the right of object.
- Check password: Always ask for a Check password when operated.
- Reconfirm: Show a message to ask for reconfirmation when operated.
- Thin Edge
- Thick Edge
- Retreat
- Frame

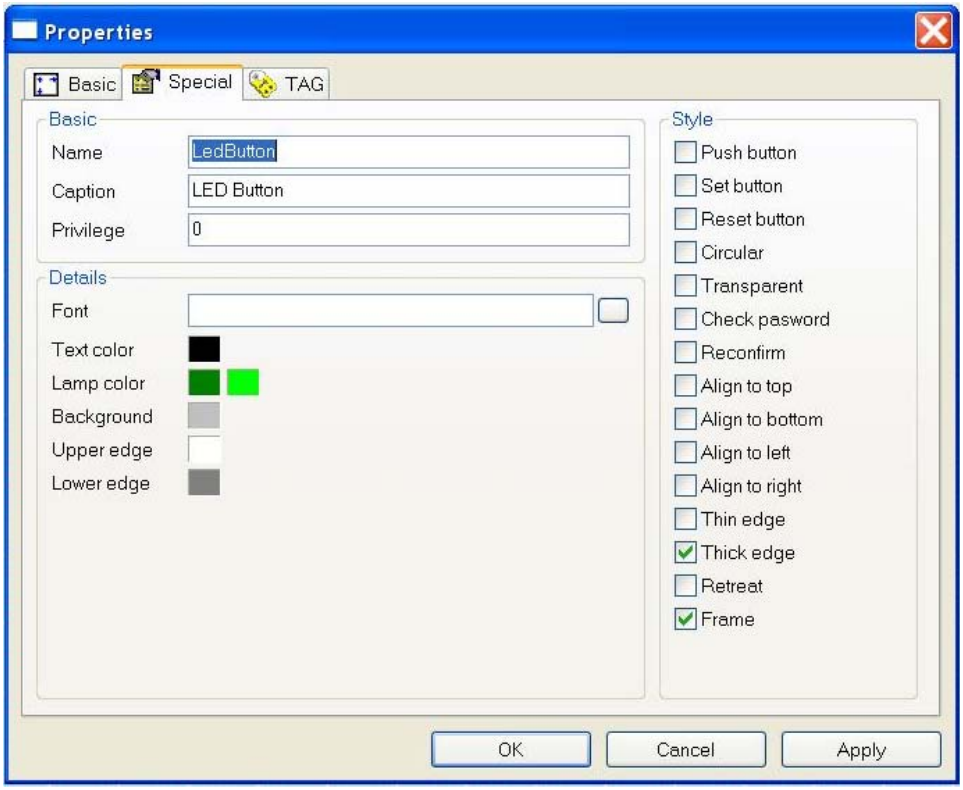
TAG Properties



- Target: The Tag controlled by this object.
- Enable: If this Tag is set, the object is operable only when this Tag is set to "1".

LED Button

LED is button with a colored LED on its left-top corner to show is current status.



Most of the settings in the Special properties page and Tag properties page are the same as **Buttons**. Please refer to the **Button** Section of this Manual.

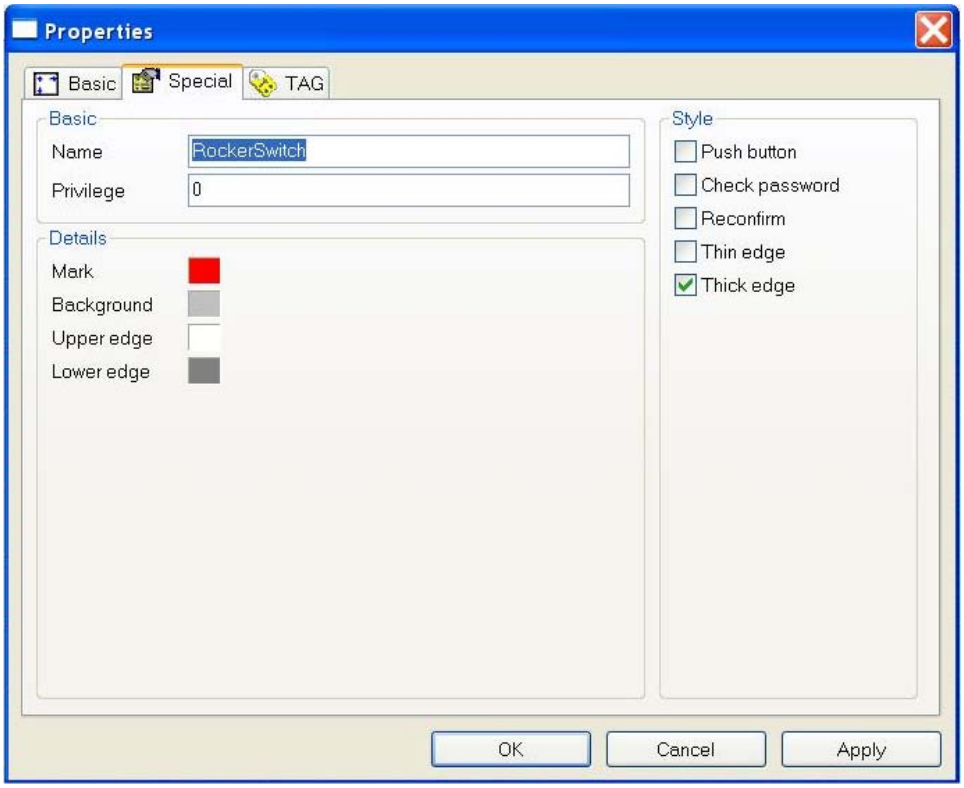
Special Properties

Details

- Lamp color: Color of the LED indicating the status of the Target Tag. Two colors are defined. The first color is shown when the button is released, and the second color is used when the button is pressed.

Rocker

Rocker is a button with the shape resemble a rocker switch, When the side with a marked dot is pressed, the Target Tag is set to 1", and when the other side is pressed the Target Tag is set to "0".



Special Properties

Basic

- ❑ Name
- ❑ Privilege: The privilege a user must have to operate on this object. Range of privilege is between 0 and 255.

Details

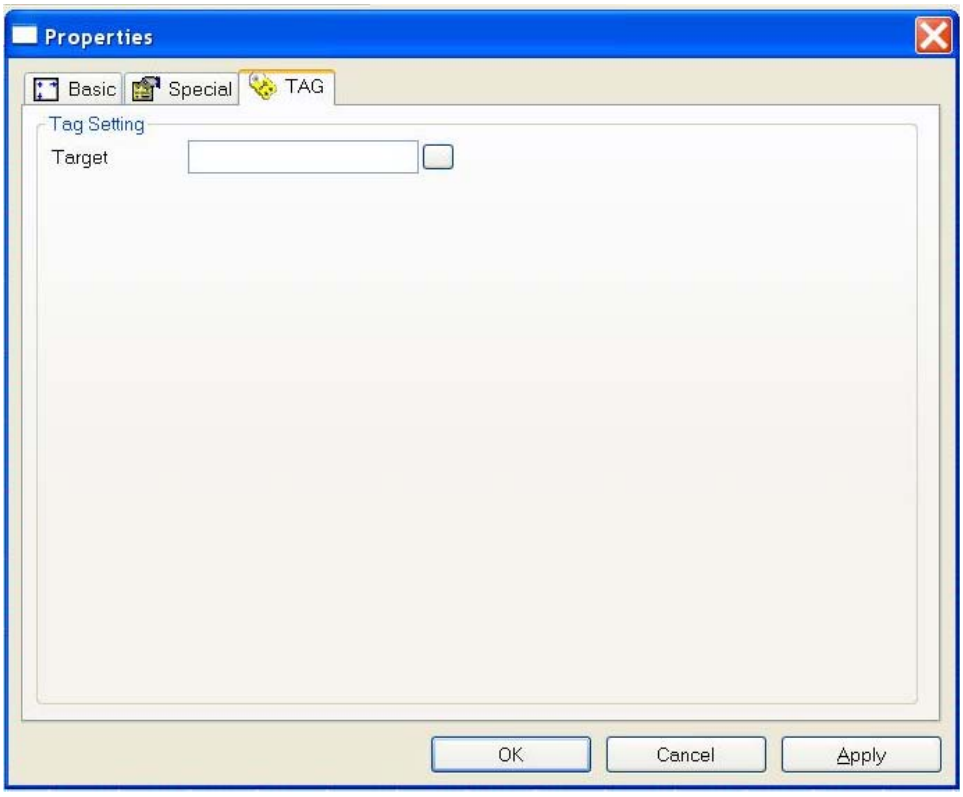
- ❑ Mark: Color of the marker on the rocker switch.
- ❑ Background: Object background color.

- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Push Button: The rocker switch is turned on when clicked with mouse, but it is turned off immediately when the mouse button is released.
- Check password: Always ask for a Check password when operated.
- Reconfirm: Show a message to ask for reconfirmation when operated.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties

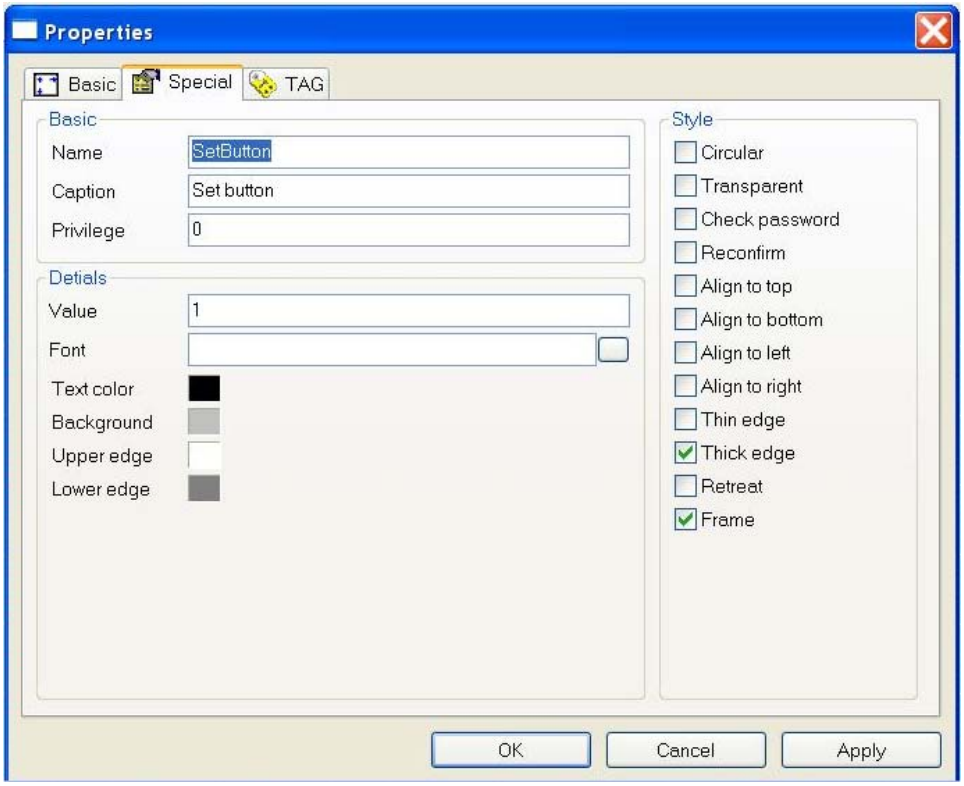


- Target: The Tag controlled by this object.

Set Button

Set Button is used to set the **Target** to a fixed value when operated.

Special Properties



Basic

- ❑ Name
- ❑ Caption: Text display on top of the Button.
- ❑ Privilege: The privilege a user must have to operate on this object. Range of privilege is between 0 and 255.

Details

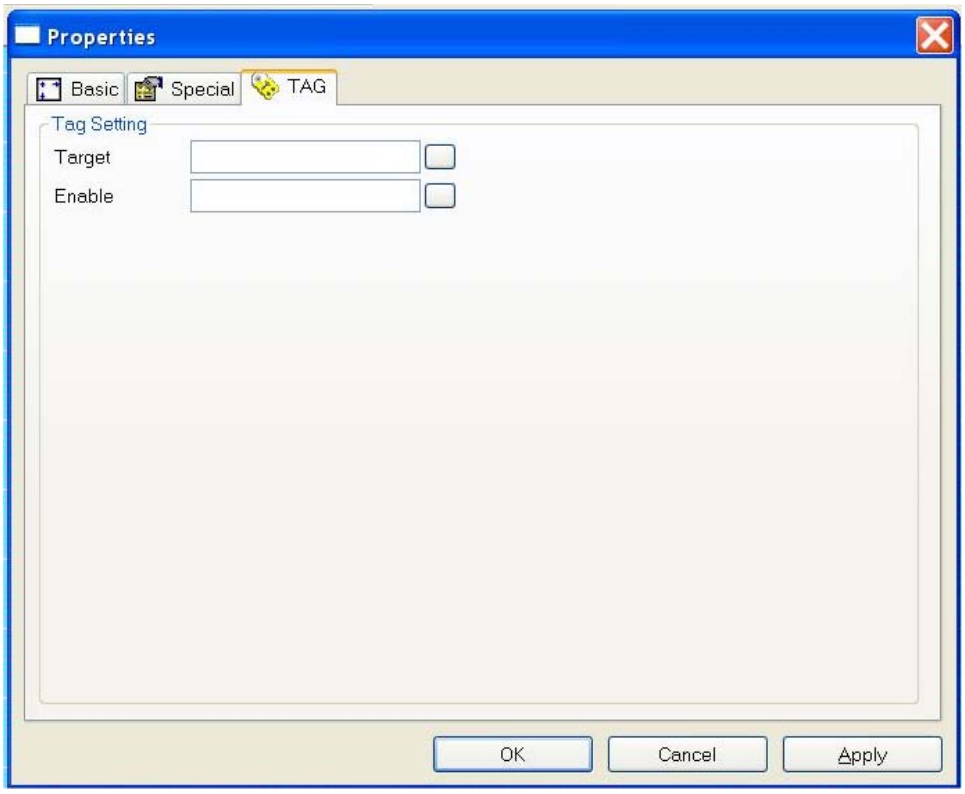
- ❑ Value: Value set to the Target Tag when this object is operated.
- ❑ Font: Font used for **Caption**.
- ❑ Text color: Color of the **Caption** text.

- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Circular: Set the shape of the button to be circular. The button is rectangular unless this style is set.
- Transparent: The button is transparent.
- Align Top: Align the caption to the top of object.
- Align Bottom: Align the caption to the Bottom of object.
- Align Left: Align the caption to the left of object.
- Align Right: Align the caption to the right of object.
- Check password: Always ask for a Check password when operated.
- Reconfirm: Show a message to ask for reconfirmation when operated.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties

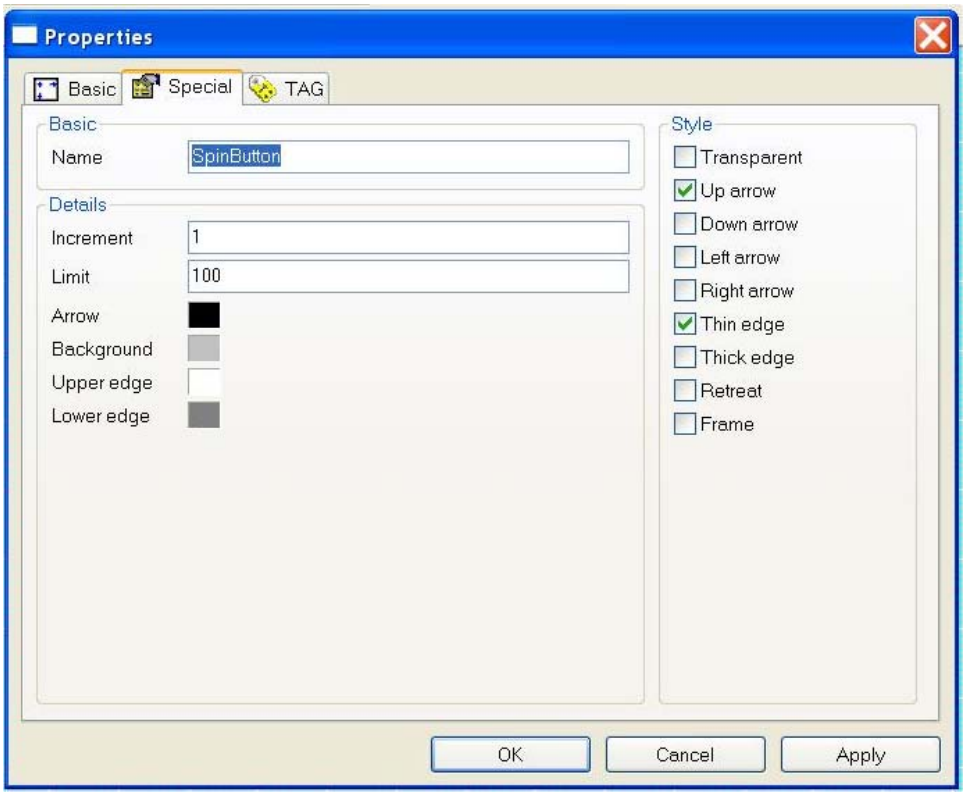


- Target: The Tag controlled by this object.
- Enable: If this Tag is set, the object is operable only when this Tag is set to "1".

Spin Button

Spin Button is used to control the increment or decrement of the **Target** Tag. Increment of each operation can be set. A limit can also be set to restrict the adjustable range.

Special Properties



Basic

- Name

Details

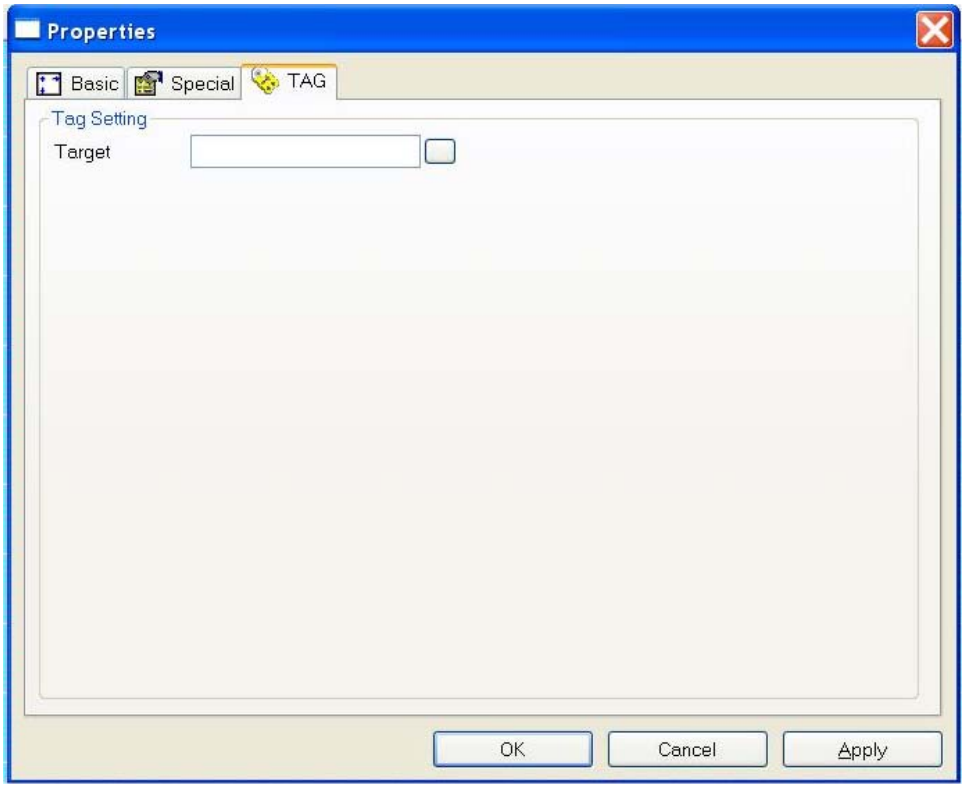
- Increment: The increment value each time the spin button is pressed. For decrementing, set this filed to a negative value.
- Limit: The limit value of increment or decrement. When the limit is reached, Target Tag will remain unchanged when the button is clicked.
- Arrow: Color of the arrow on the button.

- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Transparent: The button is transparent.
- Up Arrow: The arrow on the button is pointing upward.
- Down Arrow: The arrow on the button is pointing downward.
- Left Arrow: The arrow on the button is pointing to the left.
- Right Arrow: The arrow on the button is pointing to the right.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties



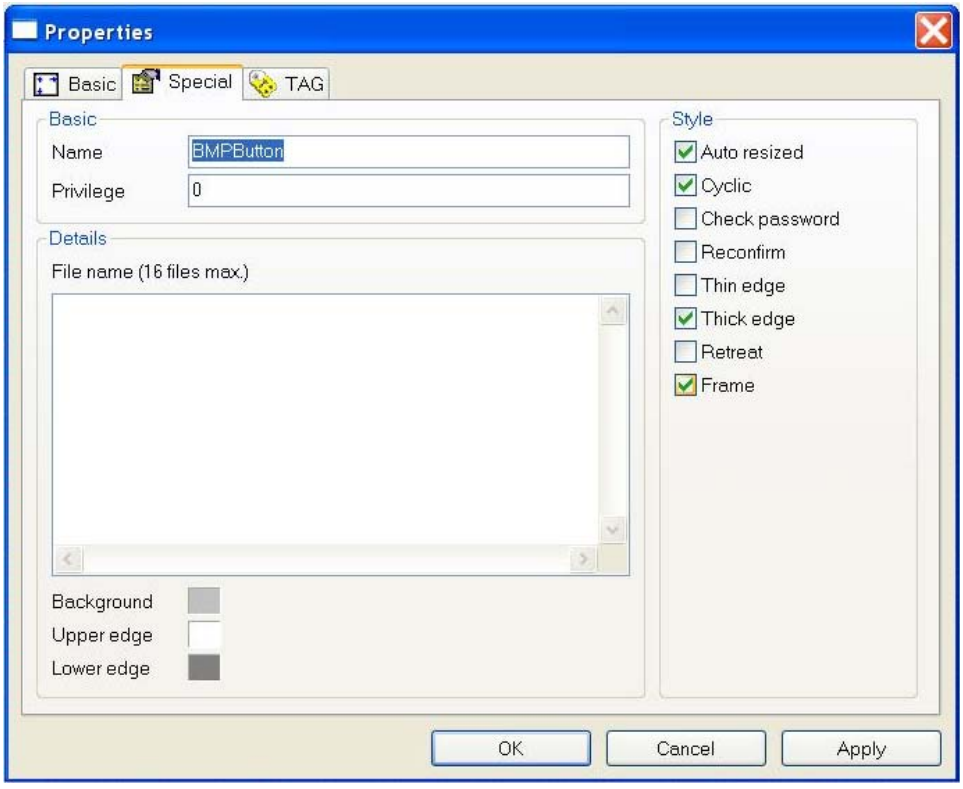
- Target: The tag whose value is adjusted by this object.

BMP Button

BMP Button is a Button with graphic attached to it. Operation on a BMP button not only changes the value of **Target** Tag, but also changes the graphics on the button. BMP button can have up to 16 states. Number of state depends on the number of graphic file assigned. The graphic file displayed on the button depends on the value of Target Tag. For example, when Target Tag is "0", the first graphic file is displayed, the second graphic file is displayed when it's "1"… If no Target is assigned, only the first graphics will be displayed.

Left click on the button will increase the value of **Target** Tag by 1, and right click on it will decrease its value by 1.

Special Properties



Basic

- Name
- Privilege: The privilege a user must have to operate on this object. Range of privilege is

between 0 and 255.

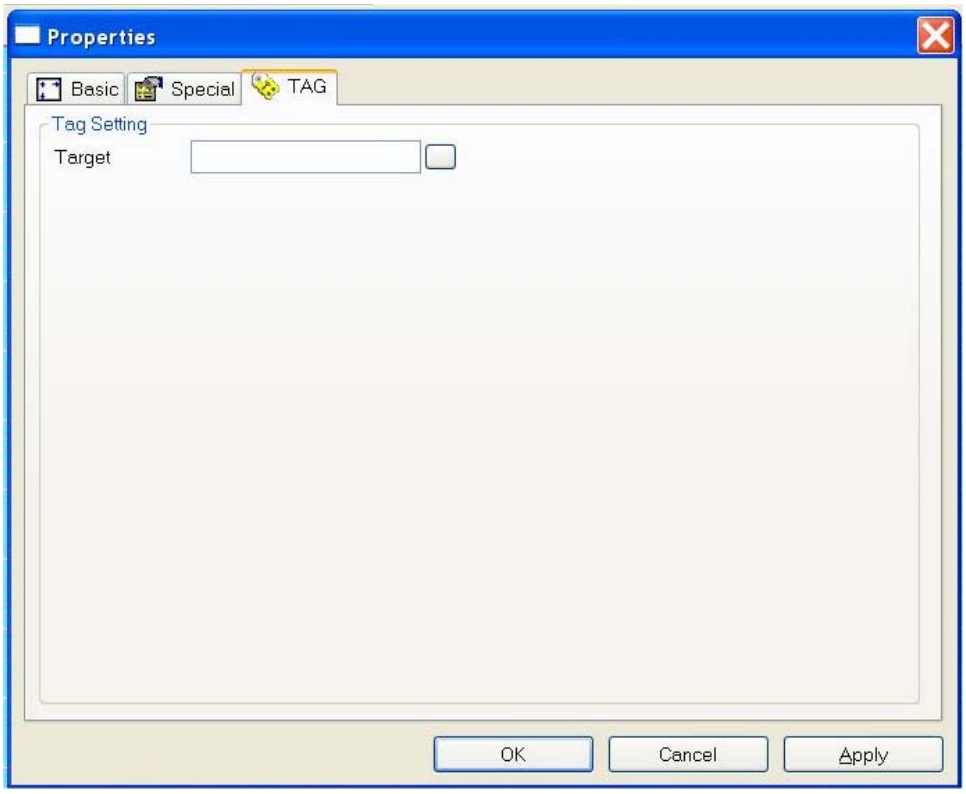
Details

- File name: A list of BMP file path which is shown on this object. Up to 16 file can be assigned. "~2" can be used in file path to represent the BMP reference path.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Auto resized: Size the specified BMP file automatically to fit into and fill the button. If the style is not set, the BMP file will be shown with its original size.
- Cyclic: Operation of this button is cyclic. If this style is set and the limit of **Target** Tag value determined by the number of graphic files assigned is reached, click on this object will reset **Target** value. For example, if three graphics are assigned and **Target** value is "2", left click the button will set **Target** to "0". On the other hand, if **Target** is"0", then right click on the button will set Tag value to "2".
- Check password: Always ask for a Check password when operated.
- Reconfirm: Show a message to ask for reconfirmation when operated.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties



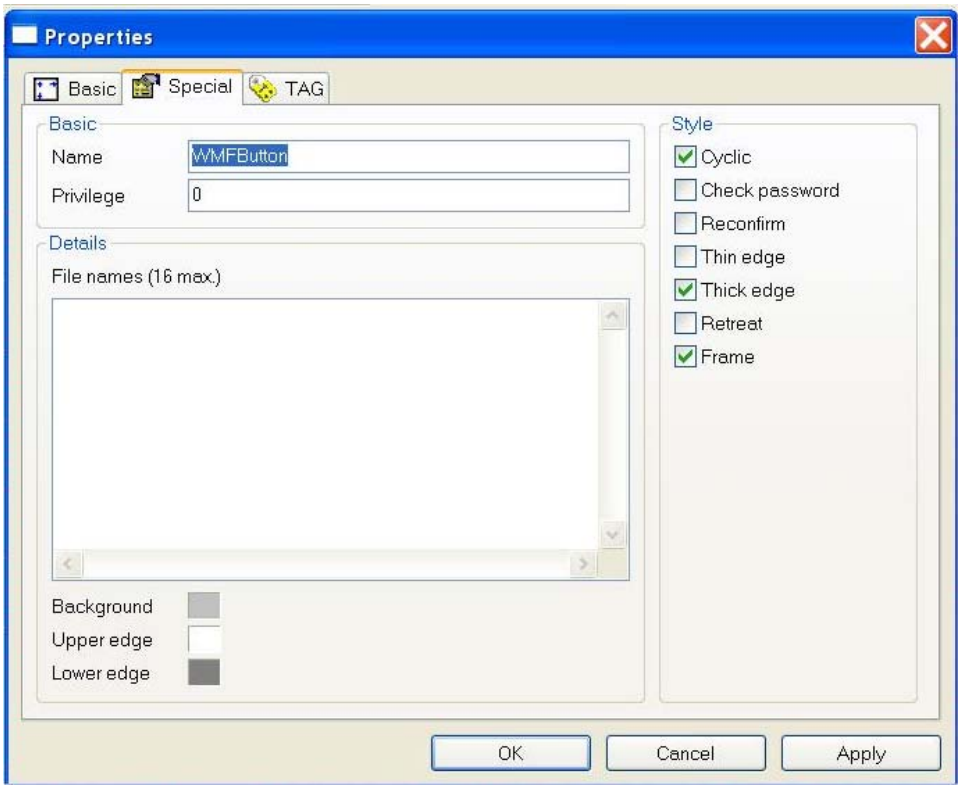
- Target: The Tag whose value is controlled by this object.

WMF 按鈕

BMP Button is a Button with graphic attached to it. Operation on a WMF button not only changes the value of **Target** Tag, but also changes the graphics on the button. BMP button can have up to 16 states. Number of state depends on the number of graphic file assigned. The graphic file displayed on the button depends on the value of Target Tag. For example, when Target Tag is "0", the first graphic file is displayed, the second graphic file is displayed when it's "1"… If no Target is assigned, only the first graphics will be displayed.

Left click on the button will increase the value of **Target** Tag by 1, and right click on it will decrease its value by 1.

Special Properties



Basic

- Name
- Privilege: The privilege a user must have to operate on this object. Range of privilege is

between 0 and 255.

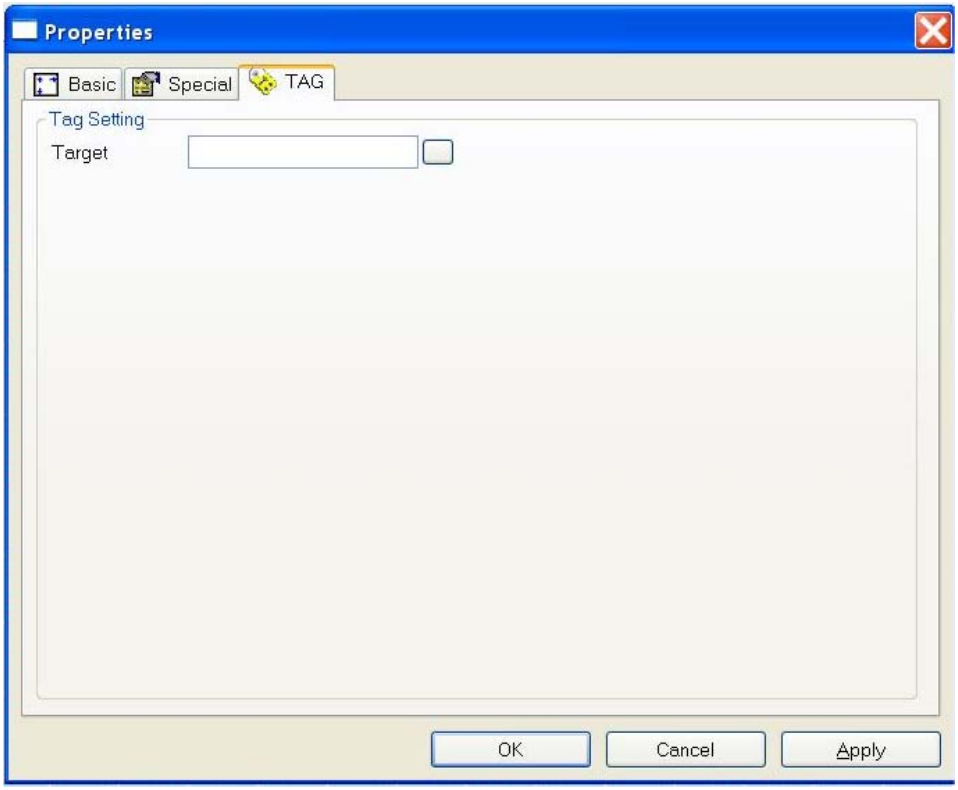
Details

- File name: A list of WMF file path which is shown on this object. Up to 16 file can be assigned. “~3” can be used in file path to represent the WMF reference path.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Cyclic: Operation of this button is cyclic. If this style is set and the limit of Target Tag value determined by the number of graphic files assigned is reached, click on this object will reset **Target** value. For example, if three graphics are assigned and **Target** value is “2”, left click the button will set **Target** to “0”. On the other hand, if **Target** is”0”, then right click on the button will set Tag value to “2”.
- Check password: Always ask for a Check password when operated.
- Reconfirm: Show a message to ask for reconfirmation when operated.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties

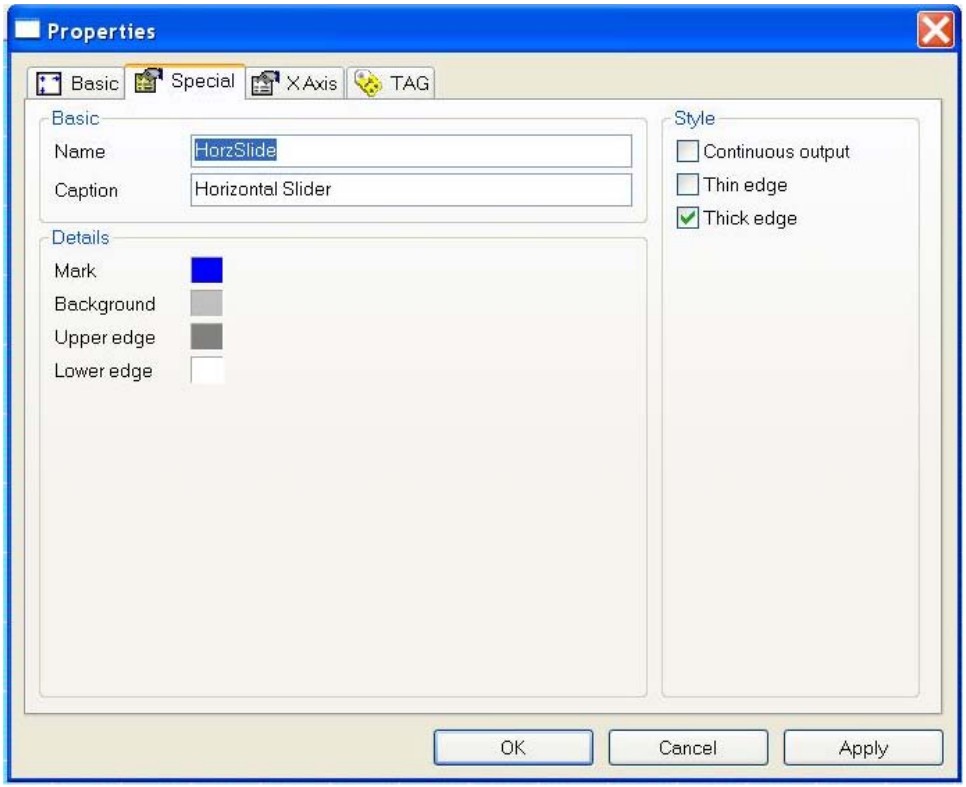


- Target: The Tag whose value is controlled by this object.

Horizontal Slider

Dragging the slider with a mouse can change the value of the **Target** Tag.

Special Properties



Basic

- ❑ Name
- ❑ Caption: Text display on top of the Button.
- ❑ Privilege: The privilege a user must have to operate on this object. Range of privilege is between 0 and 255.

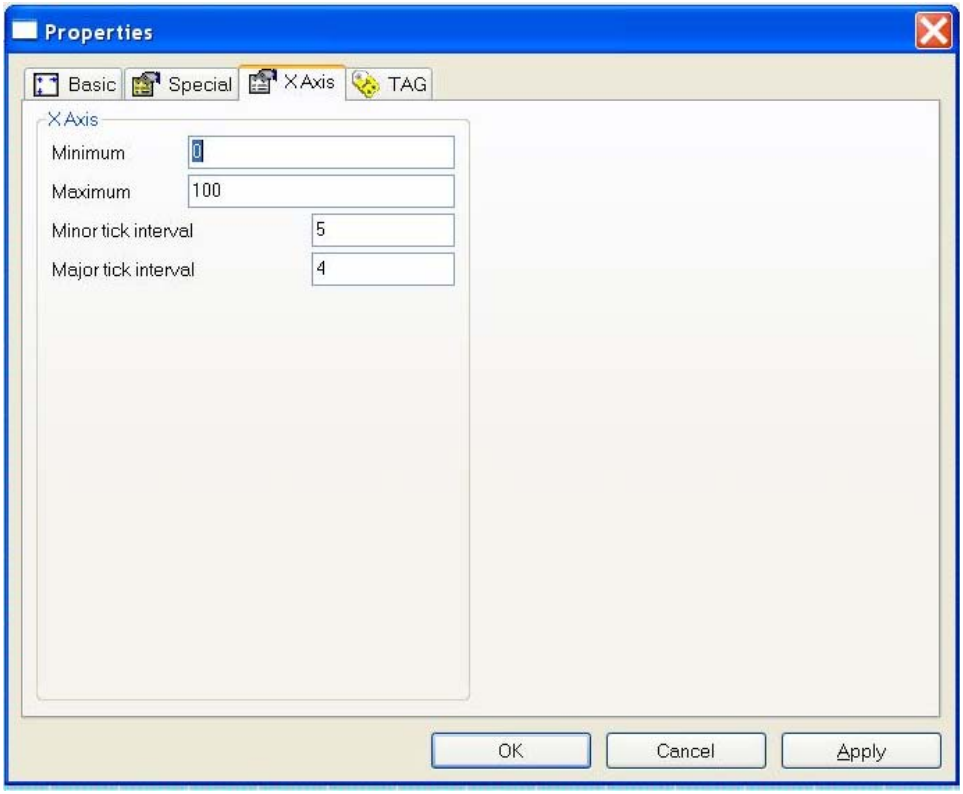
Details

- ❑ Mark: Color of the marker on the slider.
- ❑ Background: Object background color.
- ❑ Upper Edge: Upper edge color.

- Lower Edge: Lower edge color.

Style

- Continuous: If the style is set, value of Target Tag changes as the slider is being dragged. Otherwise, the value only changes when the slider is released.
- Thin Edge
- Thick Edge

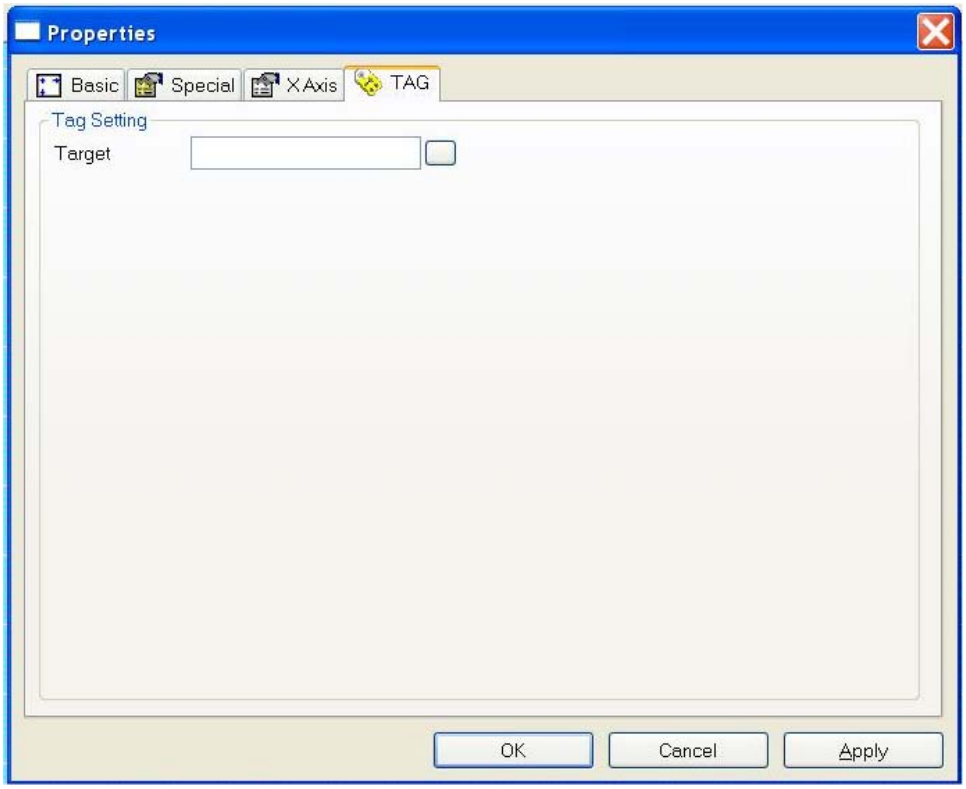


X-Axis Properties

- Minimum: Minimum value of the slider scale. This is also the lower limit of the range can be set by the object.
- Maximum: Maximum value of the slider scale. This is also the higher limit of the range can be set by the object.
- Minor tick interval: Distance between neighboring minor tick on the scale in the same unit of the Target Tag value. This property is used to draw the scale.
- Major tick interval: Distance between neighboring major tick on the scale in number of

minor ticks. This property is used to draw the scale.

TAG Properties

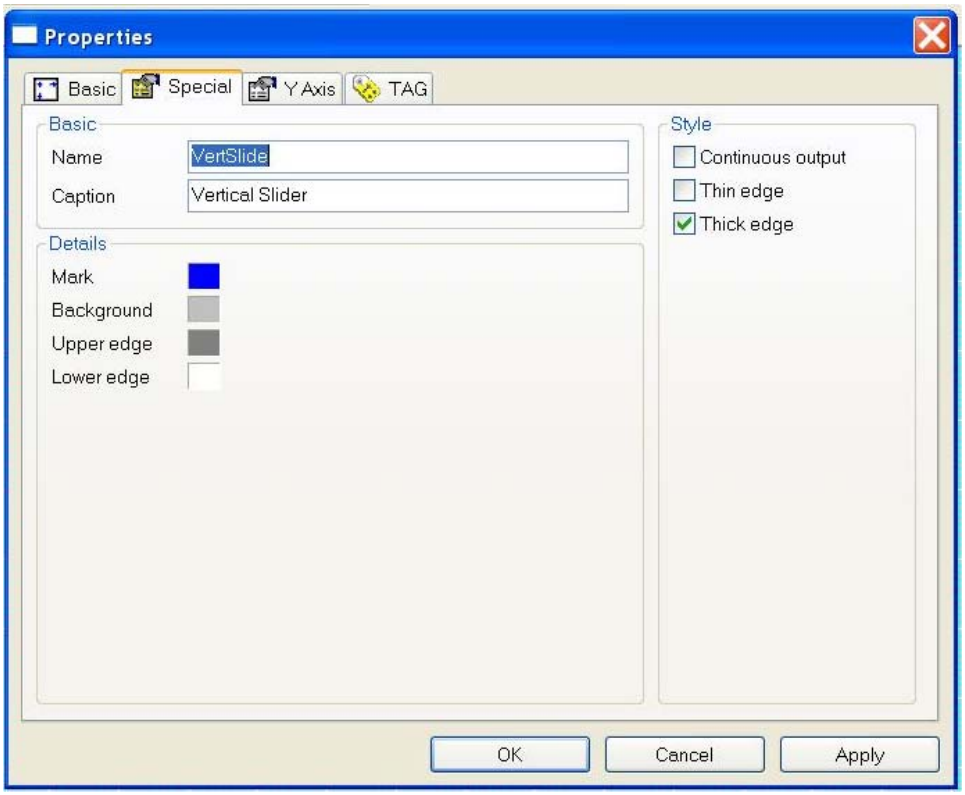


- Target: The Tag whose value is controlled by the object.

Vertical Slider

Dragging the slider with a mouse can change the value of the **Target** Tag.

Special Properties



Basic

- ❑ Name
- ❑ Caption: Text display on top of the Button.
- ❑ Privilege: The privilege a user must have to operate on this object. Range of privilege is between 0 and 255.

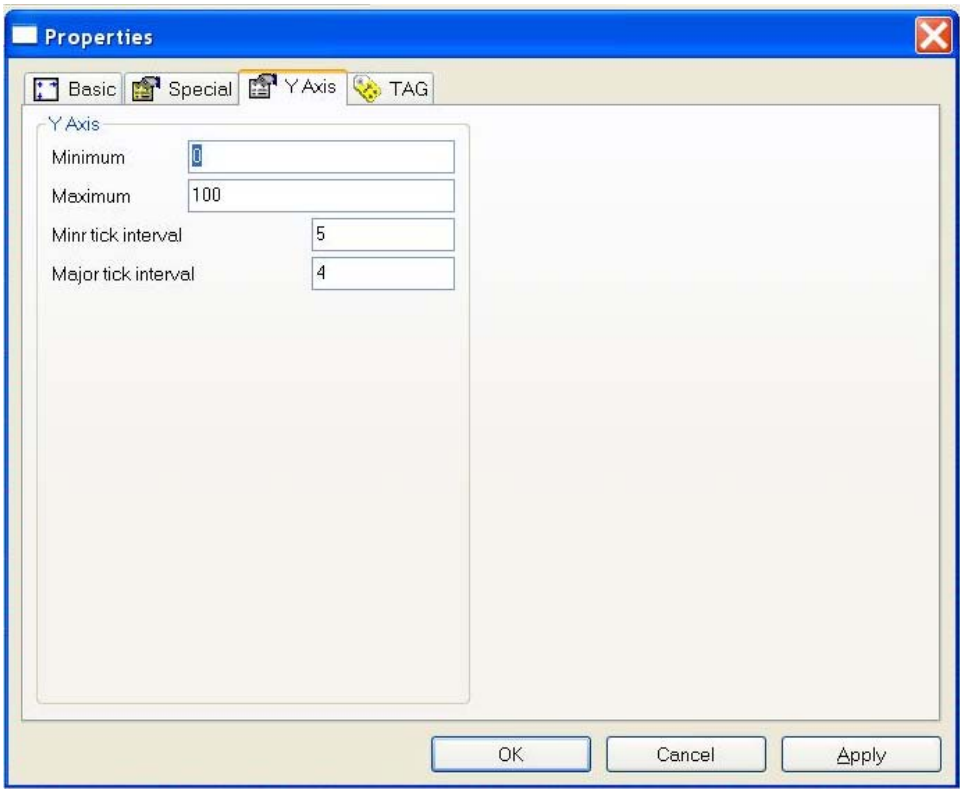
Details

- ❑ Mark: Color of the marker on the slider.
- ❑ Background: Object background color.
- ❑ Upper Edge: Upper edge color.

- Lower Edge: Lower edge color.

Style

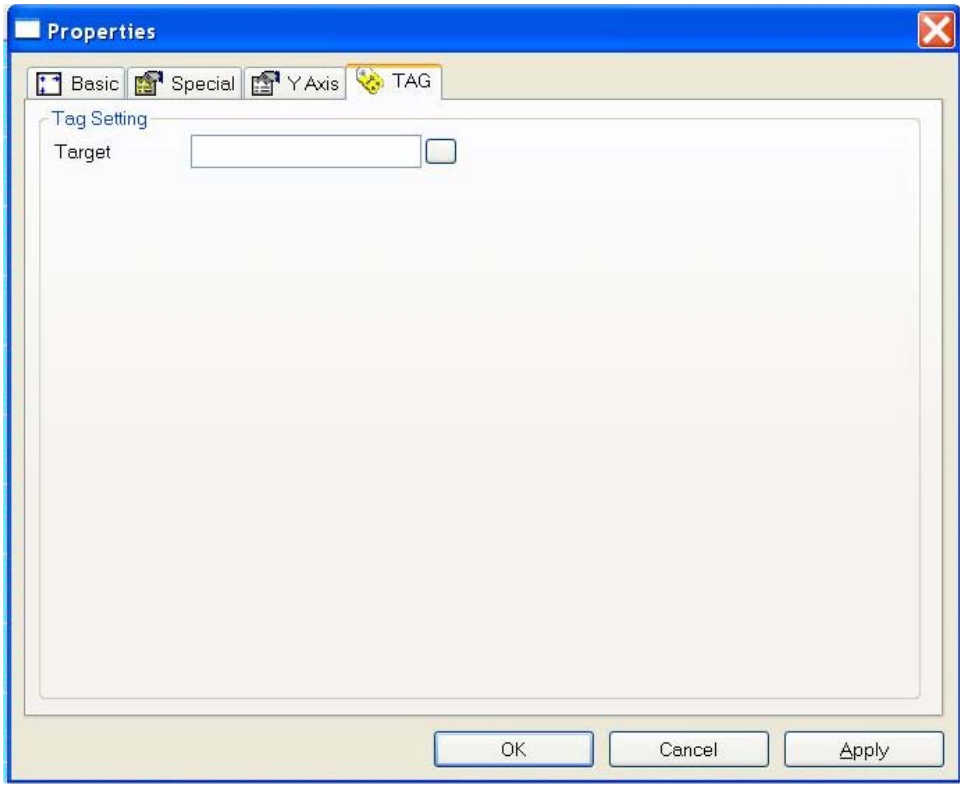
- Continuous: If the style is set, value of Target Tag changes as the slider is being dragged. Otherwise, the value only changes when the slider is released.
- Thin Edge
- Thick Edge



Y-Axis Properties

- Minimum: Minimum value of the slider scale. This is also the lower limit of the range can be set by the object.
- Maximum: Maximum value of the slider scale. This is also the higher limit of the range can be set by the object.
- Minor tick interval: Distance between neighboring minor tick on the scale in the same unit of the Target Tag value. This property is used to draw the scale.
- Major tick interval: Distance between neighboring major tick on the scale in number of minor ticks. This property is used to draw the scale.

TAG Properties

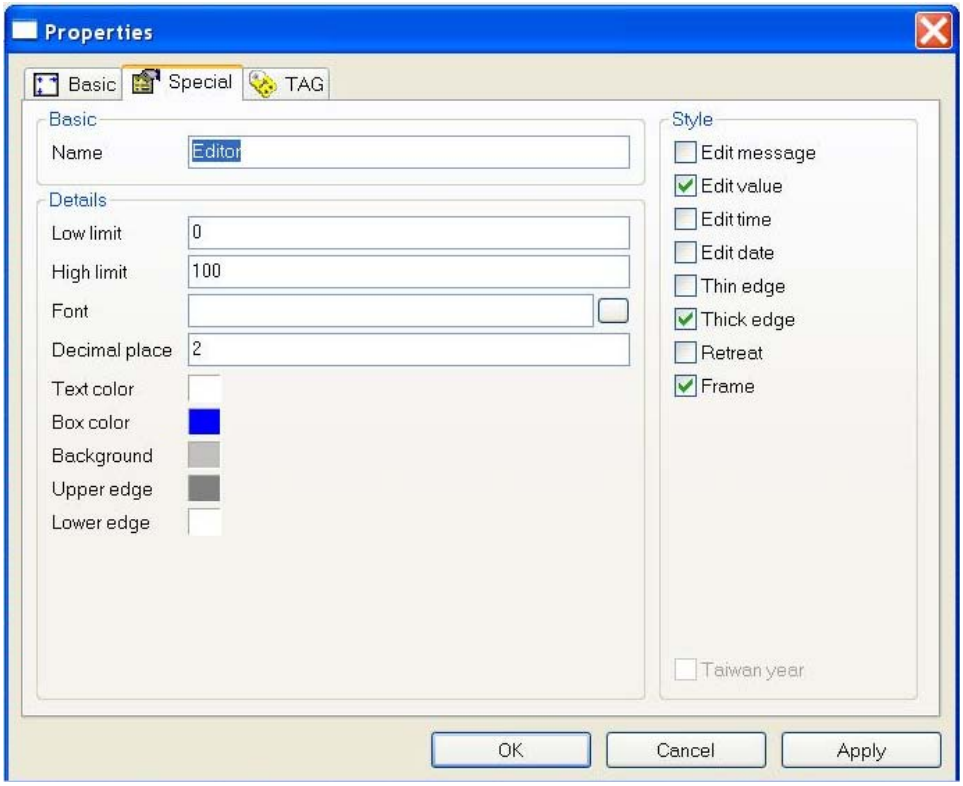


- Target: The Tag whose value is controlled by the object.

Edit Box

Edit Box is used to enter the value or message of the **Target** Tag.

Special Properties



Basic

- Name

Properties

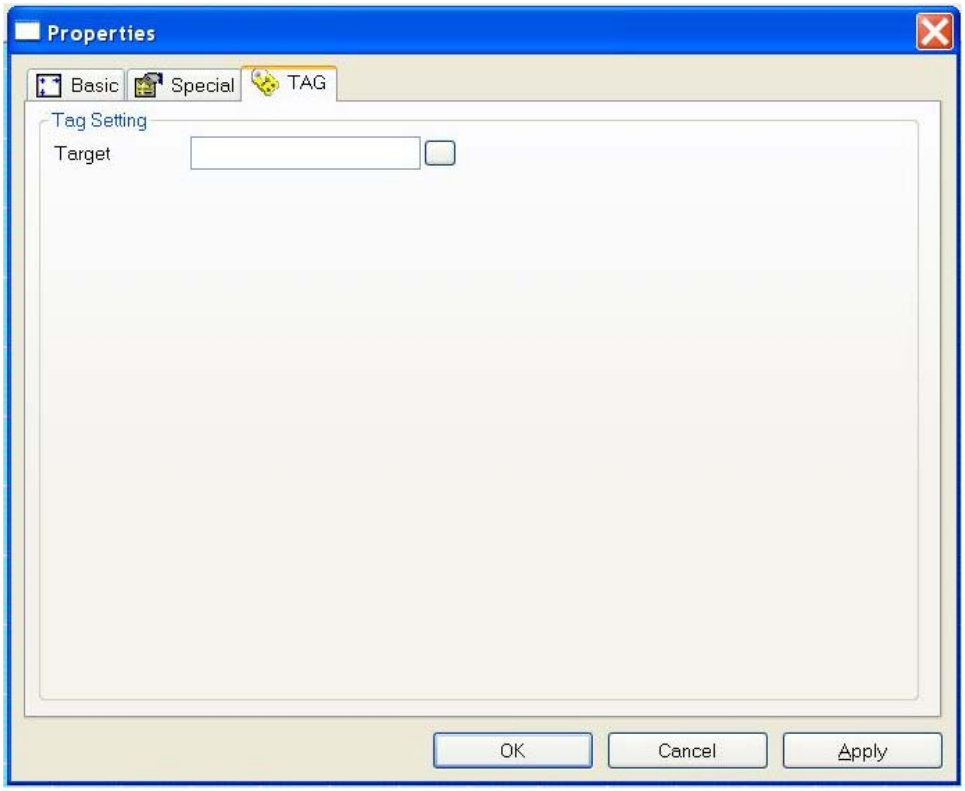
- Low Limit: Minimum value can be entered.
- High Limit: Maximum value can be entered.
- Font: The font used to display the entered text.
- Decimal place: The number of digit displayed after the decimal point.
- Text color: Color used to display the entered text.
- Box color: Color of the editing area.

- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Edit Message: The Edit Box is used to enter the message part of the **Target** Tag.
- Edit Value: The Edit Box is used to enter the value part of the **Target** Tag.
- Edit Time: The Edit Box is used to enter the time part of the **Target** Tag.
- Edit Date: The Edit Box is used to enter the date part of the **Target** Tag.
- Taiwan Year: If Edit Date is set, the year part of the Date uses Taiwan Year system.
- Thin Edge
- Thick Edge
- Retreat
- Frame

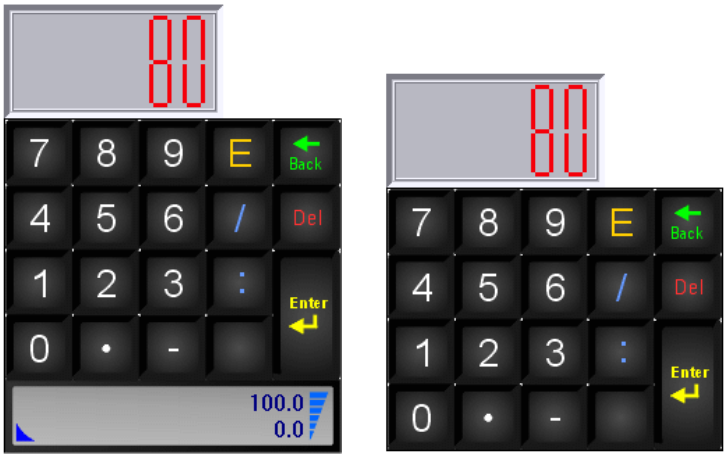
TAG Properties



- Target: The Tag whose data is to be edited by the object.

Number Pad

Number Pad is used to enter data of the Target with a number pad showing on the screen when the object is clicked. The entered number is shown using 7 segment LED digits.

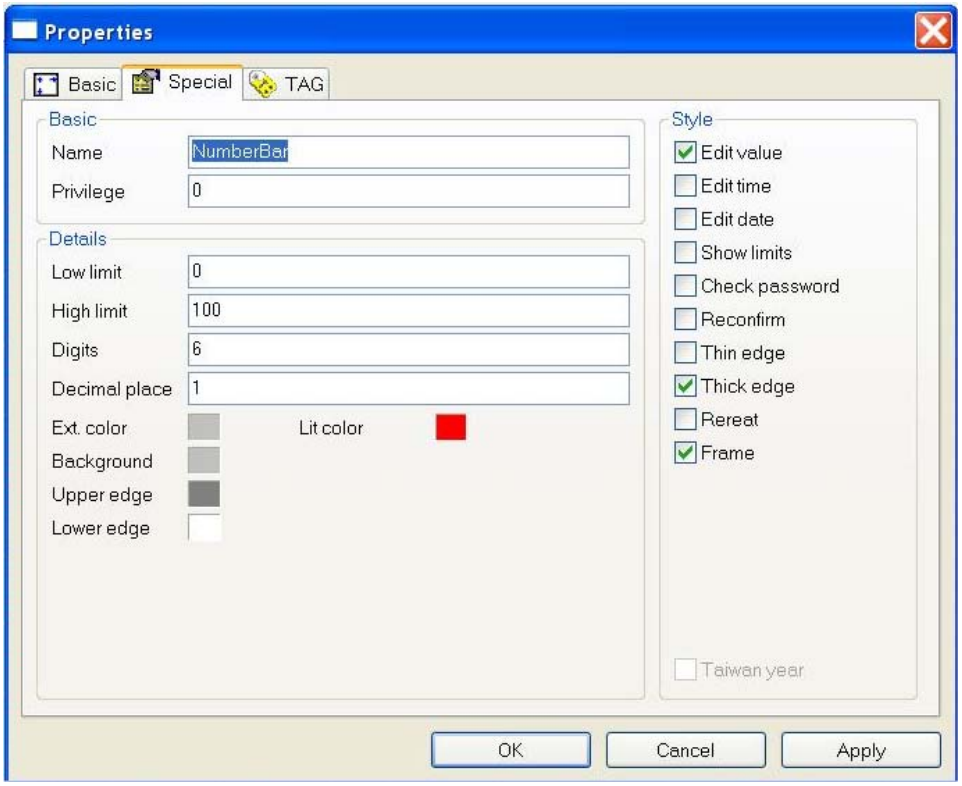


Key Functions

- Number keys: Used to enter number.
- : Decimal point.
- : Time unit marks.
- : Date unit marks.
- : Exponent symbol in scientific notation if used.
- : Finish entering data and send the entered data to Target Tag.
- : Clear data on the number pad and wait for entering.
- : Delete the last entered digit. Similar to the “Back Space” key on a keyboard.
- If left mouse button is clicked outside of the number pad during keying operation, the virtual number pad will be closed.
- 點選數字鍵盤以外的區域可放棄修改並關閉數字鍵盤。

If the number entered exceeds the high/low limit settings in the properties dialog, the Target tag will be set to the limit value.

Special Properties



Basic

- Name
- Privilege: The privilege a user must have to operate on this object. Range of privilege is between 0 and 255.

Details

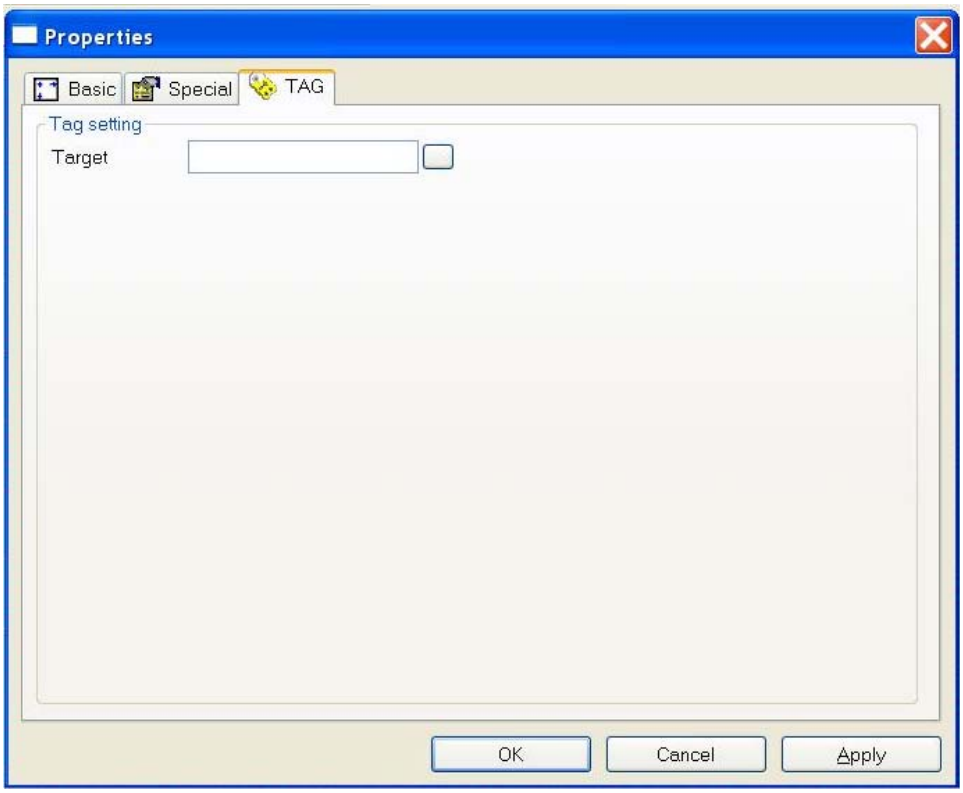
- Low limit: Minimum value can be entered.
- High limit: Maximum value can be entered.
- Digits: The number of digit can be shown.
- Decimal place: The number of digit displayed after the decimal point.
- Ext color: Color of the 7 segment LED when extinguished.
- Lit color: Color of the 7 segment LED when lit.
- Background: Object background color.
- Upper Edge: Upper edge color.

- Lower Edge: Lower edge color.

Style

- Edit Value: The Edit Box is used to enter the value part of the **Target** Tag.
- Edit Time: The Edit Box is used to enter the time part of the **Target** Tag.
- Edit Date: The Edit Box is used to enter the date part of the **Target** Tag.
- Show Limit: Display the limit of Target Tag value.
- Check password: Always ask for a Check password when operated.
- Reconfirm: Show a message to ask for reconfirmation when operated.
- Thin Edge
- Thick Edge
- Retreat
- Frame
- Taiwan Year: If Edit Date is set, the year part of the Date uses Taiwan Year system.

TAG Properties



- Target: Tag to be edited by this object.

Chapter 10 Static Display Objects

Static Display objects are used to display graphic or text files. Despite the name, its content can still be changed as the referenced Tags change.>>

 ShowBMP

 MemoBox

 ShowWMF

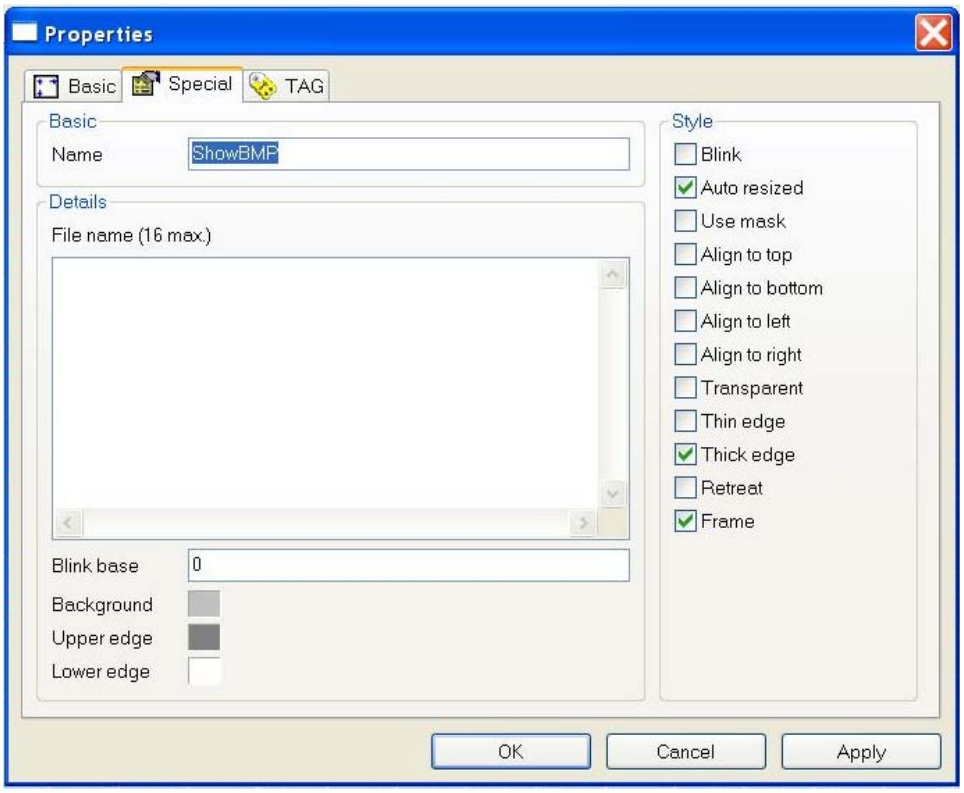
Since **Basic** properties are the same for all genie objects and have been described in chapter 4, they are omitted and will not be discussed again here.

ShowBMP

ShowBMP is used to a display graphic file on the screen. An **Index** Tag can be assigned to determine which one of the specified list of graphic files should be displayed. The first graphic file is displayed when **Index** is "0", and the second file is display when **Index** is "1"…, etc. Up to 16 graphic files can be assigned to a ShowBMP object.

Animation effect can be achieved by combing a **Timer** object to change the value of **Index** Tag and thus switching the graphics displayed periodically. This object also has a **Blinking effect**. When **Blink** is used, the object will display two graphic files intermittently to create a dynamic effect. The two files used will be the file designated by the value of the Index Tag and the file assigned by the Blink Base property.

Special Properties



Basic

- Name

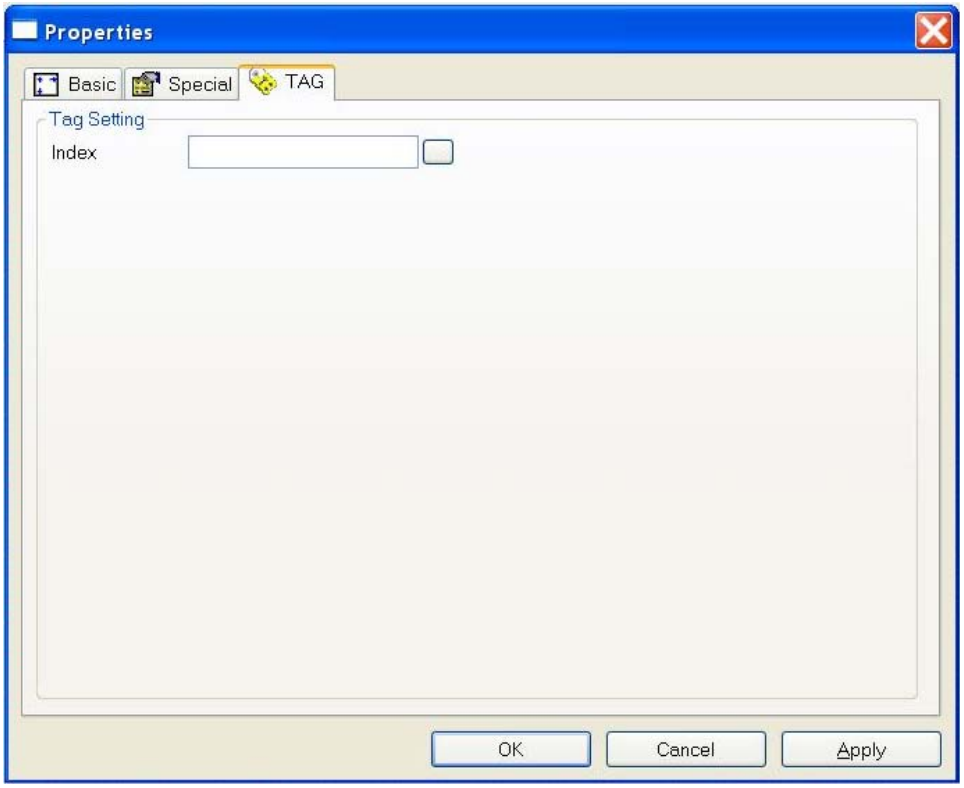
Details

- File name: A list of BMP files to be displayed. Valid path can be included and use of reference BMP path “~2” is recommended in the path designation.
- Blink Base: Designate which of the graphics file will be used when blinking.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Blink: Use Blinking effect to show the graphics.
- Auto resized: Size the specified BMP file automatically to fit into and fill the button. If the style is not set, the BMP file will be shown with its original size.
- Use mask: Apply mask to the graphics.
- Align Top: Align the graphic to the top of the object.
- Align Bottom: Align the graphic to the Bottom of the object.
- Align Left Align the graphic to the left of the object.
- Align Right: Align the graphic to the right of the object.
- Thin edge
- Thick edge
- Retreat
- Frame

TAG Properties



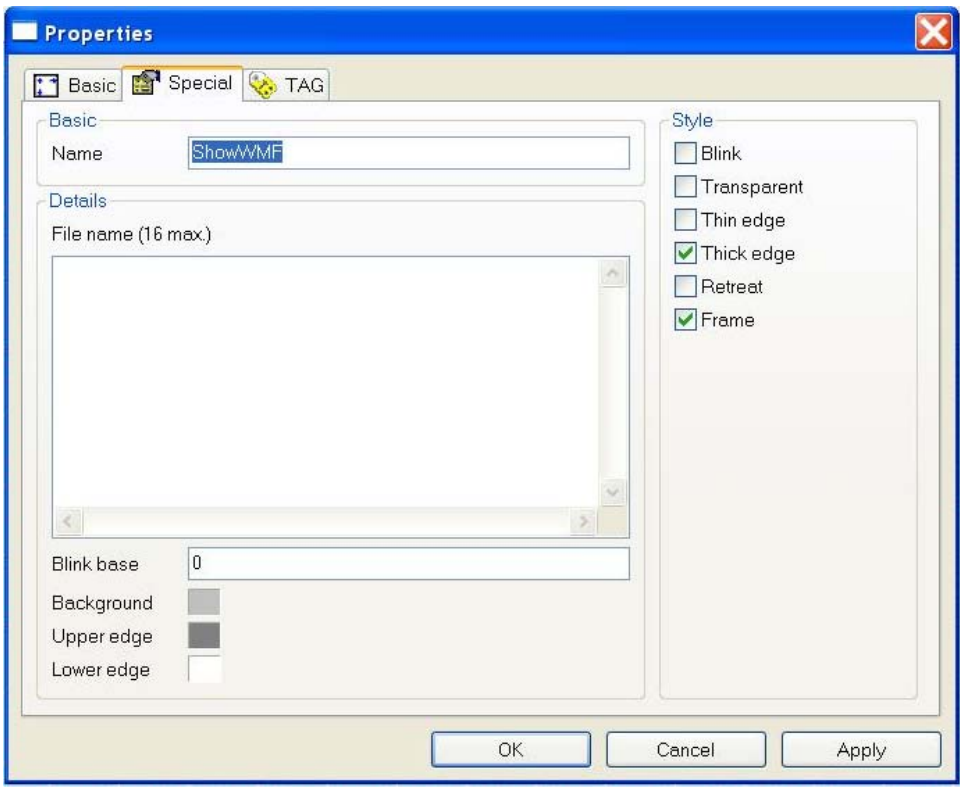
- Index: The Tag determining which graphic file to be shown.

ShowWMF

ShowWMF is used to a display graphic file on the screen. An **Index** Tag can be assigned to determine which one of the specified list of graphic files should be displayed. The first graphic file is displayed when **Index** is ”0”, and the second file is display when **Index** is “1”…, etc. Up to 16 graphic files can be assigned to a ShowWMF object.

Animation effect can be achieved by combing a **Timer** object to change the value of **Index** Tag and thus switching the graphics displayed periodically. This object also has a **Blinking effect**. When **Blink** is used, the object will display two graphic files intermittently to create a dynamic effect. The two files used will be the file designated by the value of the Index Tag and the file assigned by the Blink Base property.

Special Properties



Basic

- Name

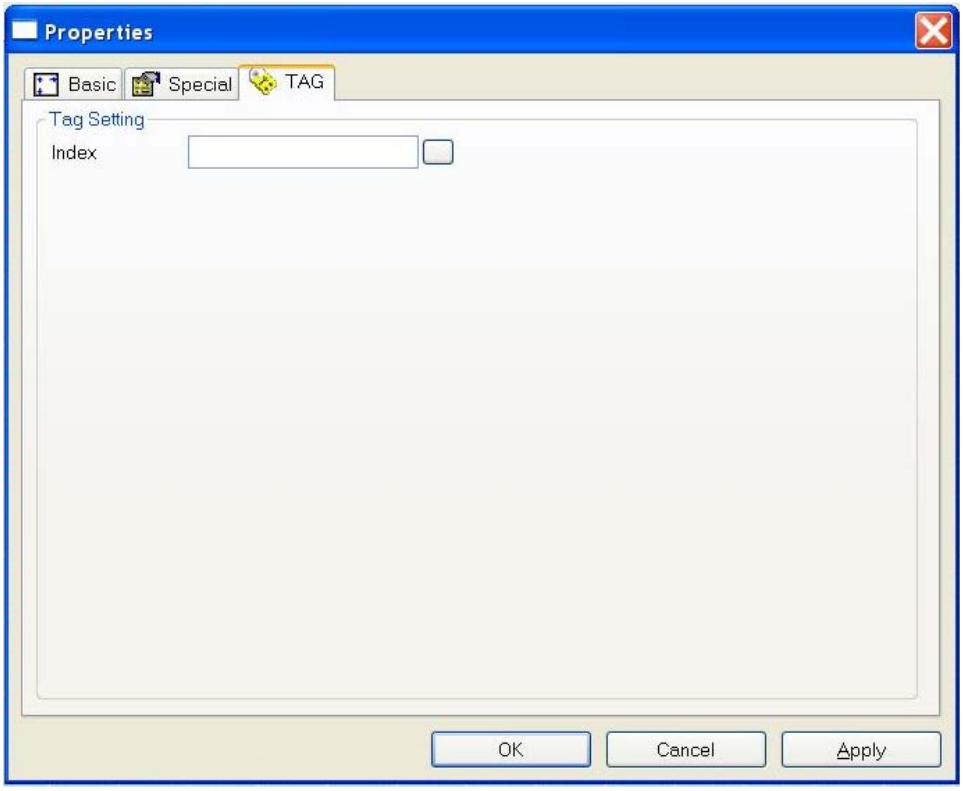
Details

- File name: A list of WMF files to be displayed. Valid path can be included and use of reference WMF path "~3" is recommended in the path designation.
- Blink Base: Designate which of the graphics file will be used when blinking.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Blink: Use blinking effect to show the graphics.
- Transparent: The background of the graphic is transparent and allows objects behind it to be seen.
- Align Top: Align the graphic to the top of the object.
- Align Bottom: Align the graphic to the Bottom of the object.
- Align Left Align the graphic to the left of the object.
- Align Right: Align the graphic to the right of the object.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties

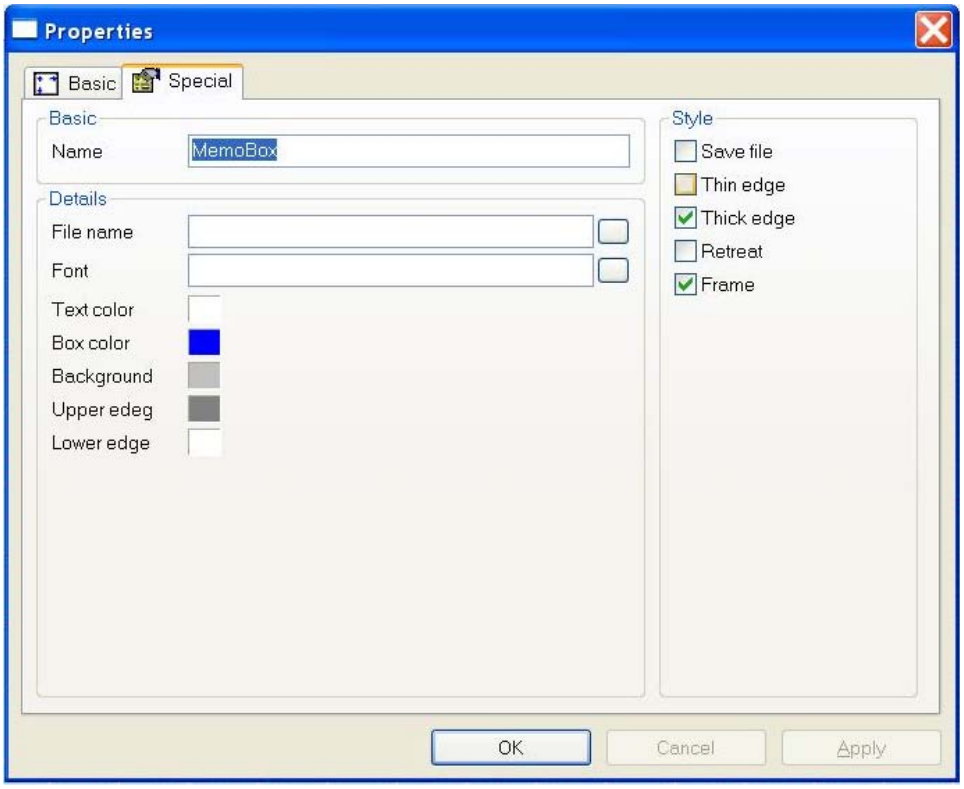


- Index: The Tag determining which graphic file to be shown.

Memo Box

Memo Box is used to show the content of a text file on the screen. It also allow the editing of the text in the file and saving of the result.

Special Properties



Basic

- Name

Details

- File name: The path of a text whose content will be shown by the object. Valid path can be included and use of reference TXT path "~5" is recommended in the path designation.
- Font: the font used to display the content of the text file.
- Text color: Color used to show the text.
- Box color: Color used for the text displaying area,

- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Save file: Allow users to edit the content of the text file and save the result when finish editing.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties

None

Chapter 11 Dynamic Display Objects

Dynamic Display Objects are visible objects whose color, shape, or text change as its referenced Tag changes.

 Log Box

 Static Text

 Dynamic Text

 Indicator

 Lamp

 Shape

 Digit Meter

Text Meter

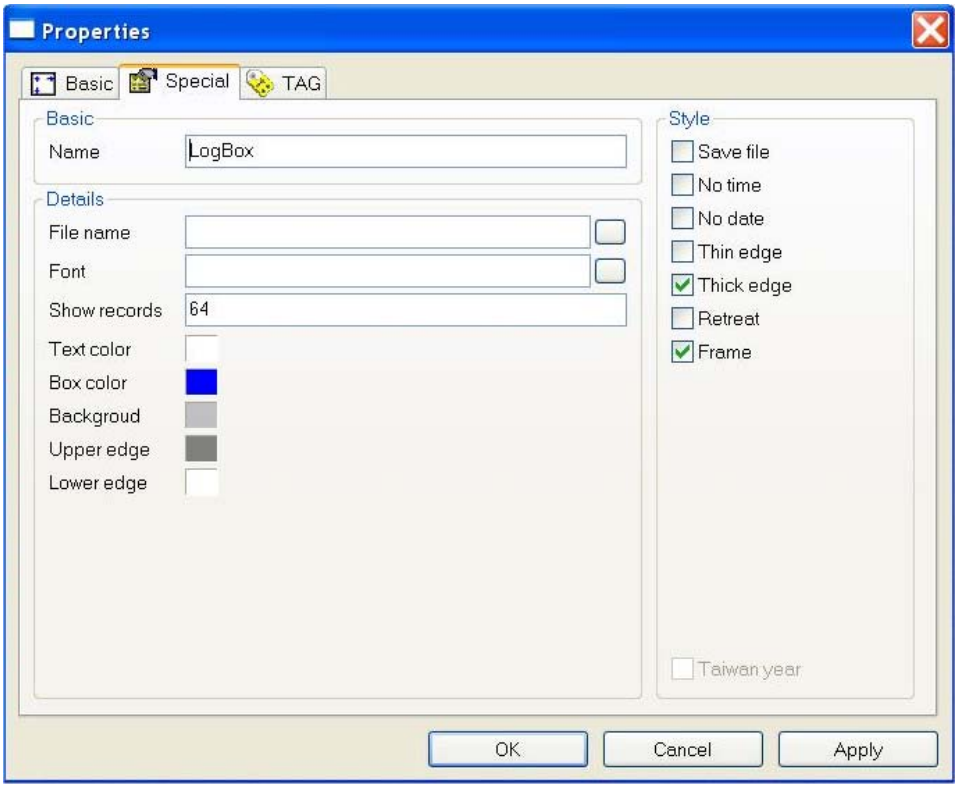
 Level

Since **Basic** properties are the same for all genie objects and have been described in chapter 4, they are omitted and will not be discussed again here.

Log Box

Log Box logs the change of the message part of the Source Tag. The logged data can include date and time and can be saved in a designated text file and.

Special Properties



Basic

- Name

Details

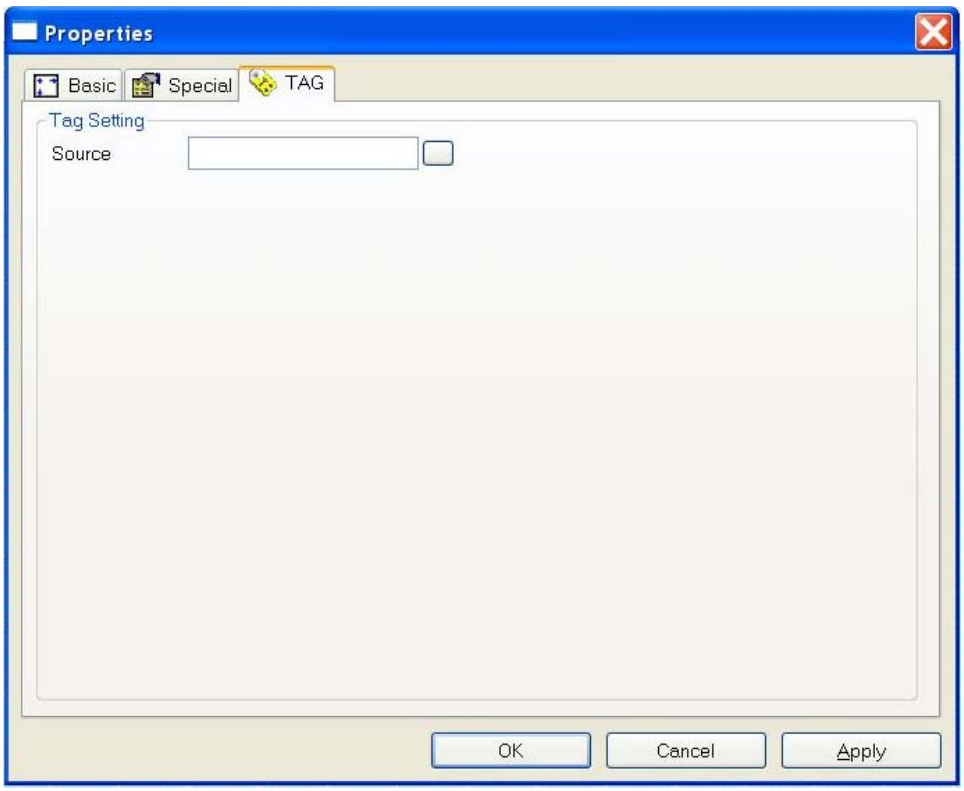
- File name: The text file used to save the logged data.
- Font: The font used to display the logged data.
- Show Records: The number of records shown.
- Text color: The color used to show the data text.
- Box color: The color of the text displaying area.

- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Save File: Save the logged data to the **Text File**.
- No Time: Do not add time to the logged messages.
- No Date: Do not add date to the logged messages.
- Thin Edge
- Thick Edge
- Retreat
- Frame
- Taiwan Year: Use Taiwan year system in the messages.

TAG Properties



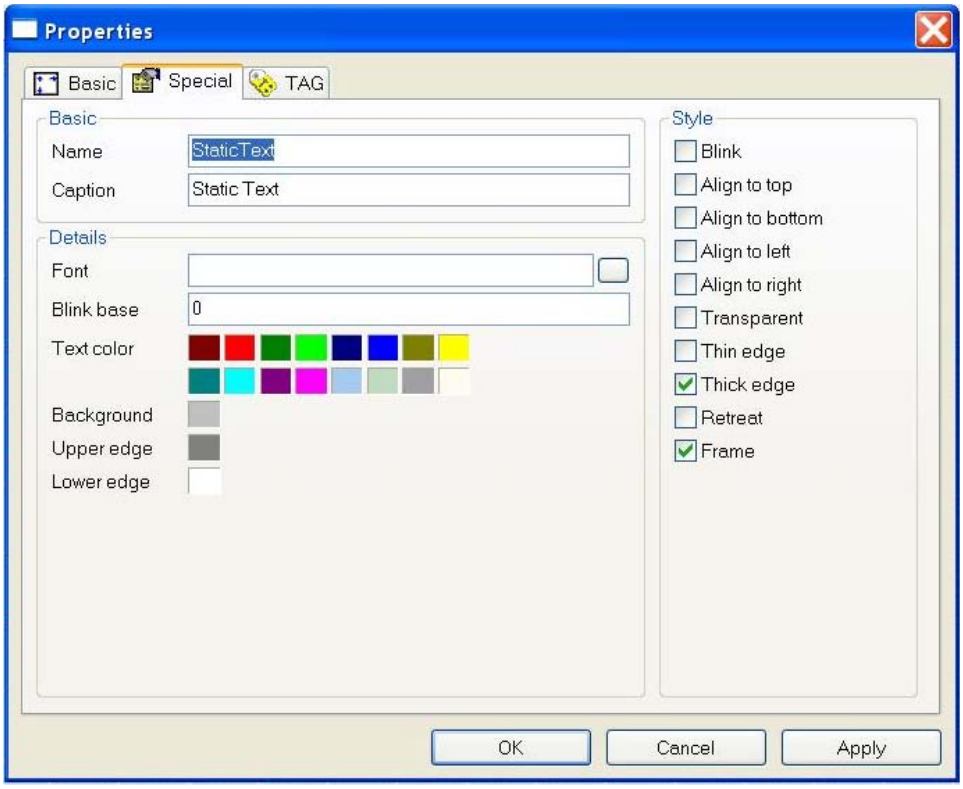
- Source: The Tag whose message part will be logged.

Static Text

Show a fixed text string on the string. The color of the text string is determined by the value of **Index** Tag. The first color will be used if **Index** is "0, and the second color will used when **Index** is "1"…, etc.

This object also has a **Blinking effect**. When **Blink** style is set, the object will use two colors intermittently to display the text and create a dynamic effect. The two color used will be the color designated by the value of the **Index** Tag and the color assigned by the **Blink Base** property.

Special Properties



Basic

- Name
- Caption: Text display by the object.

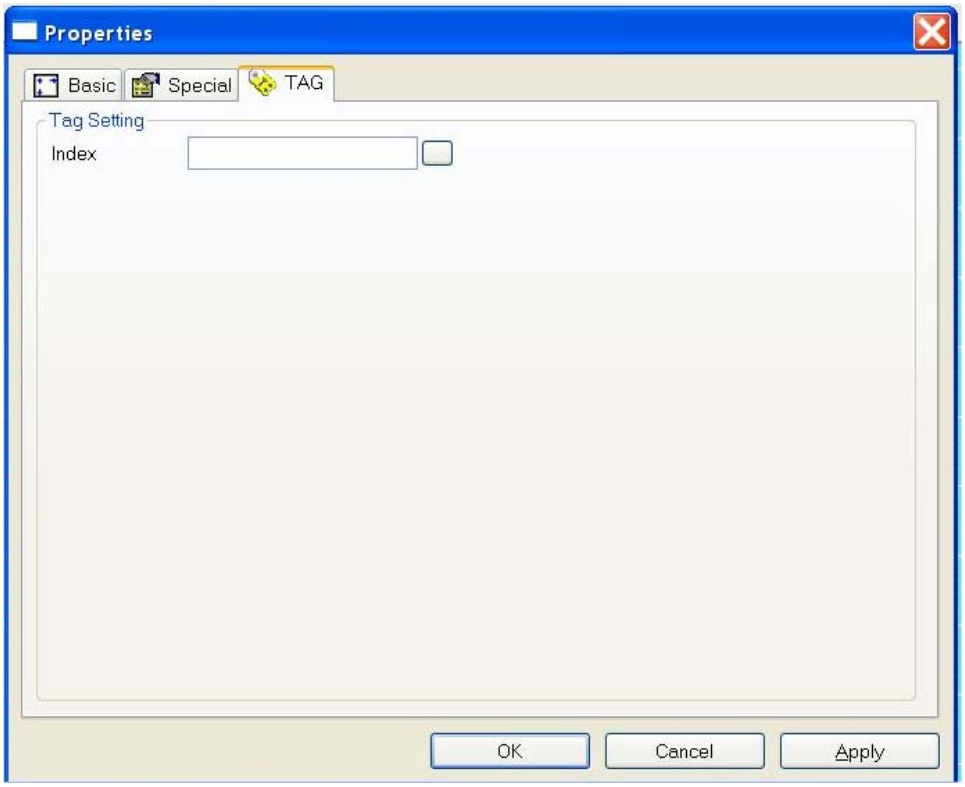
Details

- Font: The font used for the **Caption**.
- Blink Base: Specified which color is used as blink base.
- Text: Colors used to display the text. 16 colors can be assigned with sequence number from 0 to 15 and in the order from left to right and from top to bottom.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Blink: Use blinking effect.
- Align to top: Align the text to top of the object.
- Align to bottom: Align the text to bottom of the object.
- Align to left: Align the text to left of the object.
- Align to right: Align the text to right of the object.
- Transparent: The background of the text is transparent.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties



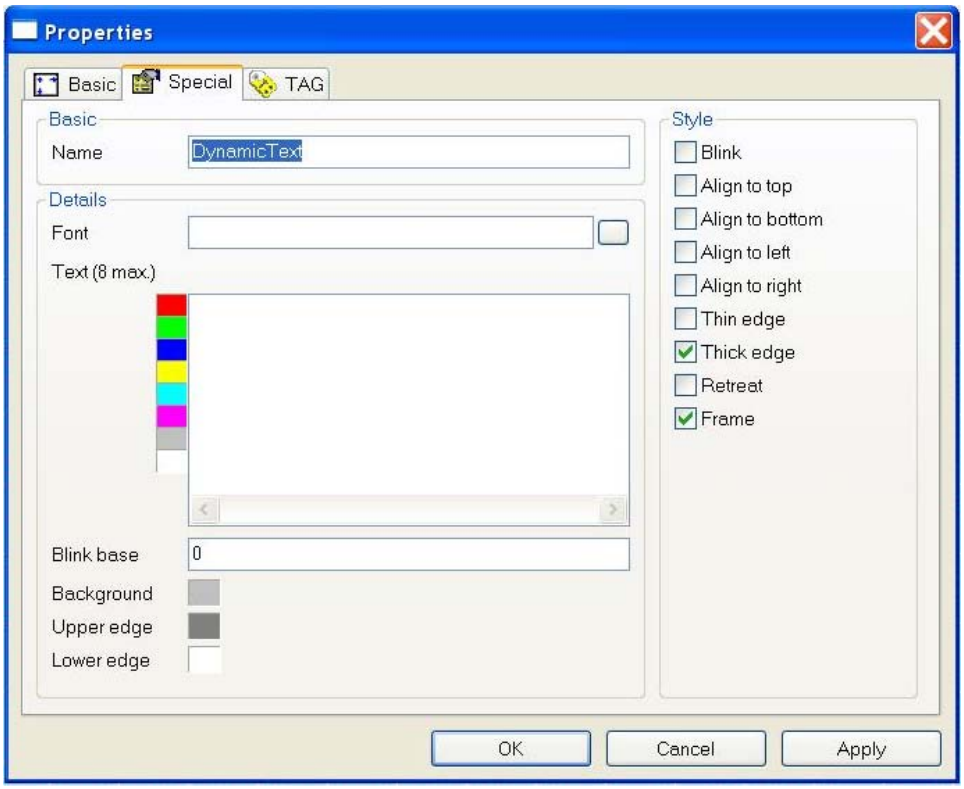
- Index: The Tag whose value determines the color used to display the text.

Dynamic Text

Dynamic Text uses the value of its **Index** Tag to determine which text string shown on the screen using which color. The first set of color and text will be shown if **Index** is “0”, and the second set of color and text will be used if **Index** is “1”…, etc. Up to 8 sets of color and text can be defined.

This object also has a **Blinking effect**. When **Blink** style is set, the object will use two sets of color and text intermittently for display and create a dynamic effect. The two sets used will be the one designated by the value of the **Index** Tag and the set assigned by the **Blink Base** property.

Special Properties



Basic

- Name

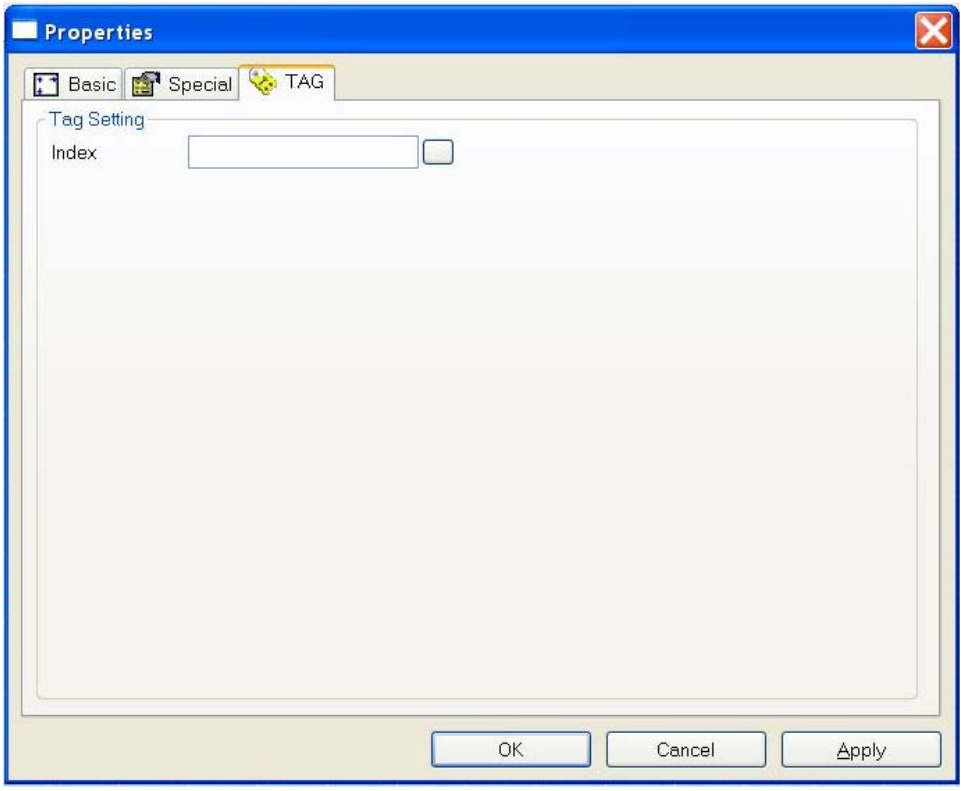
Properties

- Font: The font used for the **Text**.
- Text: A list of text and colors selected by **Index** Tag for display.
- Blink Base: Specified which color is used as blink base.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Blink: Use blinking effect.
- Align to top: Align the text to top of the object.
- Align to bottom: Align the text to bottom of the object.
- Align to left: Align the text to left of the object.
- Align to right: Align the text to right of the object.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties



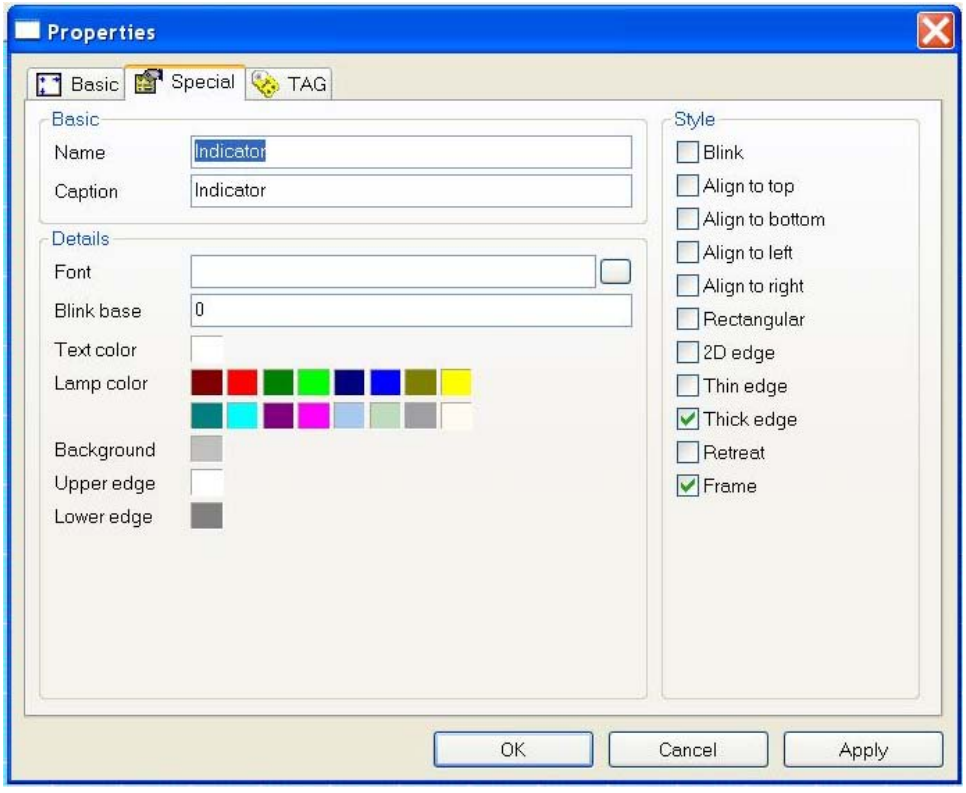
- Index: The Tag whose value determines the set of color and text to be displayed.

Indicator

Indicator can be used to show the status of an IO. It changes color according to the value of Index Tag. Up to 16 colors can be defined. The first color is used when Index is "0", and the second color is used when Index is "1"…, etc.

This object also has a **Blinking effect**. When **Blink** style is set, the object will use two colors intermittently for display and create a dynamic effect. The two colors used will be the one designated by the value of the **Index** Tag and the color assigned by the **Blink Base** property.

Special Properties



Basic

- Name
- Caption: Text display on the object.

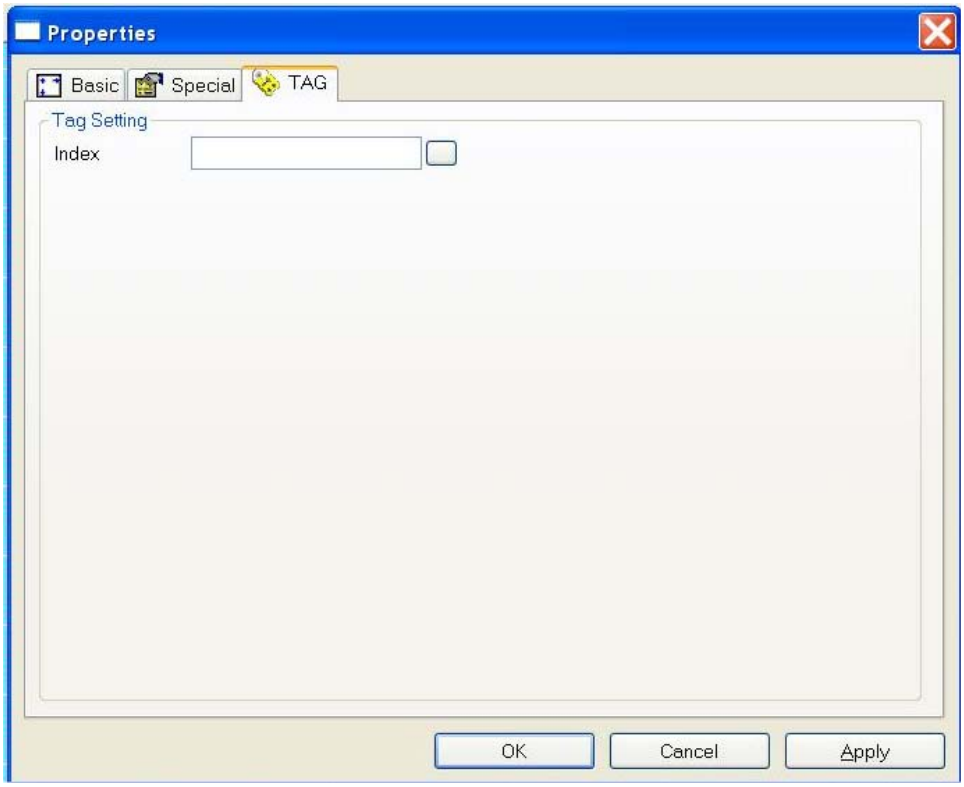
Properties

- Font: The font used for the **Caption**.
- Blink Base: Specified which color is used as blink base.
- Text color: The color used to display the **Caption** text.
- Lamp colors: Colors used to display the indicator. 16 colors can be assigned with sequence number from 0 to 15 and in the order from left to right and from top to bottom.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Blink: Use blinking effect.
- Align to top: Align the text to top of the object.
- Align to bottom: Align the text to bottom of the object.
- Align to left: Align the text to left of the object.
- Align to right: Align the text to right of the object.
- Rectangular: The shape of the indicator is rectangular. Circular shape is used if the style is not set.
- 2D edge
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties



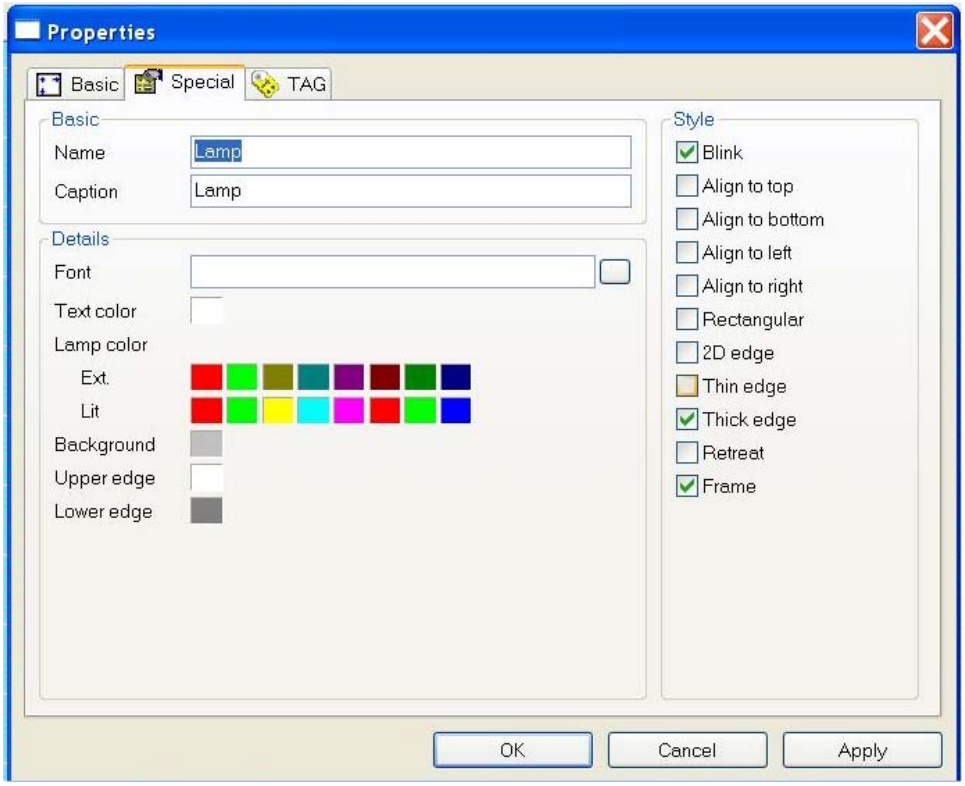
- Index: Tag determining the color of the object.

Lamp

Lamp can be used to show the status of an IO. It differs from an **Indicator** at the blinking effect. 8 sets of colors can be defined for the value of 0 to 7 for the **Index** Tag. Each color set contains two colors. For example, if the value of Index Tag is “0”, the two color of the first color set will be displayed intermittently to create the blinking effect. If Index is ”1”, the second set is used. It is possible for certain state to stop blinking by simply setting the color set for that state to be the same color.

If the Blink style is not set, only the Lit color defined in the corresponding color set will be used and no blinking effect is shown.

Special Properties



Basic

- Name
- Caption: Text display on the object.

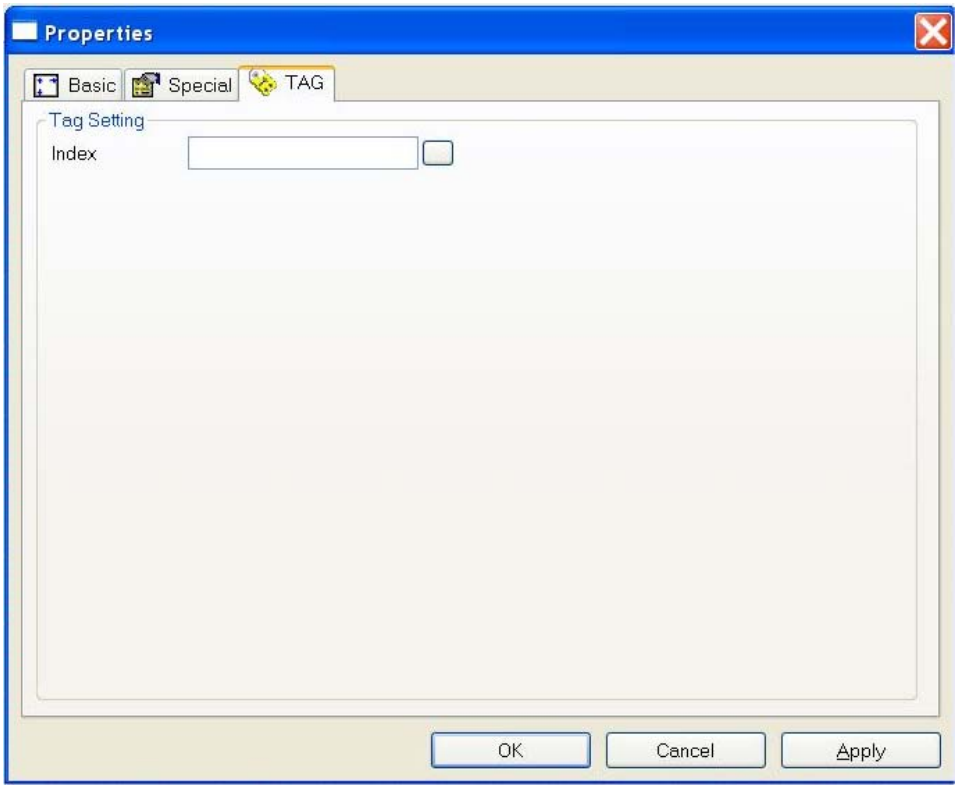
Properties

- Font: The font used for the **Caption**.
- Text color: The color used to display the **Caption** text.
- Lamp color: Colors used to display the indicator. 8 color sets can be assigned with sequence number from 0 to 7 and in the order from left to right. Two colors, namely Lit and Ext color, form a color set.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Blink: Use blinking effect.
- Align to top: Align the text to top of the object.
- Align to bottom: Align the text to bottom of the object.
- Align to left: Align the text to left of the object.
- Align to right: Align the text to right of the object.
- Rectangular: The shape of the lamp is rectangular. Circular shape is used if the style is not set.
- 2D edge
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties



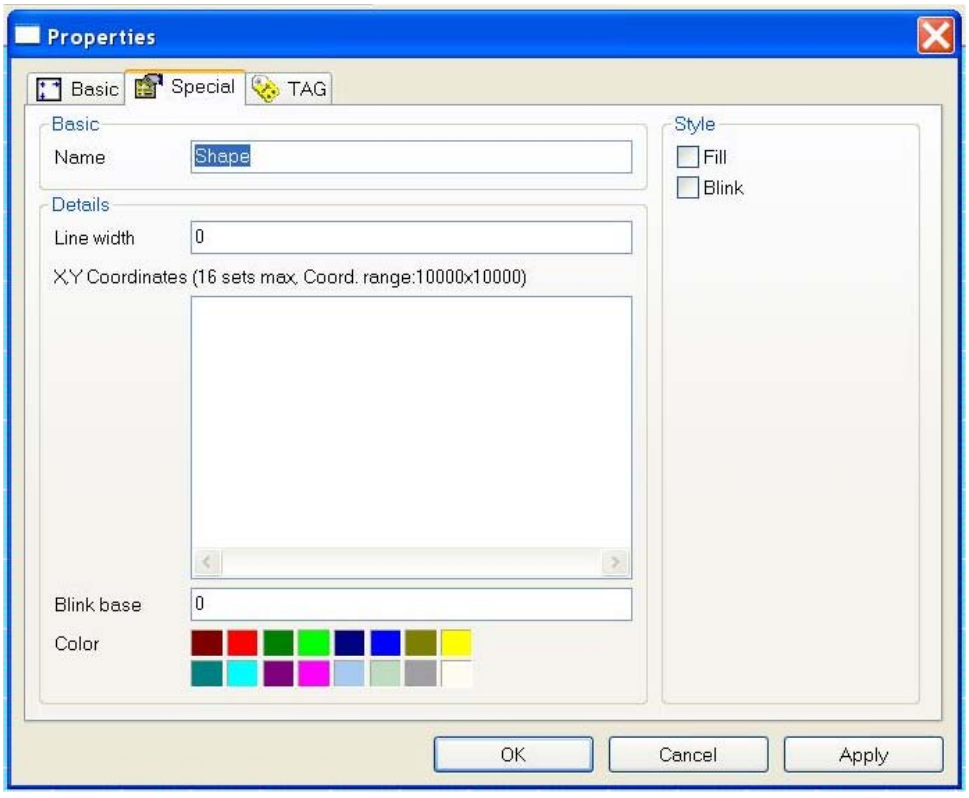
- Index: Tag determining the color of the object.

Shape

Shape changes its outline color according to the value of **Index** Tag. Up to 16 colors can be defined. The first color is used when Index is "0", and the second color is used when Index is "1"…, etc.

This object also has a **Blinking effect**. When **Blink** style is set, the object will use two colors intermittently for display and create a dynamic effect. The two colors used will be the one designated by the value of the **Index** Tag and the color assigned by the **Blink Base** property.

Special Properties



Basic

- Name

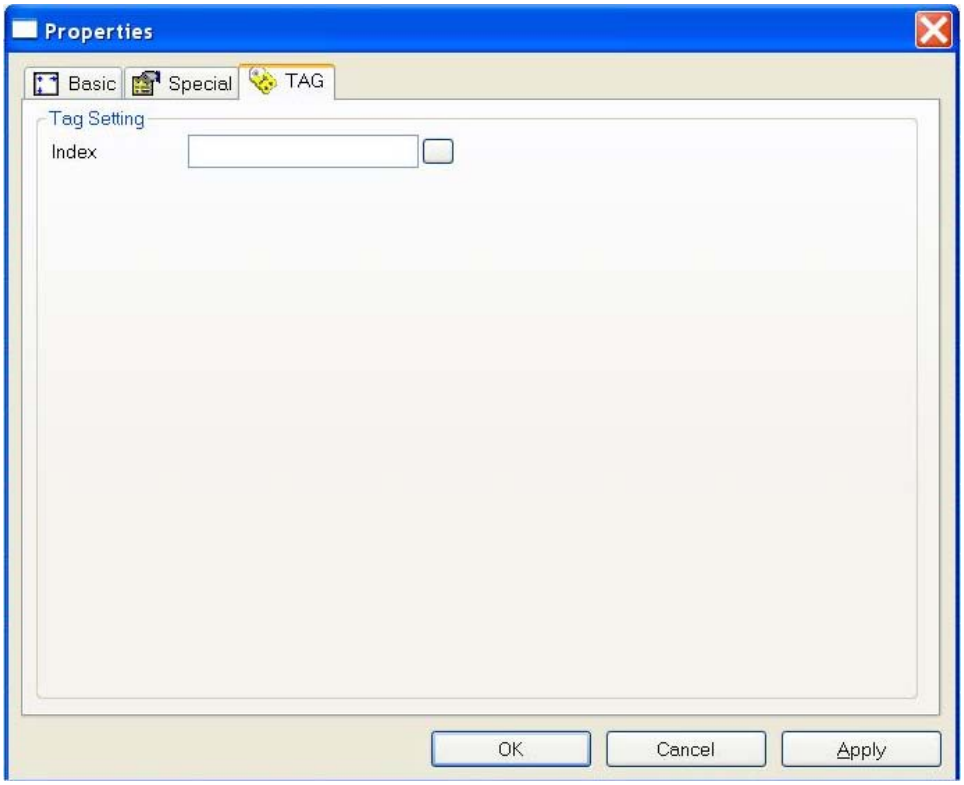
Details

- Line Width: Width of the outline of the object.
- X, Y Coordinates: Coordinates of each vertex on the outline. The coordinates map the size of the object to a scale of 0 to 10000 in both X and Y direction with the origin at the top and left corner.
- Blink Base: Specified which color is used as blink base.
- Colors: Colors used to display the indicator. 16 colors can be assigned with sequence number from 0 to 15 and in the order from left to right and from top to bottom.

Style

- Fill: Fill the shape
- Blink: Use blinking effect.

TAG Properties

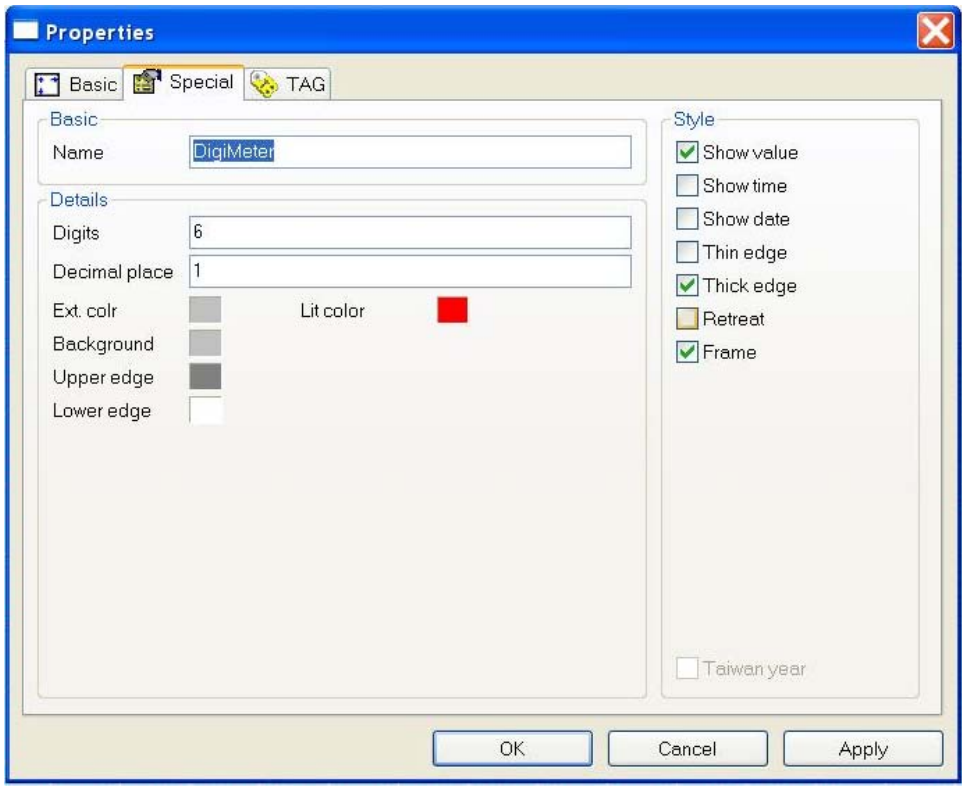


- Index: Tag determining the color of the object.

Digit Meter

Digit Meter is used to simulate a 7 segment LED meter to display data. The displayed data can be the value, time or date of **Source** Tag.

Special Properties



Basic

- Name

Details

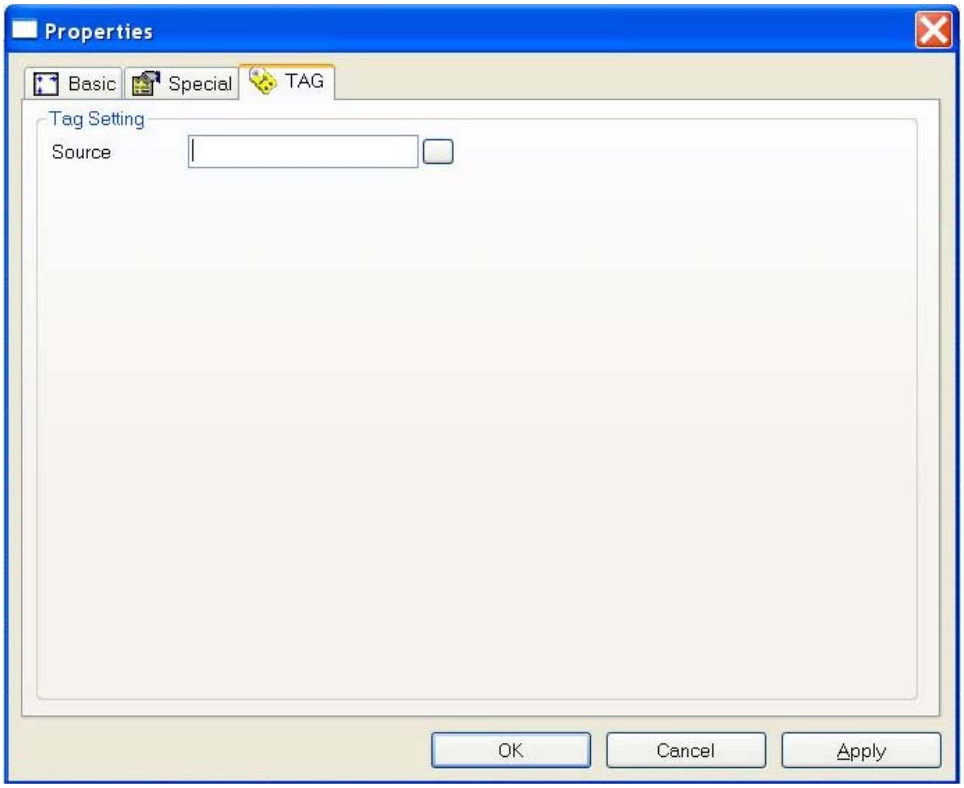
- Digits: Number of digits displayed on the object.
- Decimal place: Number of digits after decimal point.
- Ext. Color: The color displayed on the extinguished segment.
- Lit Color: The color displayed on the lit segment.
- Background: Object background color.

- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Show Value: Show the value part of **Source** Tag.
- Show Time: Show the time of **Source** Tag.
- Show Date: Show the date of **Source** Tag.
- Taiwan Year: Use Taiwan Year system when displaying date.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties



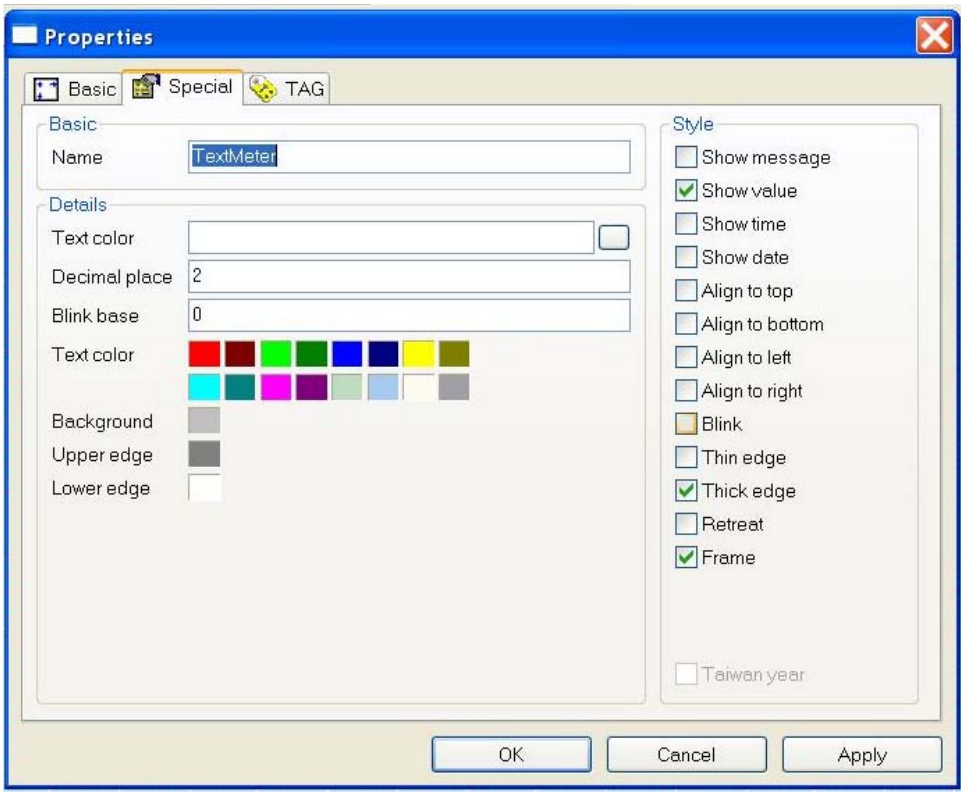
- Source: The Tag whose data is displayed by the object.

50 Text Meter

Digit Meter is used to display data of **Source** Tag. The displayed data can be the value, time or date of **Source** Tag. If an **Index** Tag is also set, text display will change color based on the value of **Index** Tag. Up to 16 colors can be defined. The first color is used when Index is "0", and the second color is used when Index is "1"…, etc.

This object also has a **Blinking effect**. When **Blink** style is set, the object will use two colors intermittently for display and create a dynamic effect. The two colors used will be the one designated by the value of the **Index** Tag and the color assigned by the **Blink Base** property.

Special Properties



Basic

- Name

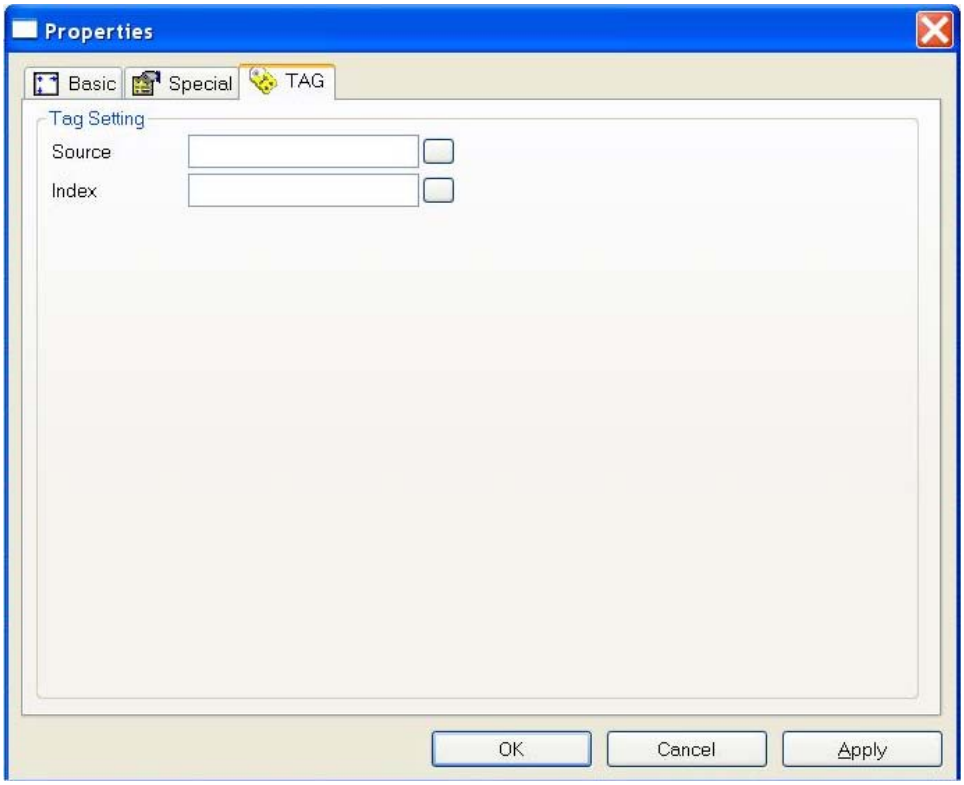
Details

- Font: The font used to display data.
- Decimal place: Number of digits after decimal point.
- Blink Base: Specified which color is used as blink base.
- Text: Colors used to display the data text. 16 colors can be assigned with sequence number from 0 to 15 and in the order from left to right and from top to bottom.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Show Message: Show the message part of **Source** Tag.
- Show Value: Show the value part of **Source** Tag.
- Show Time: Show the time of **Source** Tag.
- Show Date: Show the date of **Source** Tag.
- Taiwan Year: Use Taiwan Year system when displaying date.
- Align to top: Align the text to top of the object.
- Align to bottom: Align the text to bottom of the object.
- Align to left: Align the text to left of the object.
- Align to right: Align the text to right of the object.
- Blink: Use blinking effect.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties

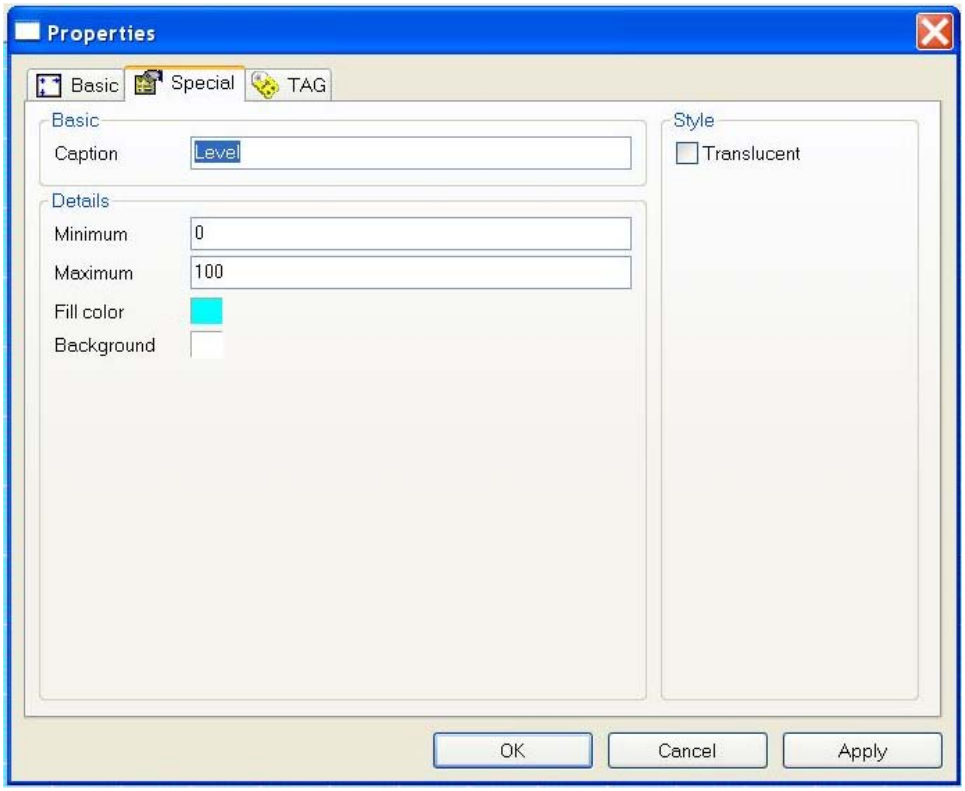


- Source: Tag whose data will be displayed.
- Index: Tag whose value determine the color of data text.

Level

Level is usually used to show the level of a tank. The value of Source Tag will be convert to the height of level and displayed as a color bar.

Special Properties



Basic

- Name

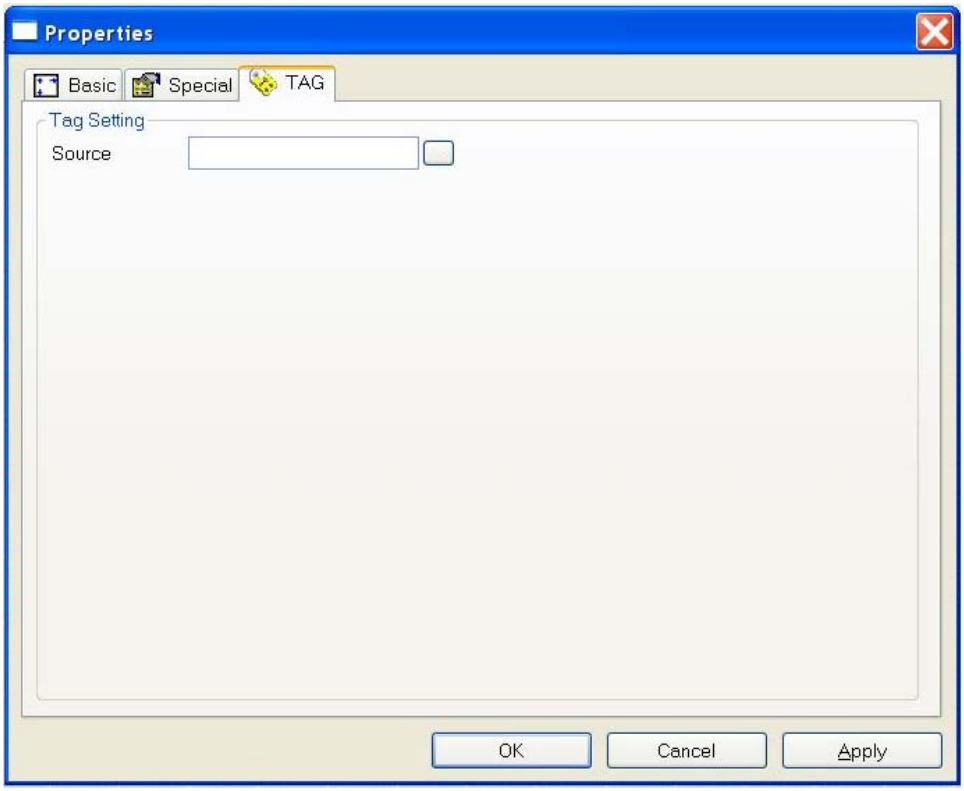
Details

- Min.: The minimum value of the level.
- Max: The minimum value of the level.
- Liquid: The color of the liquid whose level is shown.
- The background color of the object.

Style

- Translucent: Use translucent effect to show the level.

TAG Properties



- Source: The Tag whose value is converted to the level shown.

Chapter 12 Graph Objects

Graph objects show real time or historical data in the form of graphs and charts.

 Horizontal Bar

 Horizontal Trend

 Vertical Bar

 Data Trend

 Scroll Trend

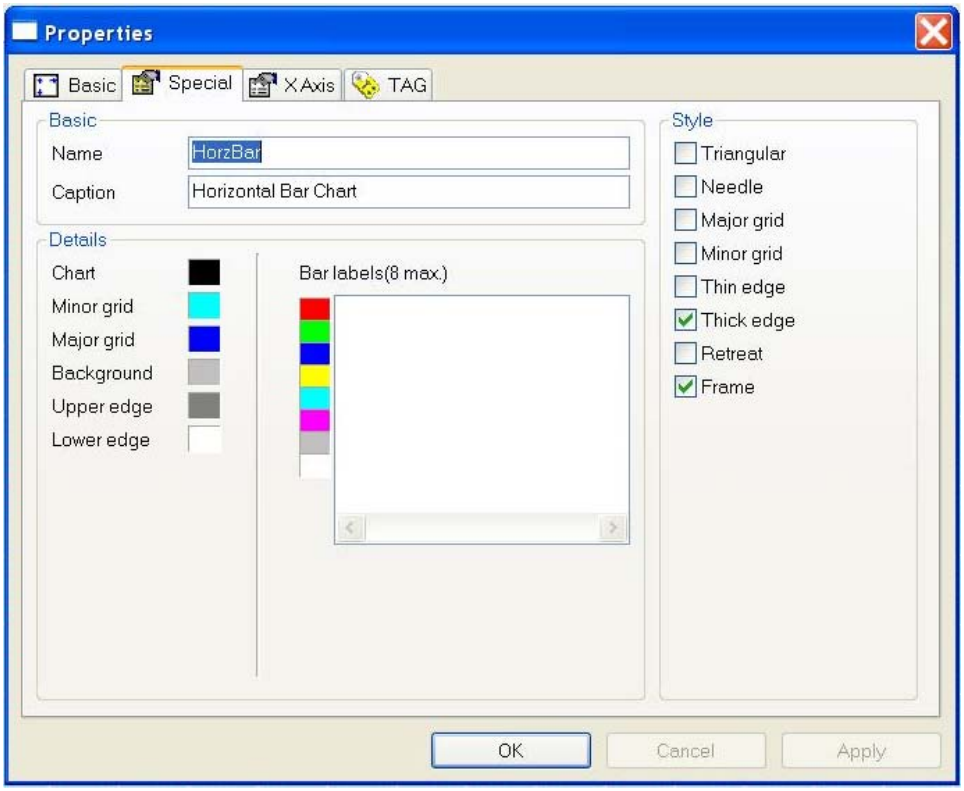
 X-Y Chart

Since Basic properties are the same for all genie objects and have been described in chapter 4, they are omitted and will not be discussed again here.

Horizontal Bar

Horizontal bar displays the real time values of multiple **Source** Tags in the form of a horizontal bar chart.

Special Properties



Basic

- Name
- Caption: Title text display on the object.

Details

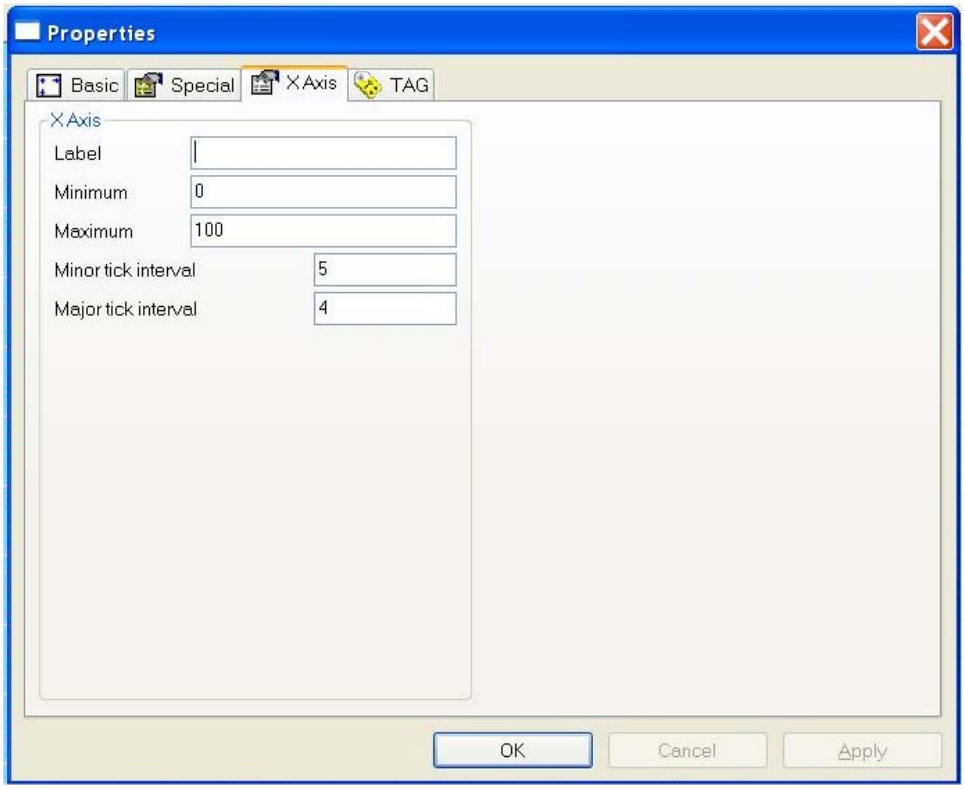
- Chart: Background color of the chart.
- Minor grid: Color of the minor grid lines.
- Major grid: Color of the major grid lines.
- Background: Object background color.

- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.
- Bar Labels: Label text shown beneath each bar. Label cannot be omitted. Blank character can be entered if no label is needed.
- Bar Color: Color of each bar. The color box next to the label text is the color used to show that bar.

Style

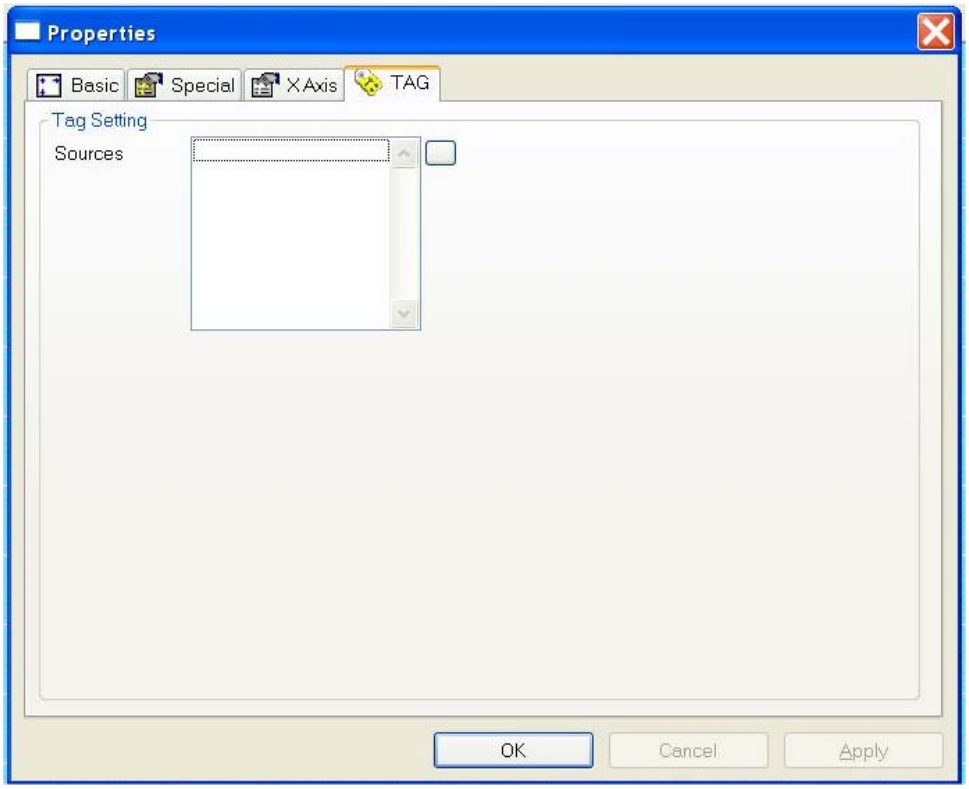
- Triangular: Show a triangular pointer on the scale to indicate values instead of showing a bar.
- Needle: Show a needle pointer on the scale to indicate values instead of showing a bar.
- Major Grid: Show major grid lines.
- Minor Grid: Show minor grid lines.
- Thin Edge
- Thick Edge
- Retreat
- Frame

X-Axis Properties



- Label: Label text shown on the scale.
- Minimum: Minimum value of the scale.
- Maximum: Maximum value of the scale.
- Minor Tick interval: Distance between neighboring minor tick on the scale in the same unit of the Source Tag value. This property is used to draw the scale.
- Major Tick interval: Distance between neighboring major tick on the scale in number of minor ticks. This property is used to draw the scale.

TAG Properties

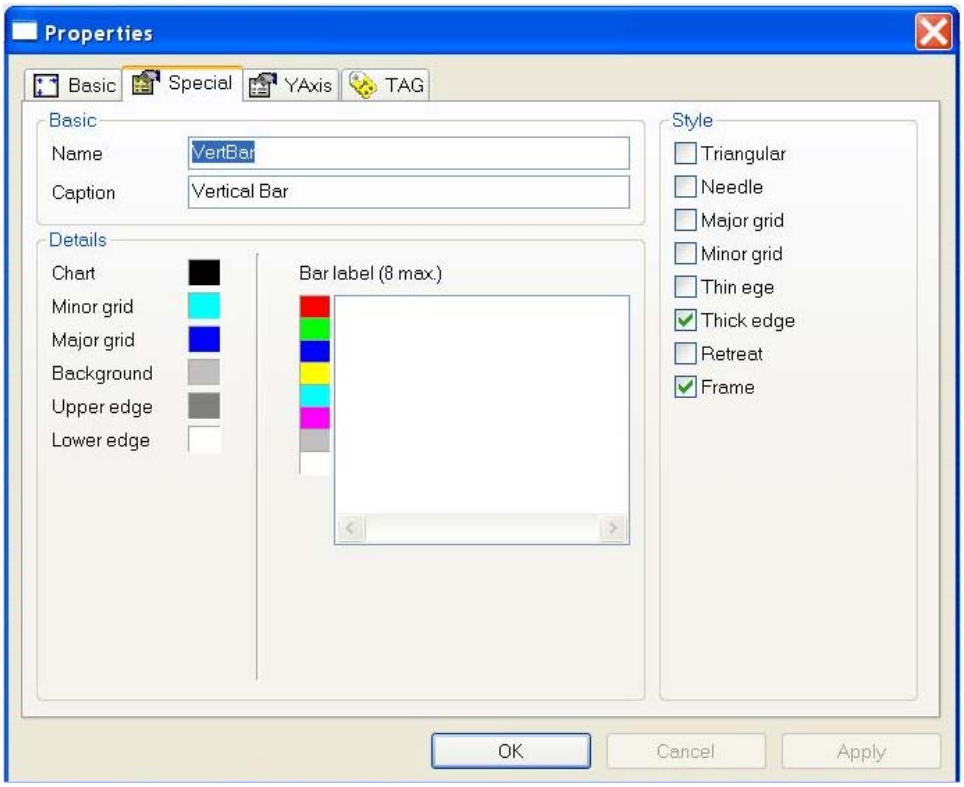


- Source: Tags whose values are shown in the bar chart.

Vertical Bar

Vertical bar displays the real time values of multiple **Source** Tags in the form of a Vertical bar chart.

Special Properties



Basic

- Name
- Caption: Title text display on the object.

Details

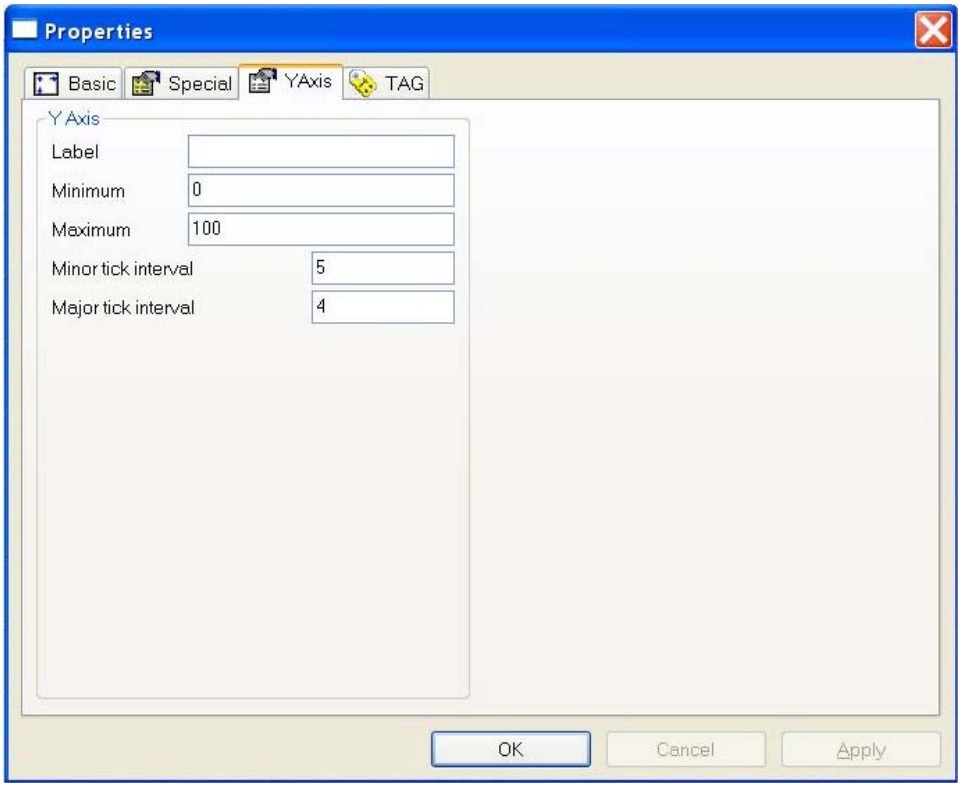
- Chart: Background color of the chart.
- Minor grid: Color of the minor grid lines.
- Major grid: Color of the major grid lines.
- Background: Object background color.

- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.
- Bar Label: Label text shown beneath each bar. Label cannot be omitted. Blank character can be entered if no label is needed.
- Bar Color: Color of each bar. The color box next to the label text is the color used to show that bar.

Style

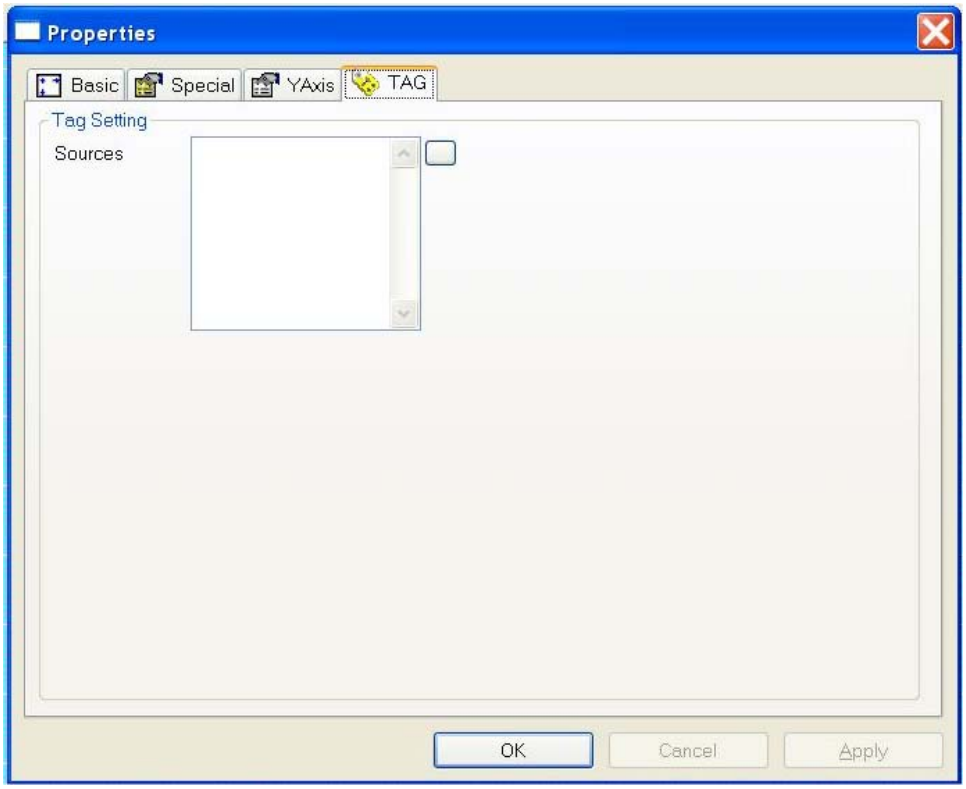
- Triangular: Show a triangular pointer on the scale to indicate values instead of showing a bar.
- Needle: Show a needle pointer on the scale to indicate values instead of showing a bar.
- Major Grid: Show major grid lines.
- Minor Grid: Show minor grid lines.
- Thin Edge
- Thick Edge
- Retreat
- Frame

Y-Axis Properties



- Label: Label text shown on the scale.
- Minimum: Minimum value of the scale.
- Maximum: Maximum value of the scale.
- Minor Tick interval: Distance between neighboring minor tick on the scale in the same unit of the Source Tag value. This property is used to draw the scale.
- Major Tick interval: Distance between neighboring major tick on the scale in number of minor ticks. This property is used to draw the scale.

TAG Properties



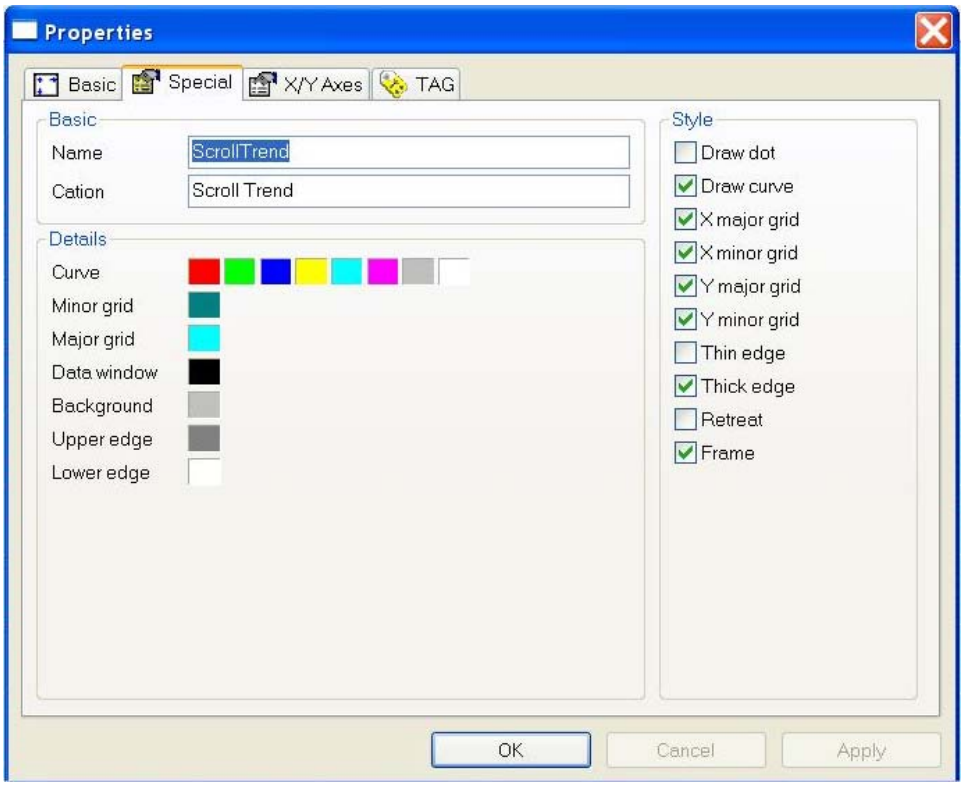
- Source: Tags whose values are shown in the bar chart.

Scroll Trend

Scroll Trend show the change of **Source** Tags data on a trend chart. Data of **Source** Tags are buffered in memory and drawn. The number of data buffered is defined by **Buffer Size** property. When data number exceeded the buffer size, older data are flushed on a first-in-first-out base. Close of the panel where the Scroll Trend resides will erase all buffered data.

Up to 8 curves can be drawn on a Scroll Trend.

Special Properties



Basic

- Name
- Caption: Title text display on the object.

Details

- Curve: Colors used to draw the trend curves. The colors sequence will be

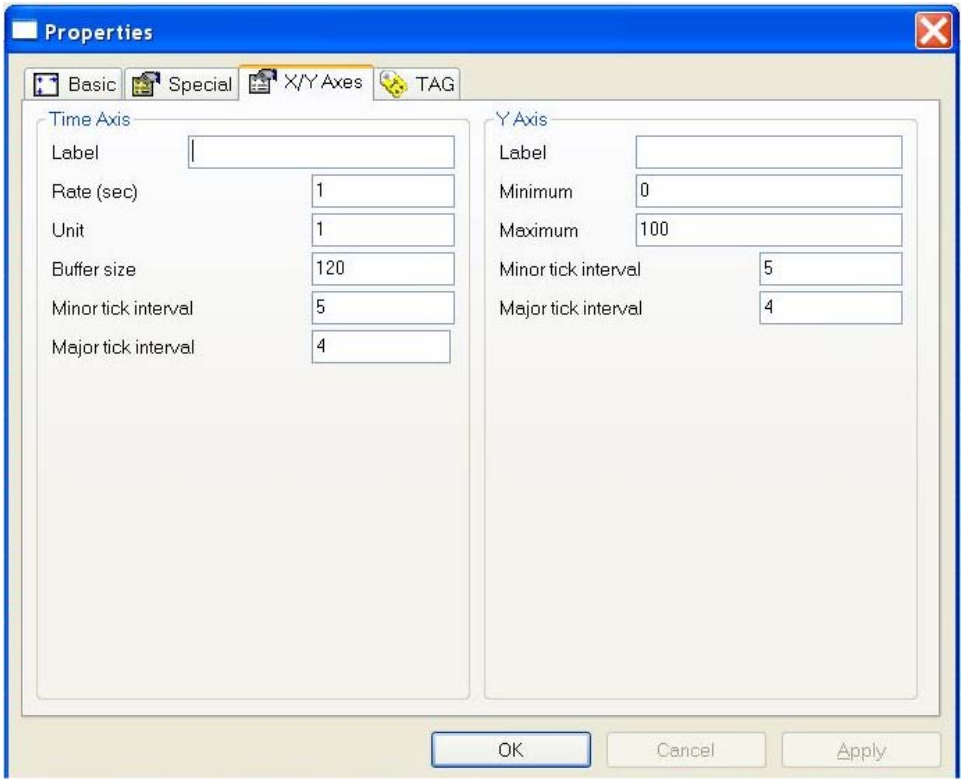
applied to the sequence of tags in the Source Tag definition. The order of the color box is from left to right.

- Data Window: Background color of the chart.
- Minor grid: Color of the minor grid lines.
- Major grid: Color of the major grid lines.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Triangular: Show a triangular pointer on the scale to indicate values instead of showing a bar.
- Needle: Show a needle pointer on the scale to indicate values instead of showing a bar.
- Major Grid: Show major grid lines.
- Minor Grid: Show minor grid lines.
- Thin Edge
- Thick Edge
- Retreat
- Frame

X/Y Axes Properties



Time Axis:

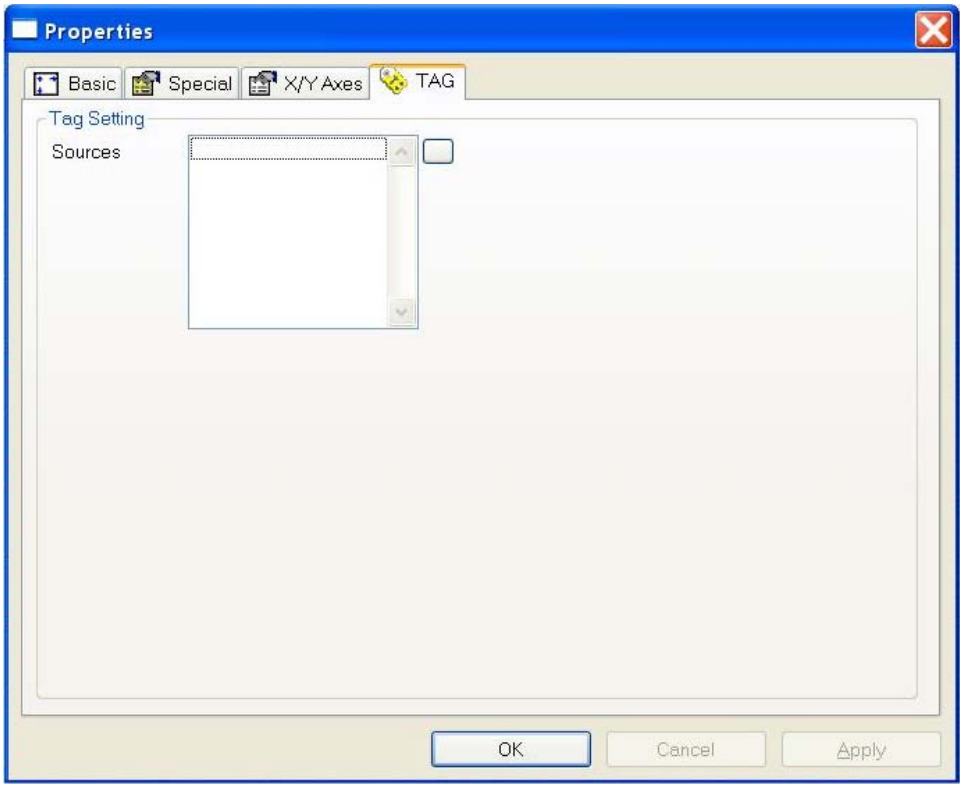
- Label: Label text shown on the time scale.
- Rate: Sampling rate of the trend chart. The unit is second.
- Unit: **Rate** in time scale unit. For example, if **Rate** is 3 seconds and unit on the time axis is minute, Unit is 0.05 minute (3/60).
- Buffer Size: The maximum number of data of each **Source** Tag can be buffered.
- Minor Tick interval: Distance between neighboring minor tick on the scale in number of samples. This property is used to draw the scale.
- Major Tick interval: Distance between neighboring major tick on the scale in number of minor ticks. This property is used to draw the scale.

Y Axis:

- Label: Label text shown on the Y scale.

- Minimum: Minimum value of the Y scale.
- Maximum: Maximum value of the Y scale.
- Minor Tick interval: Distance between neighboring minor tick on the scale in the same unit of **Source** Tags. This property is used to draw the scale.
- Major Tick interval: Distance between neighboring major tick on the scale in number of minor ticks. This property is used to draw the scale.

TAG Properties



- Source: Tags whose values are drawn as trend curve on the object.

Horizontal Trend

Horizontal Trend shows the change of **Source** Tags data on a trend chart. It differs from Scroll Trend on that it use absolute time to show the data. A separator line is drawn on the chart to show current time. Data on the left of the separator are data of this time period and data on the right of the separator are data from previous time period. There are three time period can be selected:

- 24 hour with data recorded every minute.
- 12 hour with data recorded every 30 seconds.
- 60 minutes with data recorded every 5 seconds.

Data of **Source** Tags are buffered in memory and drawn. When data number exceeded the buffer size defined by the time period selected, older data are flushed on a first-in-first-out base. Close of the panel where the Horizontal Trend resides will erase all buffered data.

Up to 8 curves can be drawn on a Horizontal Trend.

Special Properties

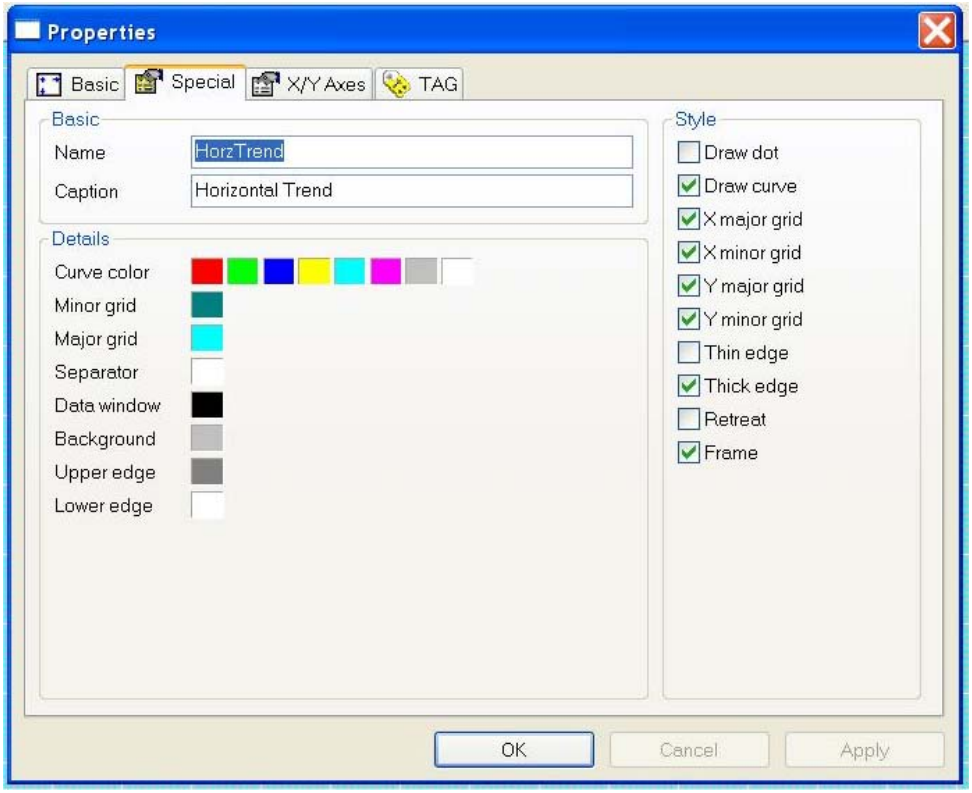
Basic

- Name
- Caption: Title text display on the object.

Details

- Curve: Colors used to draw the trend curves. The colors sequence corresponds to that in the Source Tag definition. The order of the color box is from left to right and then from top to bottom.
- Data Window: Background color of the chart.
- Minor grid: Color of the minor grid lines.
- Major grid: Color of the major grid lines.
- Background: Object background color.
- Upper Edge: Upper edge color.

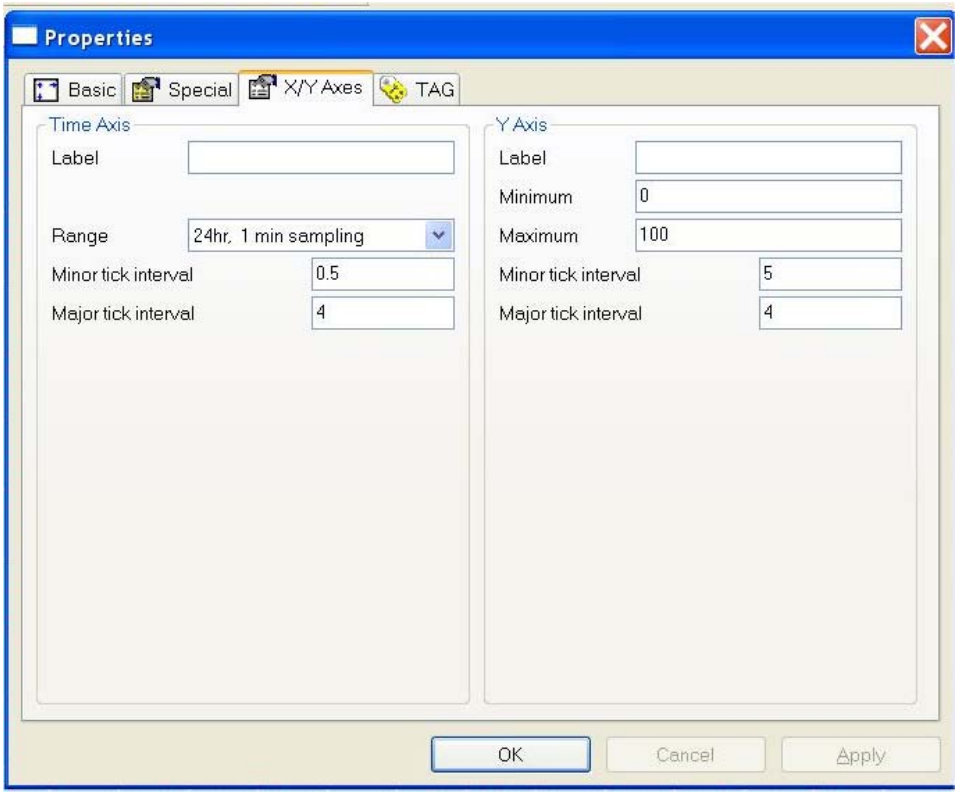
- Lower Edge: Lower edge color.



Style

- Draw Dot: Draw each data point as a dot.
- Draw Curve: Connect each data point to form trend curves.
- Time Major Grid: Show major grid lines on time axis.
- Time Minor Grid: Show minor grid lines on time axis.
- Y Major Grid: Show major grid lines on Y axis.
- Y Minor Grid: Show minor grid lines on Y axis.
- Thin Edge
- Thick Edge
- Retreat
- Frame

X/Y Axes Properties



Time Axis:

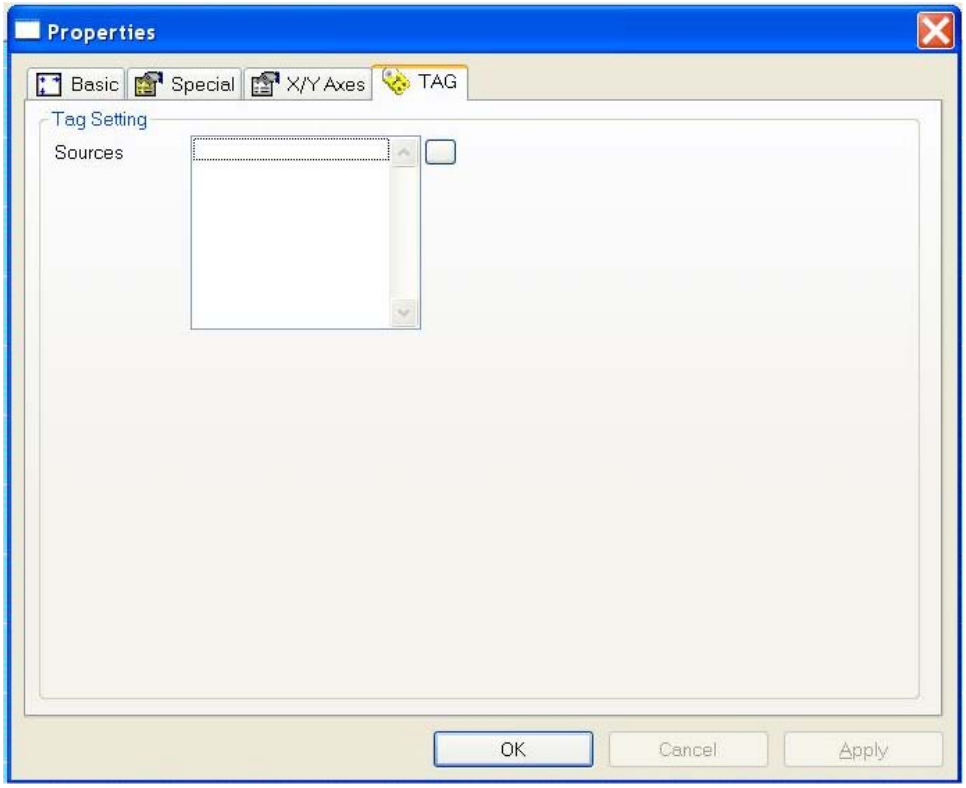
- Label: Label text shown on the time scale.
- Range: The time period which define the trend buffer size and sampling rate.
- Minor Tick interval: Distance between neighboring minor tick on the scale in the same unit of the time scale. This property is used to draw the scale.
- Major Tick interval: Distance between neighboring major tick on the scale in number of minor ticks. This property is used to draw the scale.

Y Axis:

- Label: Label text shown on the Y scale.
- Minimum: Minimum value of the Y scale.
- Maximum: Maximum value of the Y scale.
- Minor Tick interval: Distance between neighboring minor tick on the scale in the same unit of **Source** Tags. This property is used to draw the scale.

- Major Tick interval: Distance between neighboring major tick on the scale in number of minor ticks. This property is used to draw the scale.

TAG Properties



- Source: Tags whose values are drawn as trend curve on the object.

Data Trend

Data Trend reads history data from the Lab-LINK data files and draws them as curves on a trend chart.

Data Trend Operation:

- Date Selection: Click on the Date drop down list on the top and left corner of the object to select data date. **Refresh** Tag can be set to trigger data refresh.

- Time Axis Control: Use the buttons on top of the trend chart to control the scrolling and zooming of the time axis.

   : Scroll to the left end of the time axis, that is, the beginning of the day.
   : Scroll a screen to the left.
   : Scroll a major grid to the left.
   : Scroll a major grid to the right.
   : Scroll a screen to the right.
   : Scroll to the right end of the time axis, that is, the end of the day.
   : Zoom in time axis.
   : Zoom out time axis.
   : Scroll to the last and newest data in the data file.

- Y Axis Control: Use the buttons on right of the trend chart to control the scrolling and zooming of the Y axis.

   : Zoom-in Y axis.

   : Zoom-out Y axis.

   : Scroll a screen upward.

   : Scroll a major grid upward.

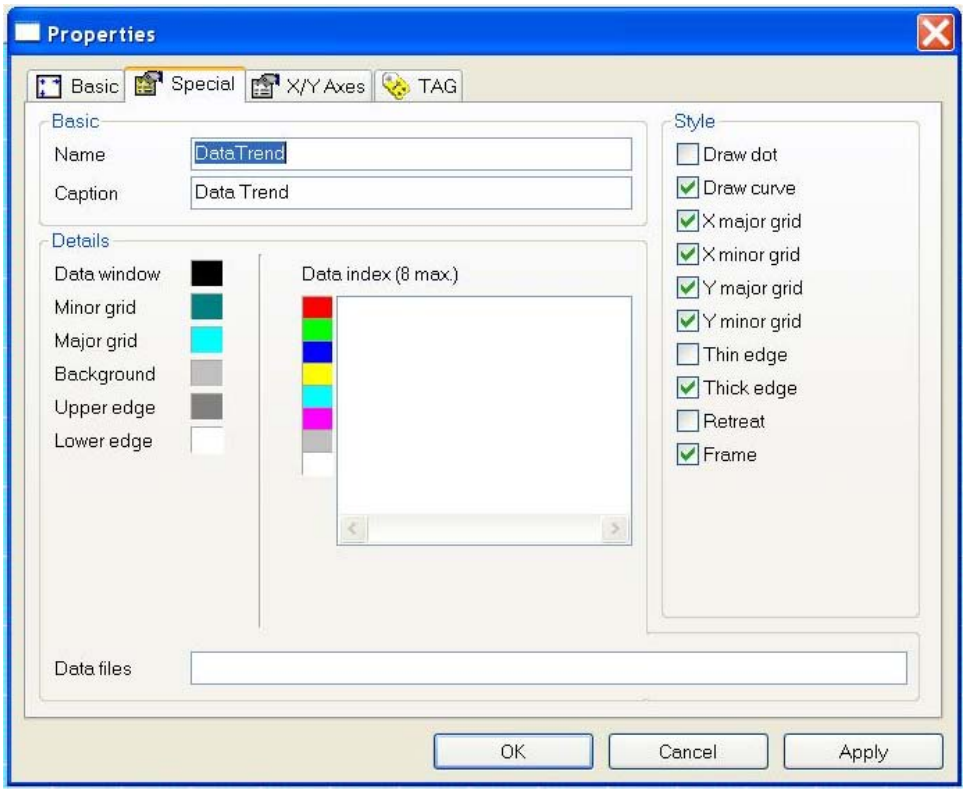
   : Scroll a major grid downward.

   : Scroll a screen downward.

Data Trend will reload the data file when:

-  button is pressed: Reload current data file and scroll to the last data.
- Change of the value of **Refresh** Tag: Reload current data file and scroll to the last data. Increasing of **Refresh** will only draw newly added data to the trend, but decreasing of **Refresh** will cause the object to redraw the whole trend cahart.
- A new date is selected: Load the selected data file and scroll to the last data.

Special Properties



Basic

- Name
- Caption: Title text display on the object.

Details

- Data Window: Background color of the chart.
- Minor grid: Color of the minor grid lines.

- Major grid: Color of the major grid lines.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.
- Data Index: The index number indicating the position of the trend data Tag in the data file. For example, it "Tag1" is the third tag in the data storage group definition, its Data Index will be "3". Please refer to Data Storage section in Lab-LINK Manual for detail. Curve colors for each data curve are also defined
- Data File: Source of trend data. The files must be Lab-LINK XDF, XMF or XYF data files. File name should include "??" , such as "data??.xdf". "??" will be replaced by the date selected at runtime. For example, if "06" is selected, the data file "data06.xdf" will be loaded. File name designation should include valid path and it is recommended to use reference path "~6" in the path if the default Lab-LINK default data file folder is used for data storage. Depending on the Basic Setting of Data module, there are two extra key words should be inserted to the Data File path. For example, if a data group in the Data module has the File Name Prefix setting of "Dat1_??", the Data File properties of Data Trend object referencing this data group could be:

Data Group Basic Setting	Data Trend Object Properties	Remark	
Overwrite Data After	Data File		
One Month	~6\dat1_??.xdf	??	data date can be selected at runtime
One Year	~6*m\dat1_??.xdf	??	data date can be selected at runtime
		*m	data month can be selected at runtime
Never	~6\20*y*m\dat1_??.xdf	??	data date can be selected at runtime
		*m	data month can be selected at runtime
		20*y	data year can be

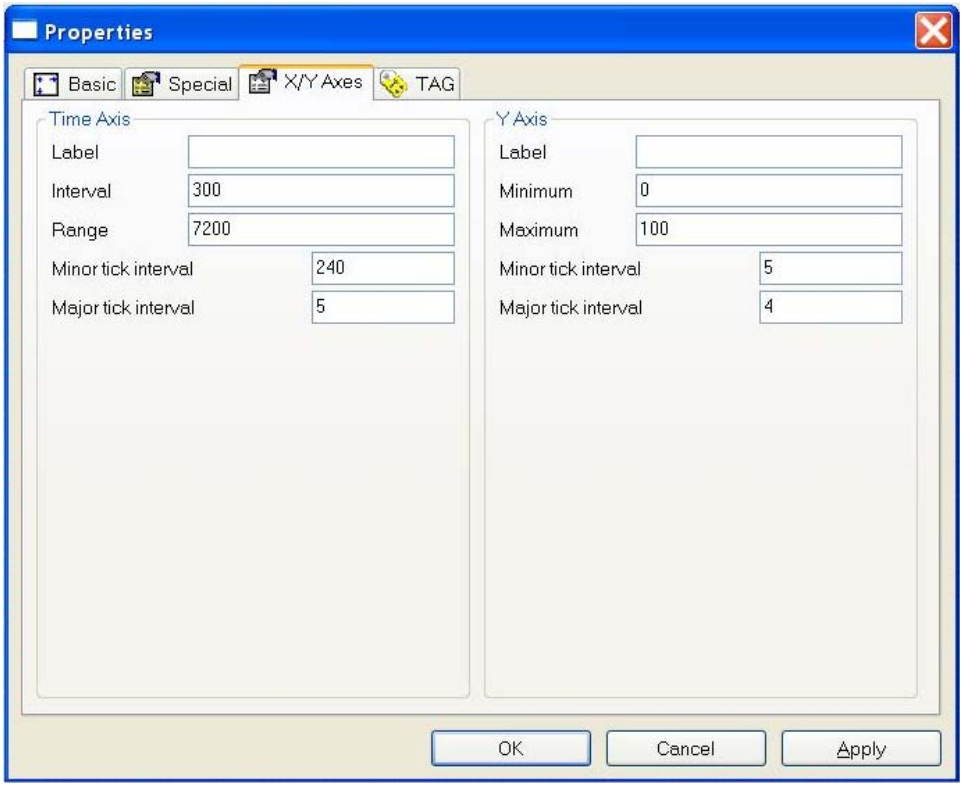
			selected at runtime

Please refer to Data Storage section in Lab-LINK Manual for detail about data group settings.

Style

- Draw Dot: Draw each data point as a dot.
- Draw Curve: Connect each data point to form trend curves.
- Time Major Grid: Show major grid lines on time axis.
- Time Minor Grid: Show minor grid lines on time axis.
- Y Major Grid: Show major grid lines on Y axis.
- Y Minor Grid: Show minor grid lines on Y axis.
- Thin Edge
- Thick Edge
- Retreat
- Frame

X/Y Axes Properties



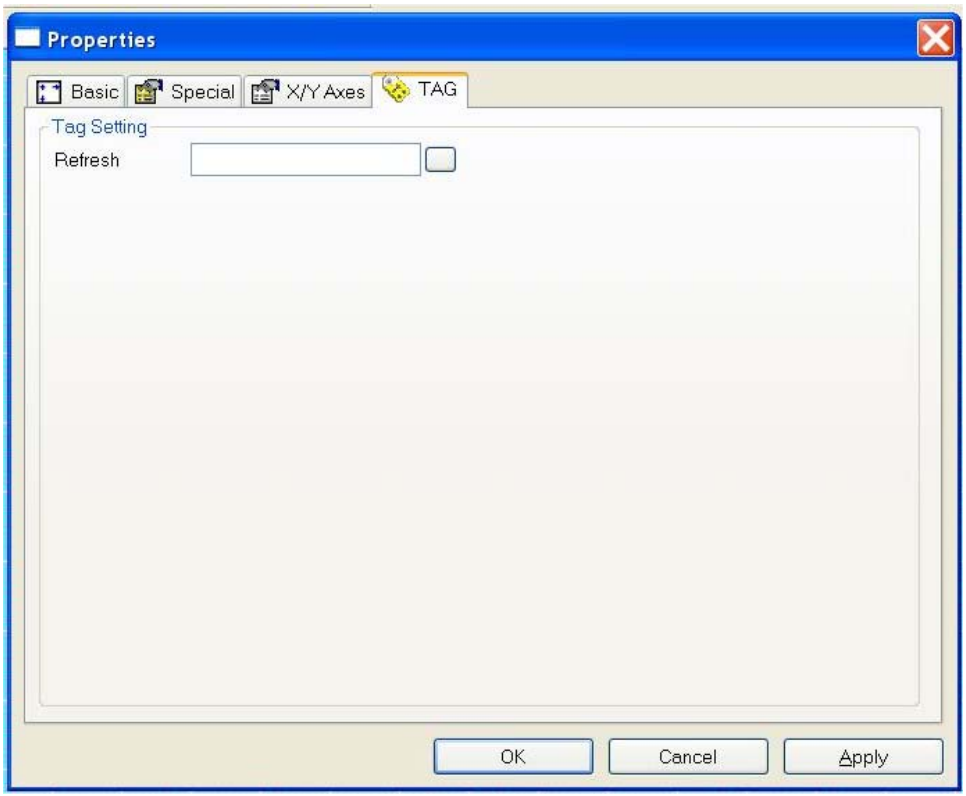
Time Axis:

- Label: Label text shown on the time scale.
- Interval: If the time difference between any two neighboring data in the data file exceeds this limit, the two data won't be connected when drawing the trend curve.
- Range: The default time scale range shown when the object is created, that is, when the panel containing this object is opened. The unit is in seconds.
- Minor Tick interval: Distance between neighboring minor tick on the scale in seconds. This property is used to draw the scale.
- Major Tick interval: Distance between neighboring major tick on the scale in number of minor ticks. This property is used to draw the scale.

Y Axis:

- Label: Label text shown on the Y scale.
- Minimum: Minimum value of the Y scale.
- Maximum: Maximum value of the Y scale.
- Minor Tick interval: Distance between neighboring minor tick on the scale in the same unit of data Tags. This property is used to draw the scale.
- Major Tick interval: Distance between neighboring major tick on the scale in number of minor ticks. This property is used to draw the scale.

TAG Properties



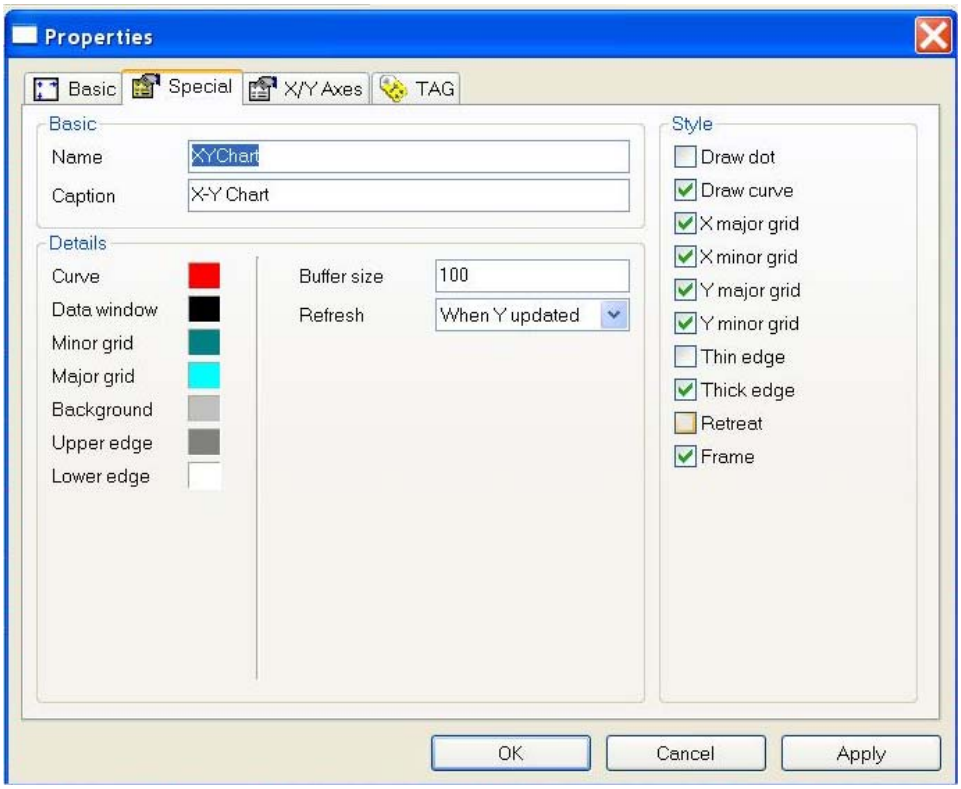
- Refresh: The Tag whose value change trigger the object to reload current data file.

X-Y Chart

X-Y Chart is used to display the change on the relation between two Tags. It is possible to define whether the change of Tag **X Source**, **Y Source** or any of them will trigger adding a new data on the curve. Data of **X Source** and **Y Source** Tags are buffered in memory and drawn. The number of data buffered is defined by **Buffer Size** property. When data number exceeded the buffer size, older data are flushed on a first-in-first-out base. Close of the panel where the Scroll Trend resides will erase all buffered data.

Erase Tag is used to clear the data buffer and the curve in the chart as well. Any change in the value of **Erase** Tag will cause the erasing.

Special Properties



Basic

- Name
- Caption: Title text display on the object.

Details

- Curve: Colors used to draw the curves.
- Data Window: Background color of the chart.
- Minor grid: Color of the minor grid lines.
- Major grid: Color of the major grid lines.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.
- Data buffer: The maximum number of data will be buffered.
- Refresh: Choose when to add new data to the curve.
  - When X updated: Add new data when **X Source** changes.
  - When Y updated: Add new data when **X Source** changes.
  - When X or Y updated: Add new data when either **X Source** or **Y Source** changes.

Style

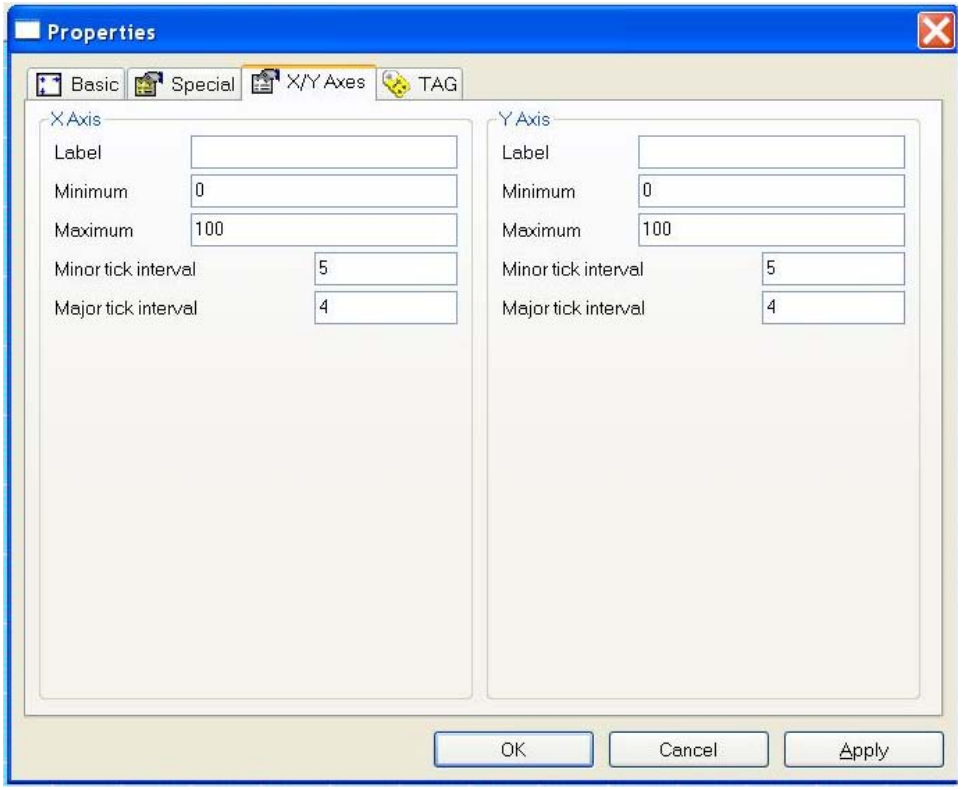
- Draw Dot: Draw each data point as a dot.
- Draw Curve: Connect each data point to form trend curves.
- X Major Grid: Show major grid lines on X axis.
- X Minor Grid: Show minor grid lines on X axis.
- Y Major Grid: Show major grid lines on Y axis.
- Y Minor Grid: Show minor grid lines on Y axis.
- Thin Edge
- Thick Edge
- Retreat
- Frame

X/Y Axes Properties

X Axis:

- Label: Label text shown on the X scale.
- Minimum: Minimum value of the X scale.
- Maximum: Maximum value of the X scale.

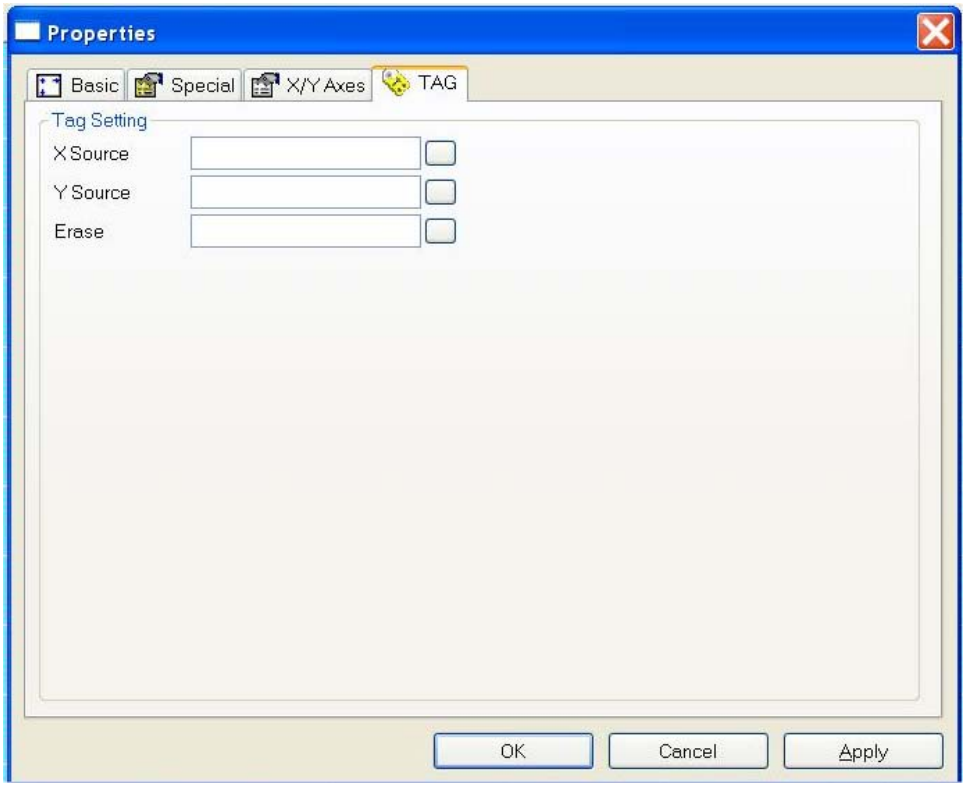
- Minor Tick interval: Distance between neighboring minor tick on the scale in the same unit of data Tags. This property is used to draw the scale.
- Major Tick interval: Distance between neighboring major tick on the scale in number of minor ticks. This property is used to draw the scale.



Y Axis:

- Label: Label text shown on the Y scale.
- Minimum: Minimum value of the Y scale.
- Maximum: Maximum value of the Y scale.
- Minor Tick interval: Distance between neighboring minor tick on the scale in the same unit of data Tags. This property is used to draw the scale.
- Major Tick interval: Distance between neighboring major tick on the scale in number of minor ticks. This property is used to draw the scale.

TAG Properties



- X Source: The Tag whose value is the data source of X.
- Y Source: The Tag whose value is the data source of Y.
- Erase: The Tag whose value change will erase all data on the object.

Chapter 13 Alarm Objects

Alarm objects are used to displace alarm status, message and log.

 Alarm Concentrator

 Alarm Bar

 Annunciator

 Alarm Log

 Alarm WAV Player

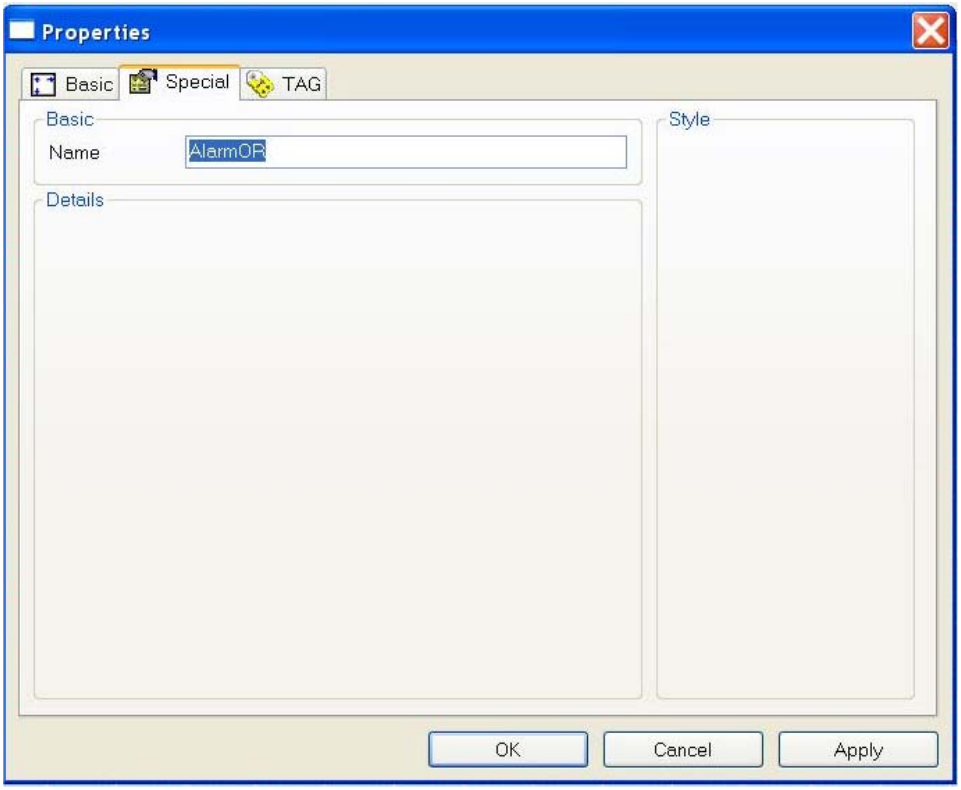
 Group Annunciator

Since Basic properties are the same for all genie objects and have been described in chapter 4, they are omitted and will not be discussed again here.

Alarm Concentrator

Alarm Concentrator can combine the alarm status of multiple **Source** Tags. In any of the **Source** Tags remains in alarm condition, the value of Output Tag will be "1". **Output** Tag will be rest to "0" only when all the **Source** Tags become normal.

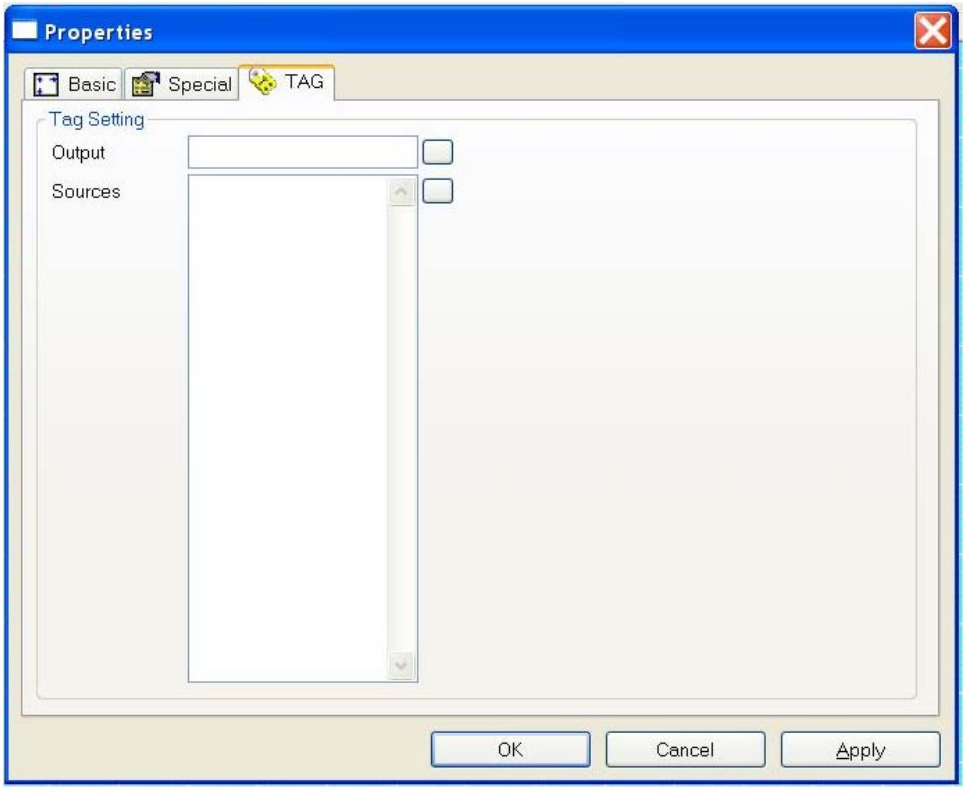
Special Properties



Basic

- Name

TAG Properties



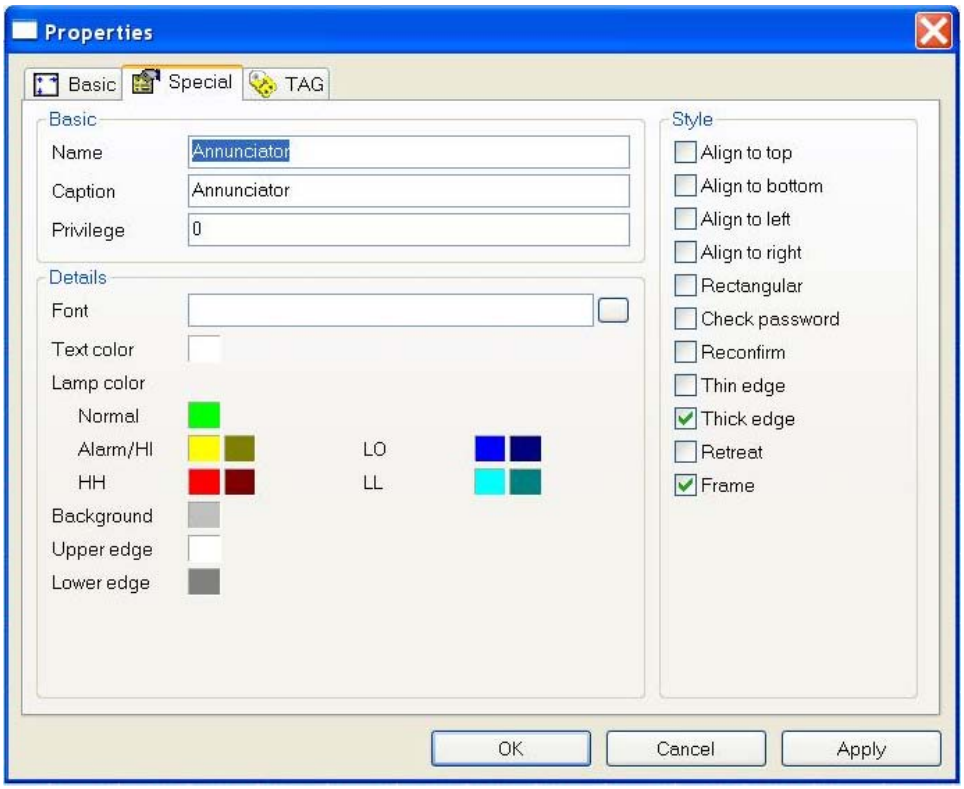
- Output: Combing alarm condition of the **Source** Tags.
- Source: Tags whose alarm condition will be combined by the object.

Annunciator

Annunciator can indicate the alarm status of Source Tag by changing colors. A set of two colors can be defined for each kind of alarm. When an alarm condition occurs, the corresponding color set will be display intermittently creating a blinking effect to alert user. When the alarm is acknowledged, the Annunciator will stop blinking, but remain in the first color of that alarm type. If the alarm condition is cleared, the Annunciator will resume its normal color.

Annunciator can also be used to acknowledge the alarm of the Tag associated with it. Move cursor upon an Annunciator and the cursor will become the shape of a hand with "ACK" notation to indicate that this is an object used for alarm acknowledge. Left click an Annunciator when it is blinking acknowledges the alarm of its Source Tag. Password and privilege can be set for acknowledge authorization.

Special Properties



Basic

- Name
- Caption: Title text display on the object.
- Privilege: The privilege a user must have to operate on this object. Range of privilege is between 0 and 255.

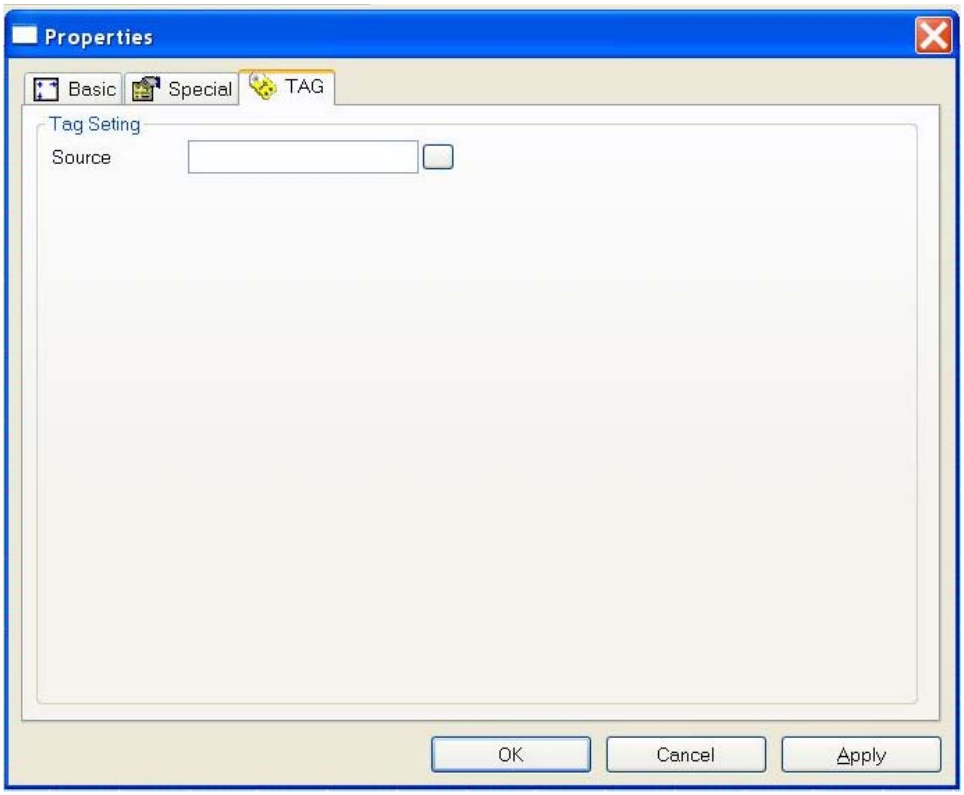
Details

- Font: Font used for **Caption**.
- Text color: Color of the **Caption** text.
- Lamp color:
  - Normal: Color of the object when **Source** Tag is in normal state.
  - Alarm/HI: Colors of the object when **Source** Tag is in Alarm or High Alarm state.
  - HH: Colors of the object when **Source** Tag is in High-High Alarm state.
  - LO: Colors of the object when **Source** Tag is in Low Alarm state.
  - LL: Colors of the object when **Source** Tag is in Low-Low Alarm state.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Align to top: Align the caption to the top of object.
- Align to bottom: Align the caption to the Bottom of object.
- Align to left: Align the caption to the left of object.
- Align to right: Align the caption to the right of object.
- Rectangular: Set the shape of the object to be rectangular. The object is circular by default.
- Check password: Always ask for a password when operated.
- Reconfirm: Show a message to ask for reconfirmation when operated.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties



- Source: Tag whose alarm status is indicated by the object.

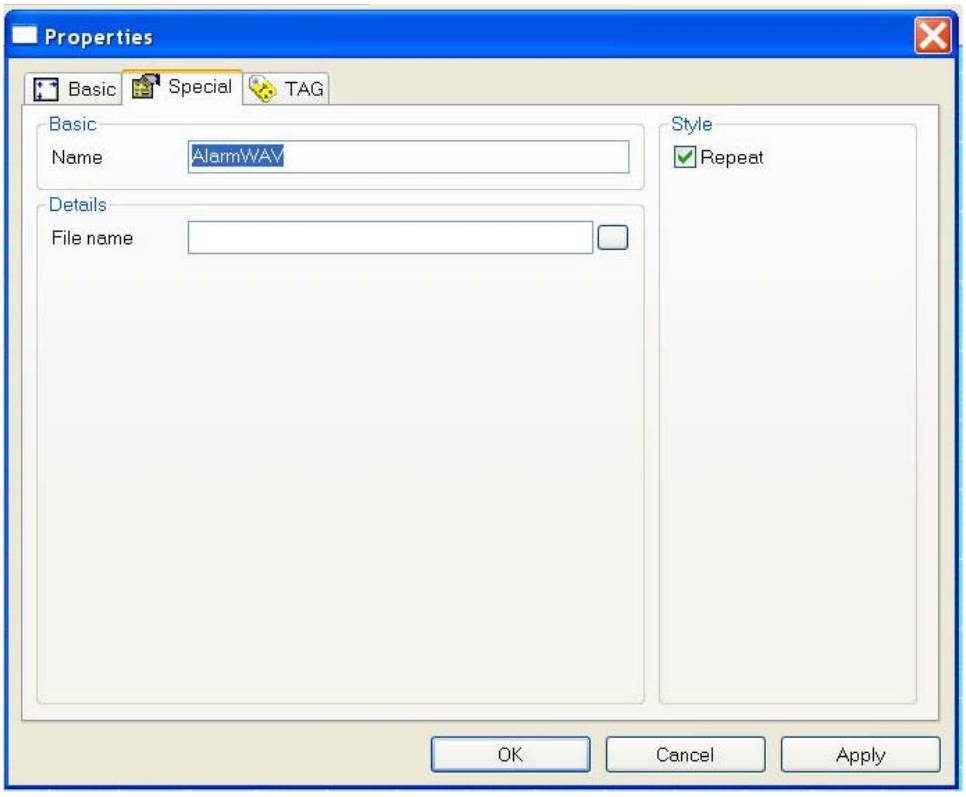
Alarm WAV Player

Alarm Wav player is used to play a Wave file when any alarm occurs. **Control** Tag control whether the will start playing wave file or not. If **Control** is “1” and there is at least one active alarm, the object uses the alarm **Group** value of the current alarm with the highest priority as an index to select the wave to play from the file name definition. If **Control** is “0”, the object stops playing.

Wave file definition contains one or more “?” characters. These characters will be replace by the alarm Group value at runtime. For example, if wave file name is “alarm-??.wav” and the most severe active alarm has a Group setting of “3”, then the wave file played will be “alarm-03.wav”. File name should contain valid path and it is recommended **reference path** “~4” is used if the wave file path is in the Lab-LINK default wave file folder.

If the designated wave file cannot be found, no sound will be played.

Special Properties



Basic

- Name

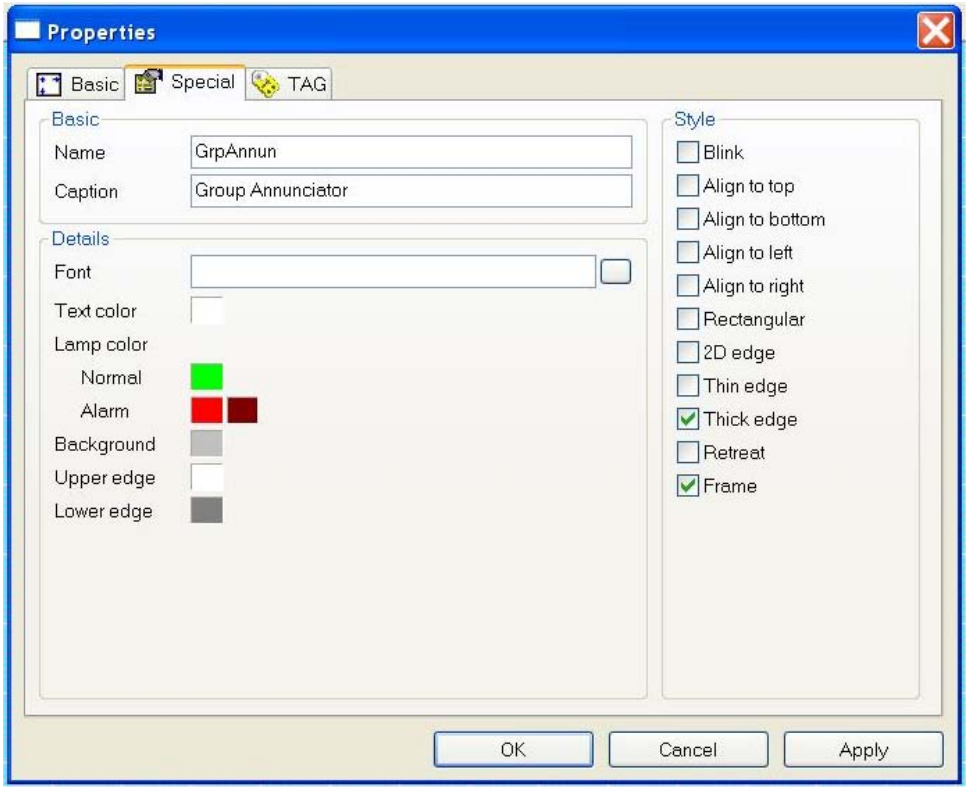
Details

- File name: WAVE file name to be played.

Style

- Repeat: Play the wave file repeatedly until **Control** is "0" or all alarms are cleared.

TAG Properties



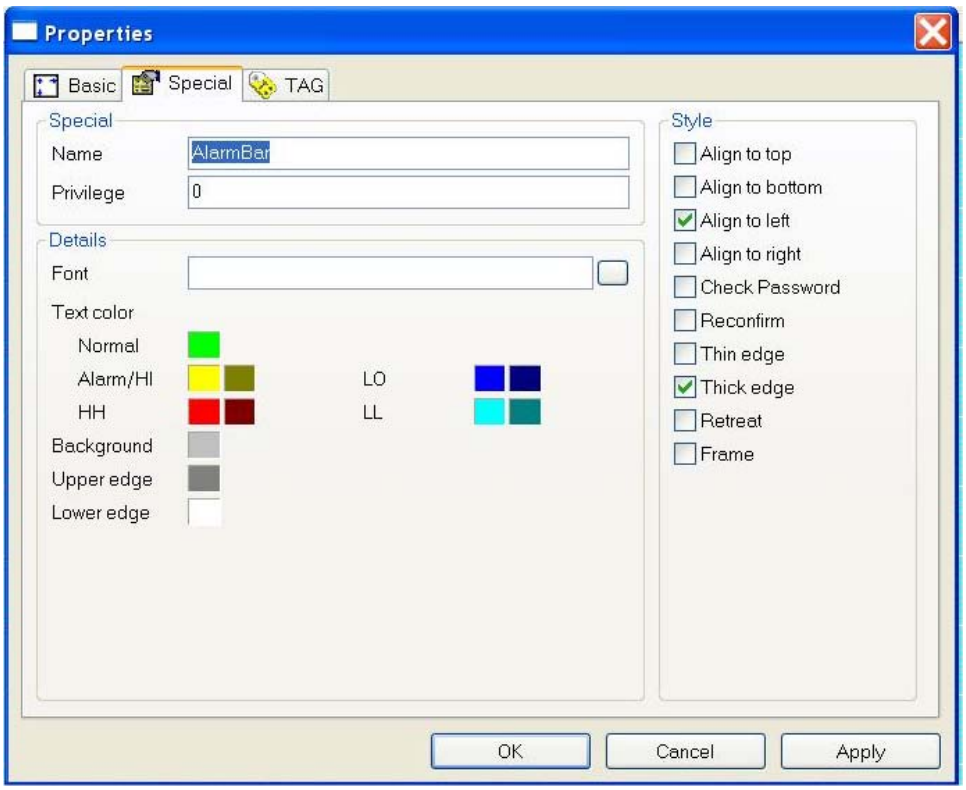
- Control: Tag controlling the start and stop of alarm wave file playing.

Alarm Bar

Alarm Bar is used to display the alarm message of the active alarm with the highest priority. Color of the message text depends on the alarm type and status. A set of two colors can be defined for each kind of alarm. When an alarm condition occurs, the corresponding color set will be display intermittently creating a blinking effect to alert users. When the alarm is acknowledged, the message will stop blinking, but remain in the first color of that alarm type. If the alarm condition is cleared, its message will be removed from the object.

Alarm Bar can also be used to acknowledge an alarm. Move cursor upon an Alarm Bar and the cursor will become the shape of a hand with “ACK” notation to indicate that this is an object used for alarm acknowledge. Left click on the message when it is blinking acknowledges the alarm related to the message. Password and privilege can be set for acknowledge authorization.

Special Properties



Basic

- Name
- Privilege: The privilege a user must have to operate on this object. Range of privilege is between 0 and 255.

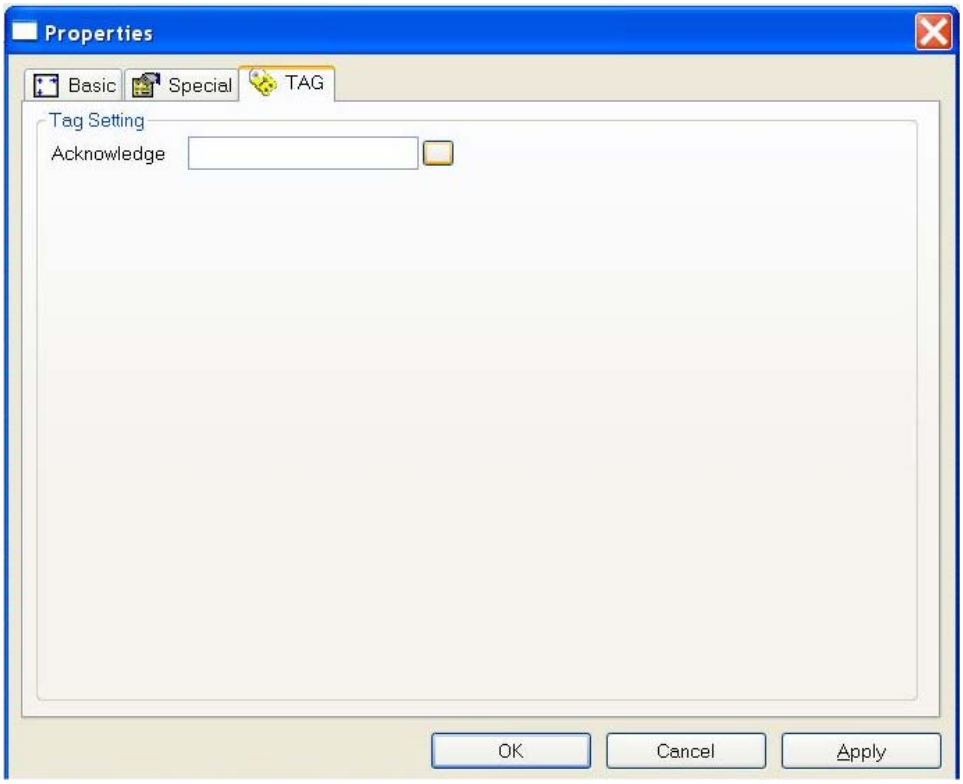
Details

- Font: Font used for alarm message.
- Text color:
  - Normal: Color used for the message text if it's a normal message.
  - Alarm/HI: Color used for the message text if it's an Alarm or High Alarm message.
  - HH: Color used for the message text if it's a High-High Alarm message.
  - LO: Color used for the message text if it's a Low message.
  - LL: Color used for the message text if it's a Low-Low message.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Align to top: Align the caption to the top of object.
- Align to bottom: Align the caption to the Bottom of object.
- Align to left: Align the caption to the left of object.
- Align to right: Align the caption to the right of object.
- Check password: Always ask for a password when operated.
- Reconfirm: Show a message to ask for reconfirmation when operated.
- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties



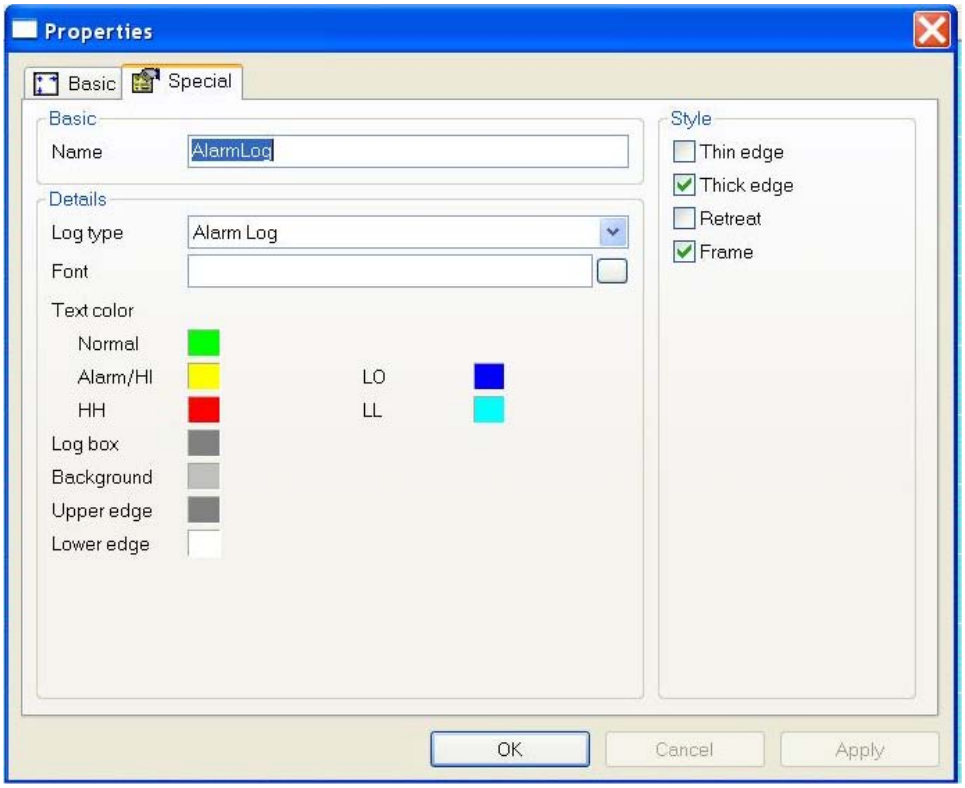
- Acknowledge: Tag used for external alarm acknowledge. When the Tag is set to “1”, the alarm showing on this object will be acknowledged.

Alarm Log

Alarm Log is used to display the messages of all the active alarms or the historical records of cleared alarms. A maximum of 1024 messages can be displayed by this object.

Different colors of message text indicate different kind of alarm messages.

Special Properties



Basic

- Name
- X, Y: Position of top-left corner.
- Width, Height: Size of the object.

Details

- Log type: Select the display of all active alarms (**Alarm Log**) or historical log of cleared

alarm (**Resume Log**).

- Font: Font used for alarm message.
- Text color:
  - Normal: Color used for the message text if it's a normal message.
  - Alarm/High: Color used for the message text if it's an Alarm or High Alarm message.
  - High-High: Color used for the message text if it's a High-High Alarm message.
  - Low: Color used for the message text if it's a Low message.
  - Low-Low: Color used for the message text if it's a Low-Low message.
- Log Box: Color of the message display area background.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Thin Edge
- Thick Edge
- Retreat
- Frame

TAG Properties

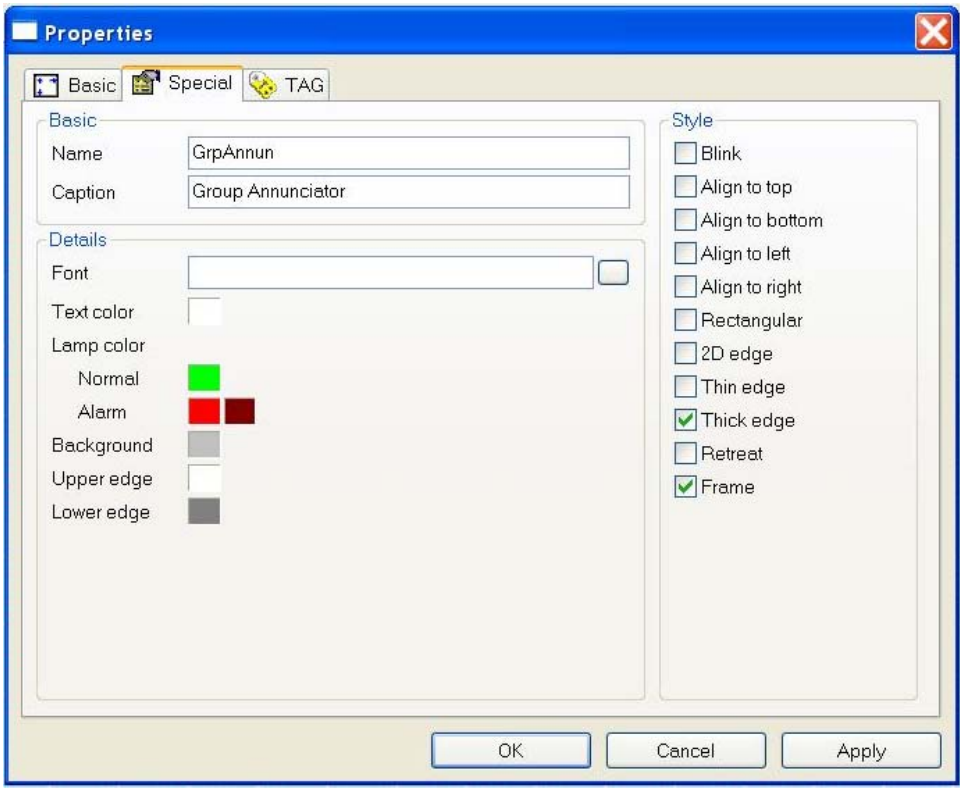
None.

Group Annunciator

Group Annunciator can combine the alarm status of multiple **Source** Tags. It is equivalent to the combination of an **Alarm Concentrator** object and an **Indicator** object. If any of the **Source** Tags remains in alarm condition, the value of Output Tag will be "1" and the color this object change to alarm color. If all the **Source** Tags become normal, **Output** Tag will be rest to "0" and the color of the object return to normal color.

Two alarm colors can be define to create a blinking effect. If **Blink** style is set and **Output** is "1", the two alarm colors are displayed intermittently to alert user.

Special Properties



Basic

- Name
- Caption: Title text display on the object.

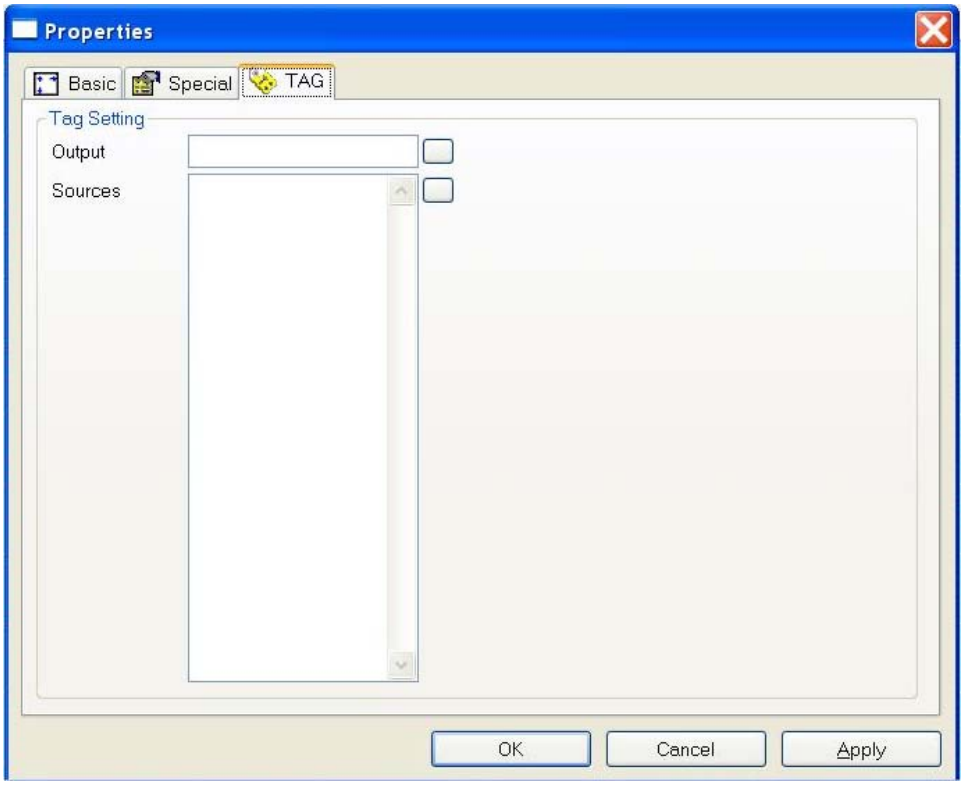
Properties

- Font: Font used for **Caption**.
- Text color: Color of the **Caption** text.
- Lamp color:
  - Normal: When all the **Source** tags are in normal state, the color will be displayed
  - Alarm: When any of the **Source** tags is in alarm state, the first color will be used to display. If Blink style is set, both colors will be displayed in turn to create the blinking effect.
- Background: Object background color.
- Upper Edge: Upper edge color.
- Lower Edge: Lower edge color.

Style

- Blink: Use blinking effect.
- Rectangular: Set the shape of the object to be rectangular. The object is circular by default.
- Align to top: Align the caption to the top of object.
- Align to bottom: Align the caption to the Bottom of object.
- Align to left: Align the caption to the left of object.
- Align to right: Align the caption to the right of object.
- Thin Edge
- Thick Edge
- Retreat
- Frame
- Thin Frame

TAG Properties



- Output: Combing alarm condition of the **Source** Tags. The tag will be set 0 if all of the **Source** tags are in normal state. The tag will be set to 1 if any of the **Source** tags is in alarm state.
- Source: Tags whose alarm condition will be combined and indicated by the object.

Object Icons

Objects	Type	Visible	Objects	Type	Visible
Pointer Tool			Vertical Slider	Control	V
Macro Box	Panel	V	Edit Box	Control	V
Pop Macro	Panel		Number Pad	Control	V
Macro Player	Panel		Show BMP	Static Display	V
Initiator	Action		Show WMF	Static Display	V
AND	Action		Memo Box	Static Display	V
OR	Action		Log Box	Dynamic Display	V
Inverter	Action		Static Text	Dynamic Display	V
ExIndex	Action		Dynamic Text	Dynamic Display	V
Multiplexer	Action		Indicator	Dynamic Display	V
Scanner	Action		Lamp	Dynamic Display	V
Counter	Action		Shape	Dynamic Display	V
Timer	Action		Digit Meter	Dynamic Display	V
Multi-Timer	Action		Text Meter	Dynamic Display	
Delay Timer	Action		Level	Dynamic Display	V
Clock	Action		Horizontal Bar	Graph	V
Calculator	Action		Vertical Bar	Graph	V
Runner	Action		Scroll Trend	Graph	V
Executer	Action		Horizontal Trend	Graph	V
WAV Player	Action		Data Trend	Graph	V
Button	Control	V	X-Y Chart	Graph	V
LED Button	Control	V	Alarm Concentrator	Alarm	
Rocker	Control	V	Annunciator	Alarm	V
Set Button	Control	V	Alarm WAV Player	Alarm	
Spin Button	Control	V	Alarm Bar	Alarm	V
BMP Button	Control	V	Alarm Log	Alarm	V
WMF Button	Control	V	Group Annunciator	Alarm	V
Horizontal Slider	Control	V			

Reference Path

Reference Path is a shorthand notation of file path used by Lab-LINK objects. It is highly recommended to use **Reference Path** wherever possible. Six Reference Paths are defined by Lab-LINK system:

~1 *Disk*:\LABLINK\PROJECT*ProjectName*\PNL
The path contains all panel file of the project.
Panel file path should be: ~1\xxxxxxxx.PNL
Used by:  Macro Box,  Pop Macro,  Macro Player

~2 *Disk*:\LABLINK4\PROJECT\ *ProjectName* \BMP
The path contains all BMP files of the project
BMP file path should be: ~2\xxxxxxxx.BMP
Used by:  BMP Button,  ShowBMP

~3 *Disk*:\LABLINK4\PROJECT\ *ProjectName* \WMF
WMF file path should be: ~3\xxxxxxxx.WMF
Used by:  WMFButton,  ShowWMF

~4 *Disk*:\LABLINK4\PROJECT\ *ProjectName* \WAV
WAV file path should be: ~4\xxxxxxxx.WAV
Used by:  WAV Player,  Alarm WAV Player

~5 *Disk*:\LABLINK4\PROJECT\ *ProjectName* \TXT
TXT file path should be:~5\xxxxxxxx.TXT
Used by:  Memo Box,  Log Box

~6 *Disk*:\LABLINK4\PROJECT\ *ProjectName* \DAT
Data file path should be:~6\xxxxxxxx.DAT
Used by:  Data Trend