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Changing the Color and Transparency of HMI Elements during Runtime

SIMATIC WINCC V7.0 to V7.3

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1 Color Display in WinCC

In WinCC 7.0 and higher the colors consist of 32-bit values. Transparency of the colors is possible. This is achieved by influencing the alpha channel.
In the active WinCC Runtime you can change the colors of objects if this has been configured beforehand. Object components which can be changed are, for example, background color, frame color and text color.

Below we present two options for changing the color of objects using scripts.

- **Assign colors from a central color palette**
  WinCC 7.0 and higher enables you to create your own color palette in addition to the default style colors. You can create 10 color palettes of 20 colors each specifically for a project.
  Scripts are used to access the colors in the color palette and assign the object color (text color, for example).
  This procedure is suitable for frequent use of colors and if the color is to be changeable centrally, in other words, after changing a color in the palette, the object color (text color, for instance) assigned to that palette color changes too.
- **Specify colors with numerical values**
  WinCC 7.0 and higher enables you to use scripts to create a color value and then assign that color value to an object color (text color, for example).
  This procedure is suitable for when color is seldom used and changes to the style colors or color palette are not to influence the colors created.

The scripts used here are available at the relevant point in the description and in the .txt file available for downloading on the entry page.

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2 Requirements

2.1 Disable Global Color Scheme

In order to change the colors of an object, the "Central color scheme" property must be disabled. You can set this property in the Graphics Designer.

Table 2-1

No.	Procedure
1.	Open the Graphics Designer.
2.	Right-click the relevant project and click "Properties".
3.	Click the "Properties" tab, then "Button" and finally "Display".
4.	In the detail window you can change the property from "yes" to "no" with a double-click in the "Static" column next to the attribute.

2.2 Change the WinCC Style

If the "WinCC style" attribute is available in the object, then you must also change the "WinCC style" attribute.

Table 2-2

No.	Procedure
1.	Open the Graphics Designer.
2.	Right-click the relevant project and click "Properties".
3.	Click the "Properties" tab, then "Button" and finally "Display".
4.	In the detail window you change the property with a double-click in the "Static" column next to the attribute.
5.	In the selection field that opens you selected "User-defined".

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3 Implementation

Below we present a solution for the script languages C and Visual Basic Script (VBS) for each of the versions named.

3.1 Configure Using C Scripts

In the example below the background color of a WinCC screen is changed during Runtime by clicking a button.
The C scripts used in this example are available at the relevant point in the description.
You can also use the scripts other than with the example.

Additional information about programming with C in WinCC is available in the manual here ("ANSI-C for Creating Functions") and here ("ANSI-C Function Descriptions").
The manual also includes other color-independent properties of objects which can be changed during Runtime. Furthermore there is also an extensive list of other script examples.

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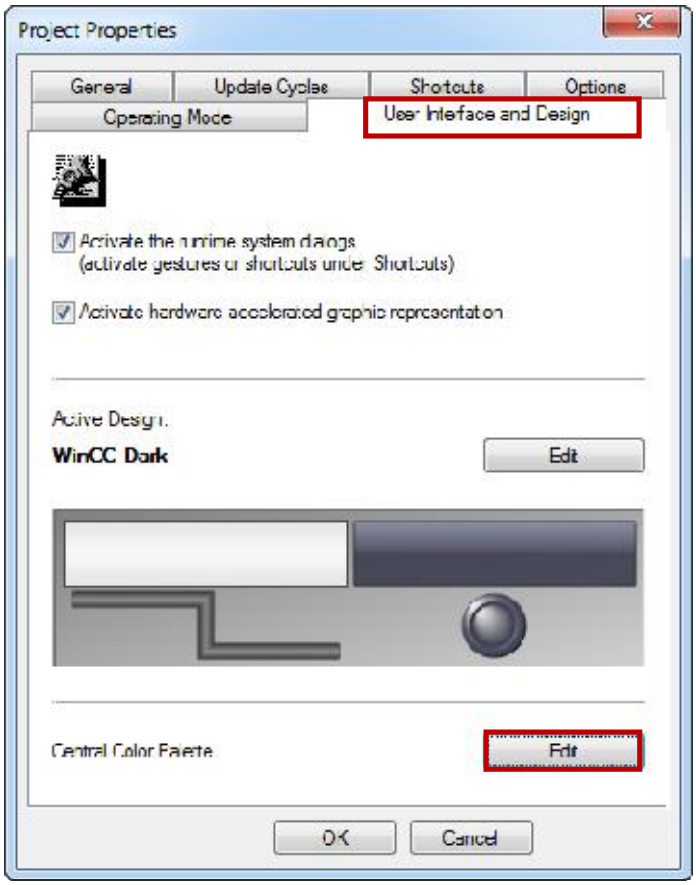
3.1.1 Assign Colors from a Central Color Palette

Create and fill a project-specific color palette

Table 3-1

No.	Procedure
1.	In the WinCC Explorer you right-click the project name in the tree view and then click "Properties" to open the Project Properties.
2.	Select the "User Interface and Design" tab. Click "Edit" next to "Central Color Palette". 

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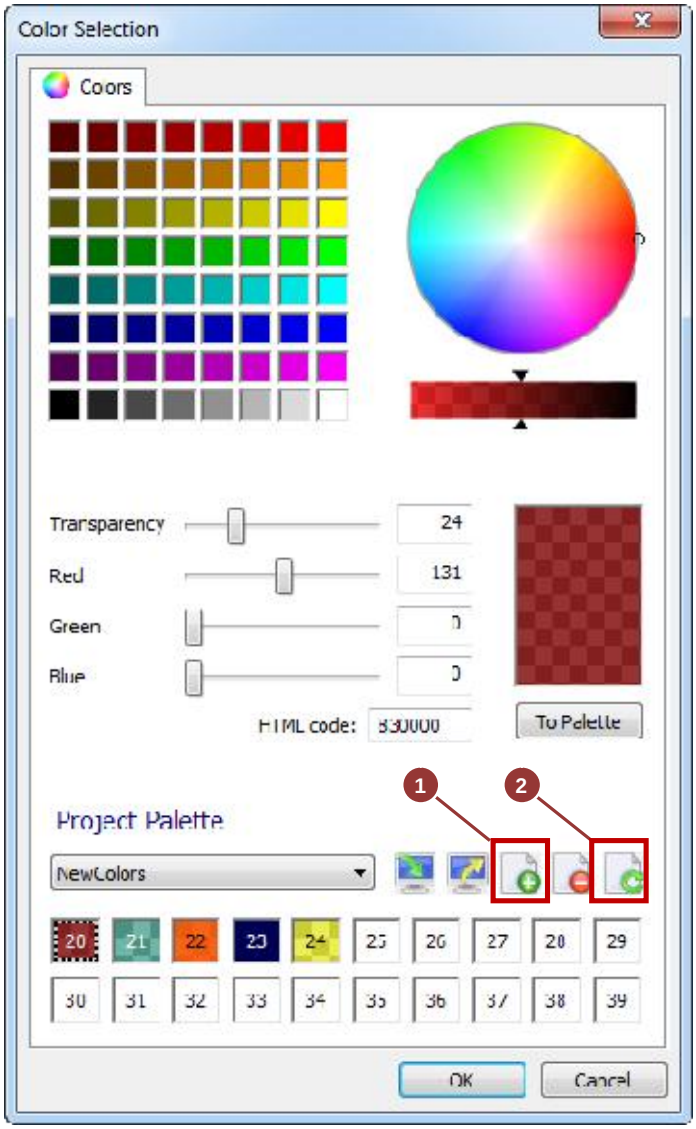
No.	Procedure
3.	Click the "Add color palette" button (1) and then the "Rename color palette" button (2). 
4.	Enter a name for the project palette (New Colors, for example).

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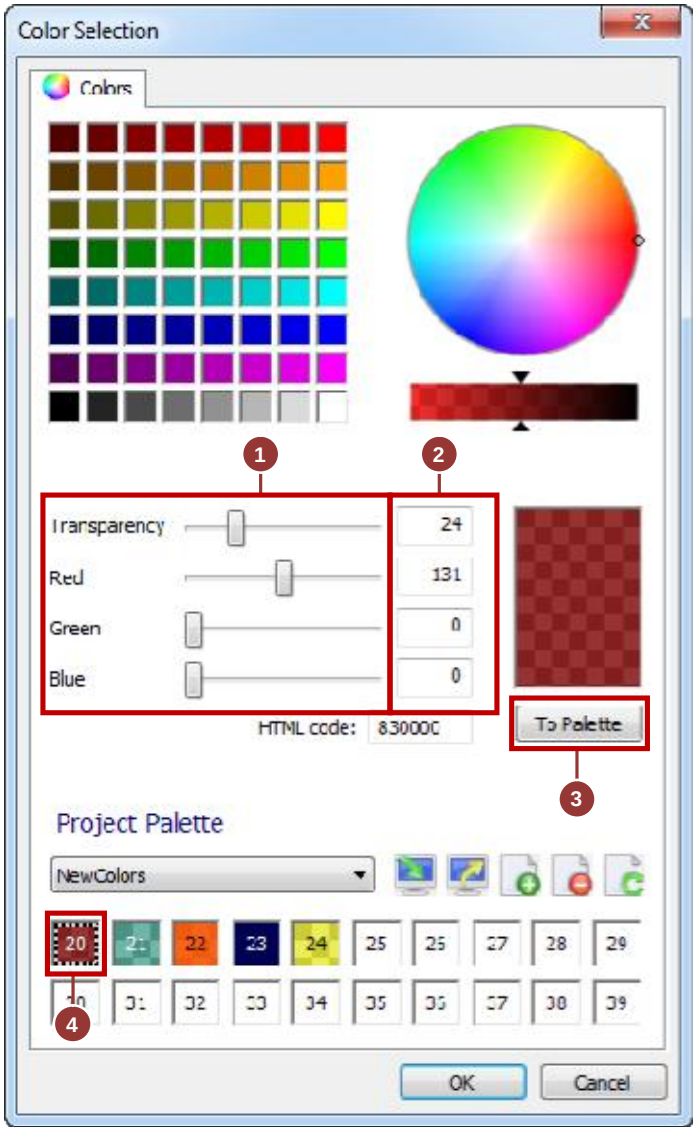
No.	Procedure
5.	Set the slider controls (Transparency, Red, Green and Blue) to the colors required (1), or enter the RGB values and transparency in the relevant input fields (2). Click the "To Palette" button (3) and then the number in the color palette (4). 
6.	Confirm both dialog boxes with "OK".

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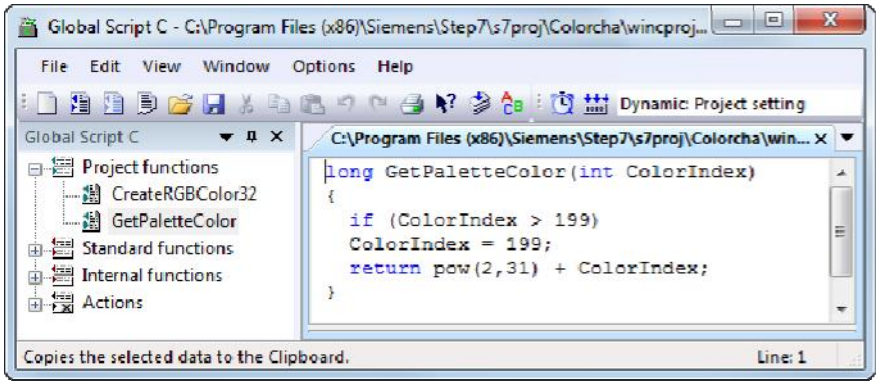
Add a global C script

Table 3-2

No.	Procedure
1.	In the WinCC Explorer you right-click "Global Script" in the tree view and then click "Open C Editor".

2.	In the menu bar you click "File" > "Create New Project Function" and replace the function template with the following C script (**C script 1a**):
	
	`long GetPaletteColor(int ColorIndex)`
	`{`
	`  if (ColorIndex > 199)`
	`  ColorIndex = 199;`
	`  return pow(2,31) + ColorIndex;`
	`}`
	
	 

3.	Click "File" > "Save", enter a name and confirm with "OK".
4.	Confirm the settings with "Yes" and close the C editor.

Create trigger for color change and assign a color

Table 3-3

No.	Procedure
1.	In the WinCC Explorer you click "Graphics Designer" in the tree view and double-click your project picture to open it.
2.	Add a button to the picture from the object palette by selecting "Standard" > "Windows Objects" > "Button".
3.	Right-click the inserted button and then click "Properties". The Properties dialog opens.
4.	Select the "Event" tab and click "Button" > "Mouse".
5.	Right-click in the "Action" column in the "Mouse click" line and then click "C action...".
6.	Replace the commented-out (green) lines with the following C script (**C script 1b**): `SetBackColor(lpszPictureName, "Testobject", GetPaletteColor(4));`

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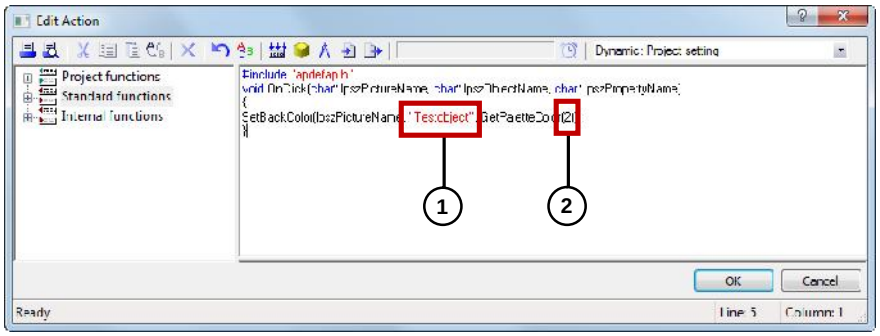
No.	Procedure
7.	• Replace the name "Testobject" (1) with the name of the object whose background is to be changed. • Replace the number 4 with the new background color from the project-specific color palette (2 in the example)(2). The value corresponds to the associated number of the color in the color palette. 
8.	Confirm the dialog with "OK", close the Properties dialog and close the picture.

Note If you do not use a button, the script must be called from Table 3-3, No.6.

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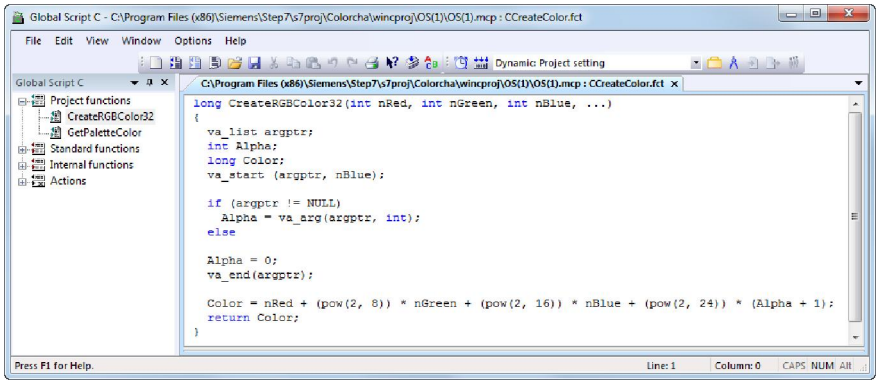
3.1.2 Specify Colors with Numerical Values

Add a global C script

Table 3-4

No.	Procedure
1.	In the WinCC Explorer you right-click "Global Script" in the tree view and then click "Open C Editor".

2.	In the menu bar you click "File" > "Create New Project Function" and replace the function template with the following C script (**C script 2a**):
	
	`long CreateRGBColor32(int nRed, int nGreen, int nBlue, ...)`
	`{`
	`va_list argptr;`
	`int Alpha;`
	`long Color;`
	`va_start (argptr, nBlue);`
	
	`if (argptr != NULL)`
	`  Alpha = va_arg(argptr, int);`
	`else`
	`  Alpha = 0;`
	`  va_end(argptr);`
	`  Color = nRed + (pow(2, 8)) * nGreen + (pow(2, 16)) * nBlue + (pow(2, 24)) * (Alpha + 1);`
	`  return Color;`
	`}`
	
	 

3.	Click "File" > "Save", enter a name and confirm with "OK".

Create trigger for color change and assign a color

Table 3-5

No.	Procedure
1.	In the WinCC Explorer you click "Graphics Designer" in the tree view and double-click your project picture to open it.
2.	Add a button to the picture from the object palette by selecting "Standard" > "Windows Objects" > "Button".
3.	Right-click the inserted button and then click "Properties". The "Properties" dialog opens.

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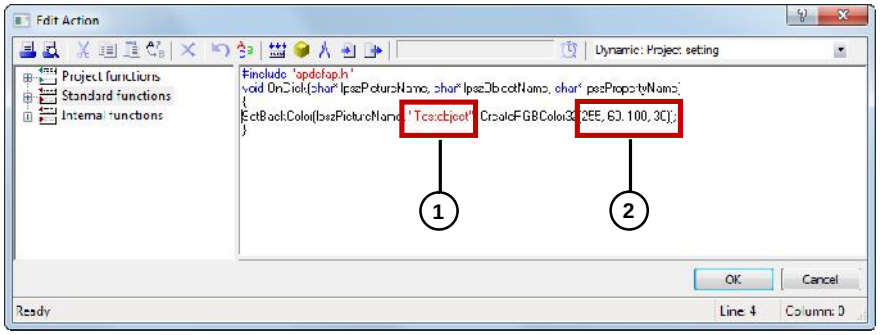
No.	Procedure
4.	Select the "Event" tab and click "Button" > "Mouse".
5.	Right-click in the "Action" column in the "Mouse click" line and then click "C action...".
6.	Replace the commented-out (green) lines with the following C script (**C script 2b**): SetBackColor(lpszPictureName, "Testobject", CreateRGBColor32(255, 60, 100, 30));
7.	• Replace the name "Testobject" (1) with the name of the object whose background is to be changed. • Replace the values 255, 60, 100, 30 with the RGB values and transparency of the color required. (2) The order is the following: red, green, blue, transparency. 
8.	Confirm the dialog with "OK", close the Properties dialog and close the picture.

Note If you do not use a button, the script must be called from Table 3-5, No.6.

3.2 Configure Using C Scripts

In the example below the background color of a WinCC screen is changed during Runtime by clicking a button.
The C scripts used in this example are available at the relevant point in the description.
You can also use the scripts other than with the example.

Additional information about programming with C in WinCC is available in the manual here ("VBS for Creating Functions") and here ("VBS Reference").

The manual also includes other color-independent properties of objects which can be changed during Runtime. Furthermore there is also an extensive list of other script examples.

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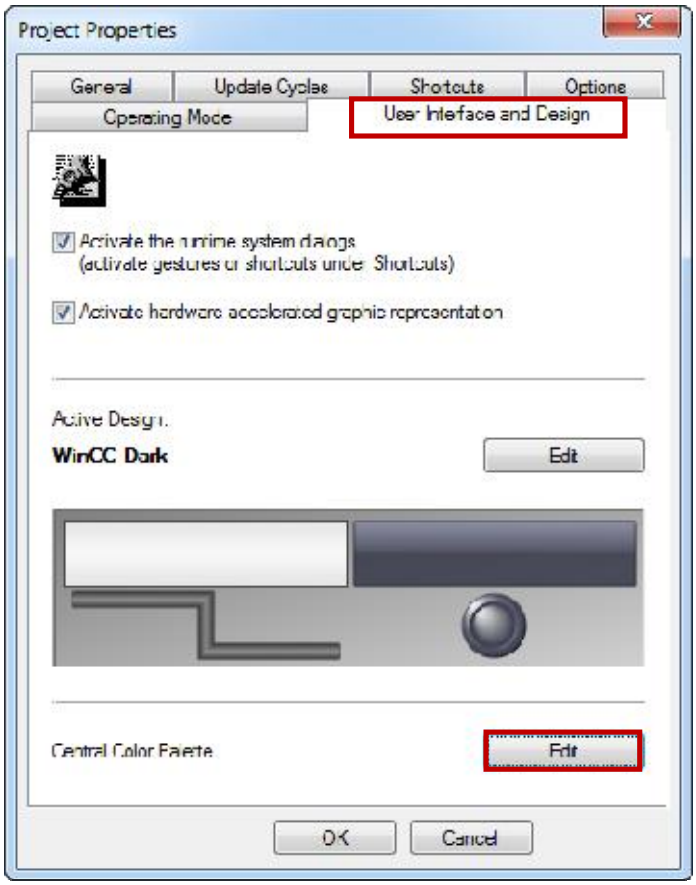
3.2.1 Assign Colors from a Central Color Palette

Create and fill a project-specific color palette

Table 3-6

No.	Procedure
1.	In the WinCC Explorer you right-click the project name in the tree view and then click "Properties" to open the Project Properties.
2.	Select the "User Interface and Design" tab. Click "Edit" next to "Central Color Palette". 

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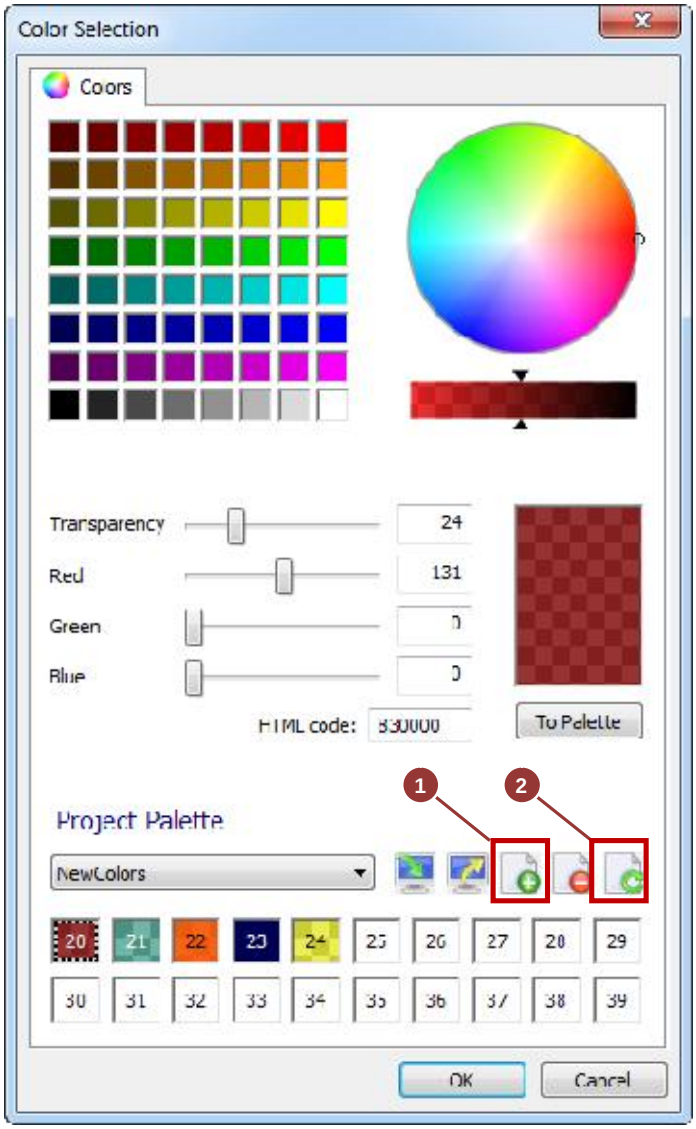
No.	Procedure
3.	Click the "Add color palette" button (1) and then the "Rename color palette" button (2). 
4.	Enter a name for the project palette (New Colors, for example).

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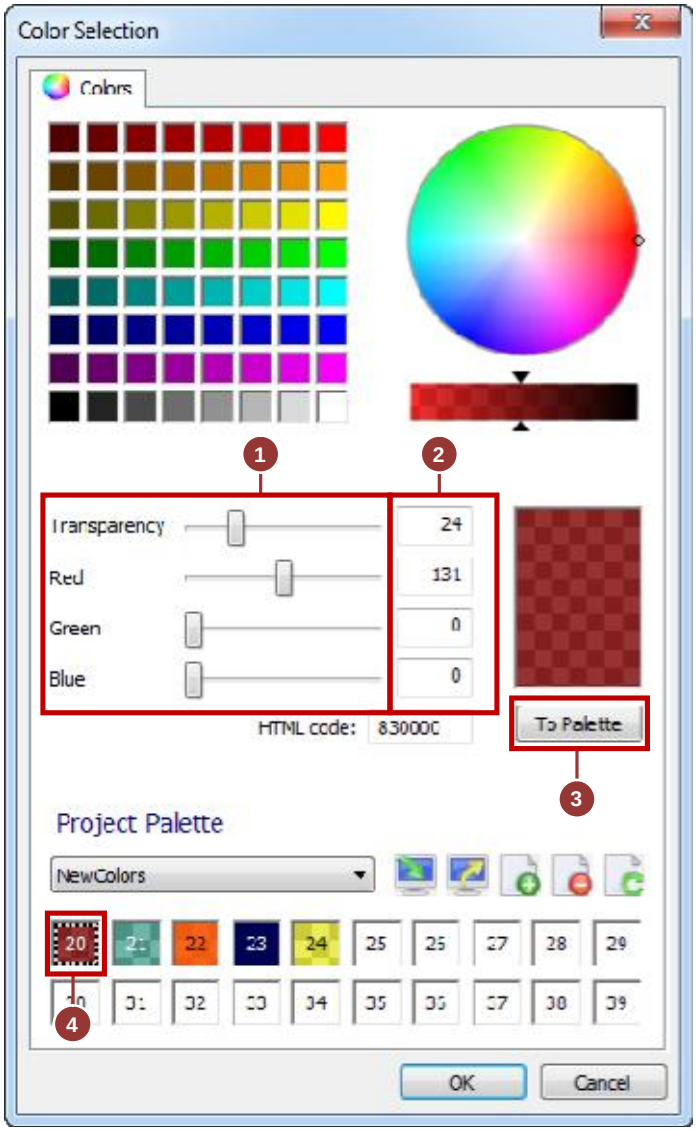
No.	Procedure
5.	Set the slider controls (Transparency, Red, Green and Blue) to the colors required (1), or enter the RGB values and transparency in the relevant input fields (2). Click the "To Palette" button (3) and then the number in the color palette (4). 
6.	Click the "To Palette" button and then the number in the color palette (2, for example).
7.	Confirm both dialog boxes with "OK".

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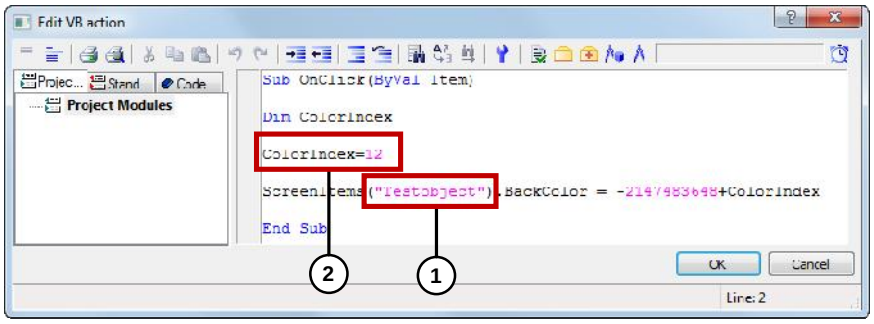
Create trigger for color change and assign a color

Table 3-7

No.	Procedure
1.	In the WinCC Explorer you click "Graphics Designer" in the tree view and double-click your project picture to open it.
2.	Add a button to the picture from the object palette by selecting "Standard" > "Windows Objects" > "Button".
3.	Right-click the inserted button and then click "Properties". The Properties dialog opens.
4.	Select the "Event" tab and click "Button" > "Mouse".
5.	Right-click in the "Action" column in the "Mouse click" line and then click "VBS action...".
6.	Replace the commented-out (green) lines with the following VB script (**VB script 1**): Dim ColorIndex ColorIndex=4 ScreenItems("Testobject").BackColor=-2147483648+ColorIndex • Replace the name "Testobject" (1) with the name of the object whose background is to be changed. • Replace the number 4 with the new background number from the project-specific color palette (12 in the example)(2). The "ColorIndex" variable corresponds exactly to the number of the color in the color palette. 
7.	Confirm the dialog with "OK", close the Properties dialog and close the picture.

Note If you do not use a button, the script must be called from Table 3-7, No.6.

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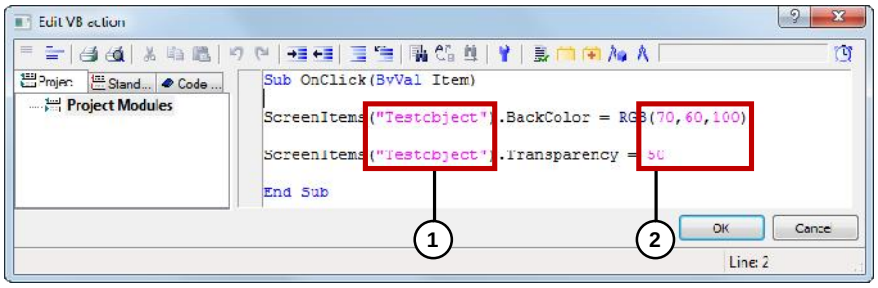
3.2.2 Specify Colors with Numerical Values

Create trigger for color change and assign a color

Table 3-8

No.	Procedure
1.	In the WinCC Explorer you click "Graphics Designer" in the tree view and double-click your project picture to open it.
2.	Add a button to the picture from the object palette by selecting "Standard" > "Windows Objects" > "Button".
3.	Right-click the inserted object and then click "Properties". The "Properties" dialog opens.
4.	Select the "Event" tab and click "Button" > "Mouse".
5.	Right-click in the "Action" column in the "Mouse click" line and then click "VBS action...".
6.	Replace the commented-out (green) lines with the following VB script (**VB script 2**): ScreenItems(“Testobject“).BackColor=RGB(70,60,100) ScreenItems(“Testobject“).Transparency=50
7.	• Replace the name "Testobject" (1) with the name of the object whose background is to be changed. Replace the values 255, 60, 100, 30 with the RGB values and transparency of the color required. (2) The order is the following: 1st line: red, green, blue; 2nd line: transparency.  **Note** To obtain the color code of the desired color you can use the slider controls to set the color in the color palette. The associated color code is given under the slider controls in the "HTML code" output field. The color code is set in the "RRGGBB" order (red, green blue) and be applied as such. You do not have to store the new color in the palette.
8.	Confirm the dialog with "OK", close the Properties dialog and close the picture.

Note If you do not use a button, the script must be called from Table 3-8, No.6.

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