

10 Connector Designer

About this Section

In this section you will learn how to create your own custom connectors and edit them using the optional software connector designer.

Note that Connector Designer is sold as an optional software and activated with a special license. Connector Designer is embedded in the main CableEye software for easy access and flexibility. Call CAMI Research to order your license.

You will learn how to import custom graphics for your connectors and learn great tips on how to pre-process your pictures to import better quality connector graphics.

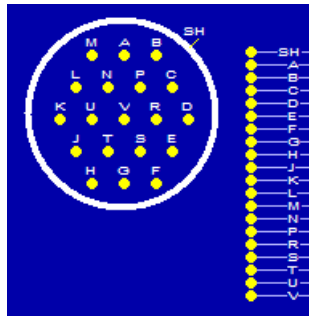
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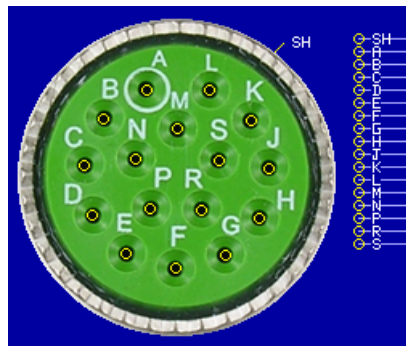
The Optional Connector Designer software, or connector editor, (catalog Item 707) lets you define connector graphics and characteristics and add them to the CableEye connector database. CableEye ships with a large connector database, along with facilities for generating regular connector types (dual-row headers, D-sub, pin matrix) directly within the program. However you may have connectors that don't appear in the standard CAMI library and cannot be properly represented by one of the generic types. In these cases, you can use this program to easily create connector definition files that augment the CAMI library.

10.1 Connector Designer Capabilities

1 - The graphics can either be in wire-frame form, where the circular shell graphic is automatically generated by CableEye



or the graphics can be supplied by you, where the reference pins are placed by you after you import a connector graphic from a bitmap (.BMP) or Portable Network Graphics (.PNG) file:




2 - The software creates and edits connector definitions in “reference pin” format. That is, the drawing is comprised of two parts: reference pins and pinouts.

The reference pins appear inside the connector graphic. You determine the position and labeling of these pins.

The pinouts are automatically placed and arranged by CableEye just to the outside of the shell graphic and reference pins. These attach to the cable wiring when rendered in a cable drawing.

3 - You determine the name of the connector, it's gender, the pin labels, as well as the shell graphic.

10.2 Designing a New Connector (Quick Guide)

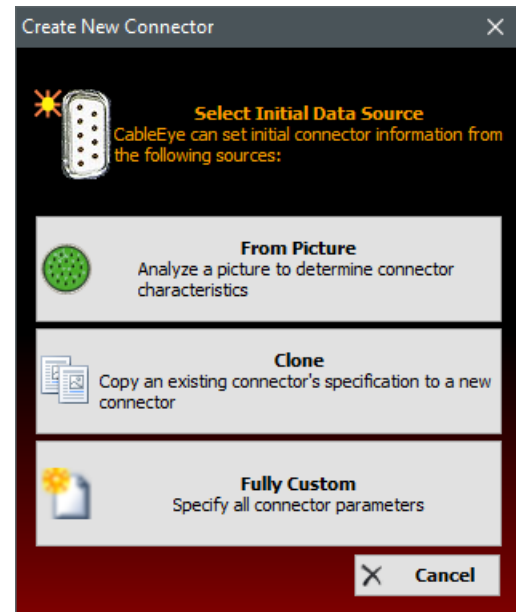
To create a new connector definition file and add it to your database, click on the Create New button  on the editor toolbar. The editor then displays the dialog box shown on the right.

Click on the button that most fully describes what you want to do:

From Picture - creates new connector from image. Import a PNG image of your connector. Then continue to the new connector specification window to fill in additional connector information.

Clone - create a new connector from an existing one, then go to the new connector specification window to fill in the new connector information.

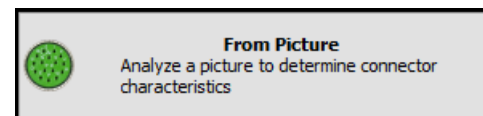
Fully Custom - Go to the new connector specification window to fill in basic connector information from which to create the new connector file.



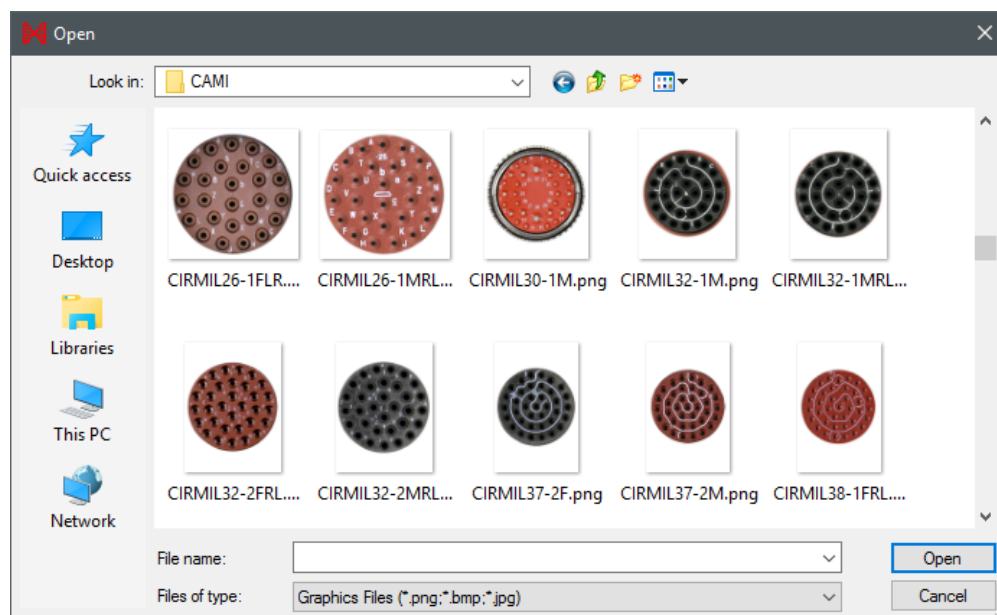
10.2.1 Create Connector from Picture

Create a new connector file from a picture using the following procedure.

1) Click the **Create Connector** button  on the toolbar, and then **select the From Picture button**.



2) **Select the graphic file** you wish to edit from the Open File dialog and **double-click it or press the Open button**:



We recommend that you use PNG (Portable Network Graphics) formatted image files. These are heavily compressed and also contain an “alpha channel” that lets you make unwanted parts of the background invisible so that they don’t show up in cable drawings.

3) Fill in the fields in the New Connector Specification window.

Connector Type - This represents the basic shape of the connector, like “circular”, “rectangular”, “custom” or any name that you might want to assign to keep your connector organized by that category.

Connector Name - The actual name of the connector goes here. Some examples will be “DB25”, “CIR10”, etc.

Pins - Set the Pins field to the number of unique pins that the connector has. If the connector has a shell connection, do not include this in the pin count. This field is automatically filled in with the numeric portion of the Connector Name text you entered above; you can change this value if the editor’s pin count assumption is incorrect.

Has Shell - If, and only if, the connector has a shell connection, then check the Has Shell box.


Gender - Select the connector gender by checking the Male or Female radio button. You must select one. Once you have selected the gender, the editor automatically fills in the Connector Unique ID and Name fields:



The Unique Identifier field determines the identification for your connector. It is, in fact, the name of the file that the connector information will be stored in. The ID does not appear on any screens or printed reports, but it is referred to internally in CableEye cable files and pin maps. Therefore it does not have to be a representative name. However, it must be unique within the connector library.

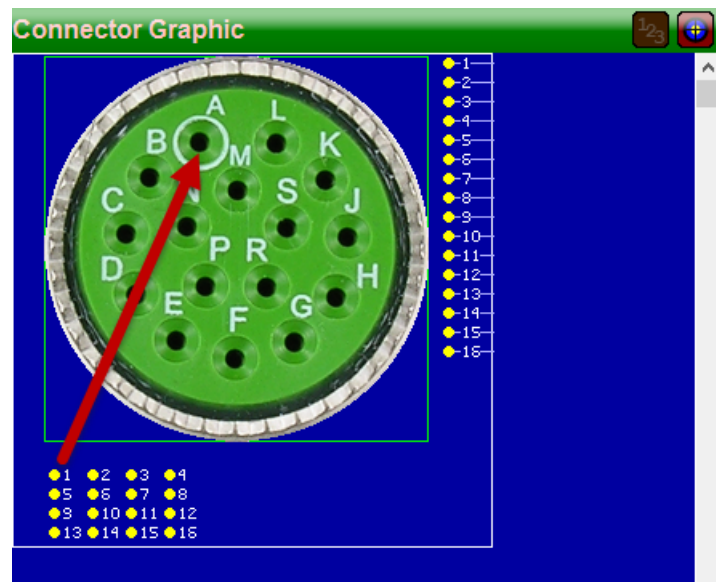
Full Name is the name of the connector as it will appear on the CableEye cable graphics screen and in printed reports.

Short Name is the abbreviated name of the connector. It appears in netlist column headings and as the default connector designator in fully-specified pin labels (e.g. CableEye may refer to pin 17 of the CX23 Male connector as “CX23M:17”).

4) Finally, click the Create button to create a new connector definition and begin editing it.

5) After clicking create, you will see the connector displayed in the screen, with the reference pins at the bottom of the image. You can now start to manually **move the pins to the required position**. You can also use the AutoDrop function by clicking the AutoDrop button .

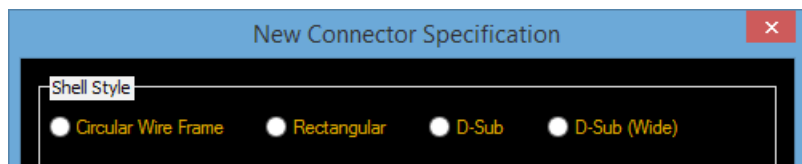
6) When you are done positioning all the pins, **click the Save Source** button  to save your changes, and the **Save All** button  to save your changes and add the connector file to your CableEye connector library.



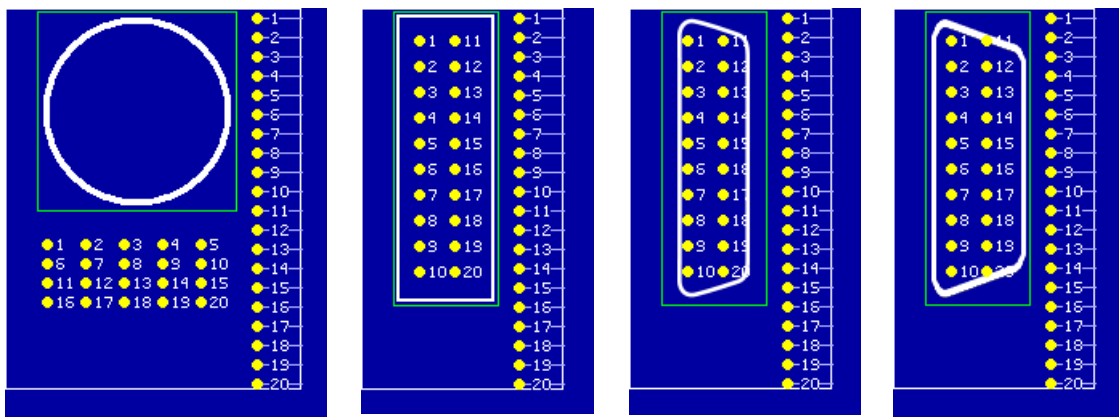
10.2.2 Create Fully Custom Connector

A fully custom connector can be created without custom graphics. It is basically the same process as creating a connector from a picture, but this time we use a generic wire frame defined by the software.

Connector Designer offers 4 shell styles to choose from: Circular Wire Frame, Rectangular, D-Sub and D-Sub Wide.



The software automatically generates the following graphics for 20-pin connectors, for each one of the shell styles:



From this point, all the steps are identical as in creating a connector from a picture. When you are done, simply click the Save buttons to generate your connector and make it available to the CableEye database.

10.3 Connector Designer Windows

You access the connector editor by pressing the Edit button on the main toolbar in the left side of the screen.

This button is a toggle. Pressing it once displays the main connector editor window. Pressing it again closes the editor and reverts to your previous CableEye window state.

Note: CableEye only shows this button and enables connector designer access if you have a valid license for the Connector Designer software. If you did not purchase the Connector Designer with your unit, you can obtain the license (catalog Item 707) separately and upgrade your license file.



After clicking the EDIT button shown in the previous screen, a new window opens as shown below:
















There are 4 sections in the Connector Designer as highlighted above, plus the editor Toolbar located at the top of the Connector Designer screen. Each one of these sections will be explained along with a couple of full examples from start to end on how to create a connector.

10.3.1 Editor Toolbar

The Connector Designer Editor Toolbar appears at the top of the pane and contains the following items:



The following table describes the function executed when you click on one of these buttons:

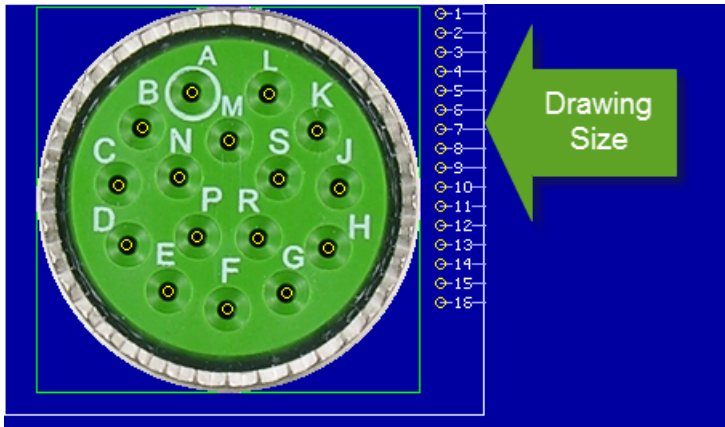
	Create New	Starts the New Connector dialog to create or clone a new connector
	Open Existing	Loads an existing connector file into the editor
	Save Source Only	Saves changes you have made to the connector definition to the source (XML) file.
	Save Source and Connector	Saves changes you have made to the connector definition to the source (XML) file and also compiles the connector information and creates the connector file.
	Truncate Labels	Truncates labels longer than 3 characters to their last 3 characters and prepends a tilde (~).
	Adjust Offsets	Adjust the space on the screen allocated to the connector to account for label length and placement.
	Full Screen	Expands the Connector Designer pane so that it covers the entire screen.
	Undo	Restores the last position on the moved pins. Works only with single pin movement, not with multiple pins.
	Redo	Reverts the last undo. Works only with single pin movement, not with multiple pins.
	Clone Connector	Clones the current loaded connector. A dialog window will appear asking for the new connector name.
	Delete Connector	Deletes the current loaded connector.
	Toggle Inverted	Change between the Normal and Inverted view of the connector. The “Normal” view is the view into the connector, the “Inverted” view is the view out of the connector.
	Toggle Left/Right	Change between view of the connector as it will appear on the left and right sides of a cable drawing.

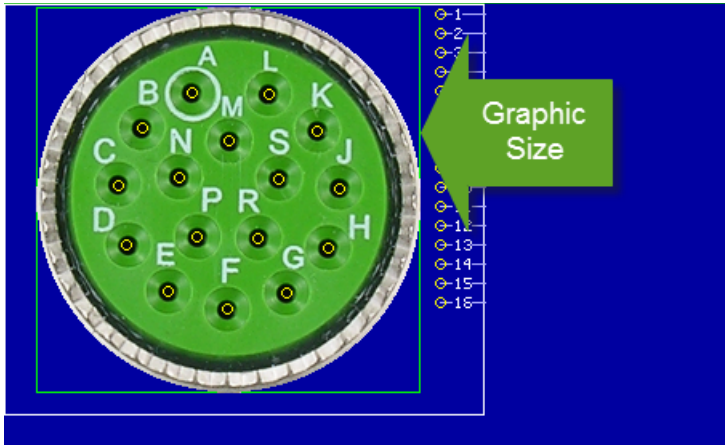
10.3.2 Connector Graphic Properties Window

The graphic properties window appears in the left side pane of the editor and allows you to change general connector attributes like gender, name, pin shapes, etc. The Properties menu has been split in half in the screen shots in the next page:

Identification	
Type	CIR12-2
Full Name	CIR12-2 Female
Short Name	CIR12-F2
Gender	Female
<input type="checkbox"/> Add or Remove Pins	
Pins	12
Shells	1
Appearance	
<input checked="" type="checkbox"/> Drawing Size	
Width	180
Height	126
<input checked="" type="checkbox"/> Graphic Size	
Width	100
Height	100
Graphic Offset	
X	20
Y	2

<input checked="" type="checkbox"/> Show Reference Pins	
Pin Type	Circle
Pinout Columns	Single
Shells	
Normal	
Shell Type	Custom
Graphic File	CIR20-GE-SMALL.png
<input type="checkbox"/> Scale image to graphic area size	
Inverted	
Shell Type	Custom
Graphic File	CIR20-GE-SMALL.png
<input type="checkbox"/> Scale image to graphic area size	
<input type="checkbox"/> Flip pins vertically	
<input type="checkbox"/> Flip pins horizontally	
<input type="checkbox"/> Place pins manually	

Identification	
Type	The connector class name is a short mnemonic for the connector. Typically it is 2 or 3 letters followed by the number of pins, e.g., “DB25”.
Full Name	Is the expanded full, formal name of the connector, which usually includes the gender, e.g., “DB25 Female”.
Short Name	The abbreviated name for the connector, which is generally the Class name and a single letter gender abbreviation (M or F), e.g., “DB25F”.
Gender	Connector gender (Male, Female) specified in a dropdown:
Add or Remove Pins	You can change the number of pins in a connector by enabling this option. By default, you can’t change the number of pins after the connector has been created, however if you haven’t use the connector in an existing cable, you can change the number of pins without problems.
Pins	Connector pin count.
Shells	Shell count (1 or 0).
Appearance	
Drawing Size	Height and width (in pixels) required by the connector. This includes the graphic itself, pinouts, and labels. It is shown by the white outline in the graphic display window: <div style="text-align: center;">  </div>

Graphic Size	<p>Height and width (in pixels) required by the connector graphic only. It is shown by the green outline in the graphic display window:</p>  <p>Note that if you are using an automatically drawn wireframe graphic, the Graphic Size parameter determines the size of the circle.</p>
Graphic Offset	X and Y offset (in pixels) from the top left of the drawing area to the connector graphic itself.
Show Reference Pins	You can choose to hide or show the reference pins in the connector graphic.
Pin Type	Determines the reference pin shape in a dropdown box (circle, filled circle, rectangle, etc.). This is a global setting that affects all the pins. You can change individual pin types in the tools window.
Pinout Columns	Determines by a dropdown box whether the pinout pins are displayed in a single column or two columns. Two columns is a little more vertically compact but a little less readable, so you generally use it only for connectors with high pin counts.
Shells	
Normal	Shell graphics description for the “normal” view, which is the view into the connector.
Inverted	Shell graphics description for the “inverted” view, which is the view out of the connector.
The following properties apply to the Normal and Inverted views separately	
Shell Type	Dropdown box selecting the type of graphic to draw. Select Circular for a simple wire frame circle inscribed within the Graphic Size rectangle described above. Select Custom to specify a PNG or BMP file that contains a picture of the connector graphic to display.
Graphic File	If you specify Custom for Shell Type, specifies the BMP or PNG file containing the connector graphic to display.
Scale image to graphic size	If you specify Custom for Shell Type, specifies whether the picture image should be reduced (scaled) to the size specified in the Graphic Size property.

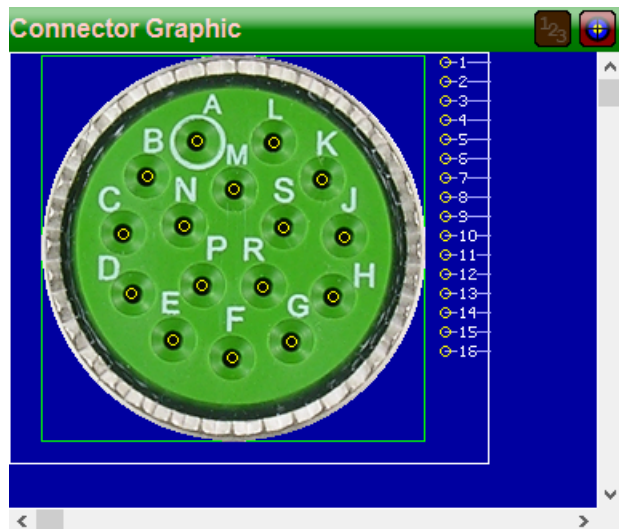
10.3.3 Connector Graphic Window



The connector graphic window appears at the top right of the editor panel and contains an image of the connector as it will appear in cable drawings.

You can use this window to

- select pins by clicking on them
- place reference pins by dragging and dropping them
- place reference pins by clicking on them and then using the keyboard up/down/left/right keys then moving them into position

You can also use the buttons at the top to change connector views (right/left, normal/inverted) and start pin placement sequences:



	AutoAssign	Starts the AutoAssign function. This function assigns pin numbers to reference pin locations as you sequentially click each pin. You use this function after you create a new connector where you have let the machine vision library automatically determine pin locations (but can't assign pin numbers to those locations).
	AutoDrop	Starts the AutoDrop function, which sequentially places pins on the connector graphic as you click on a location on the drawing. You use this function after you create a connector, but the pin locations have not been determined.

10.3.4 Connector Pin List Window

The Pin Definitions window appears at the bottom right of the Connector Designer panel and shows you reference pin information in tabular form:

Using this window you can:

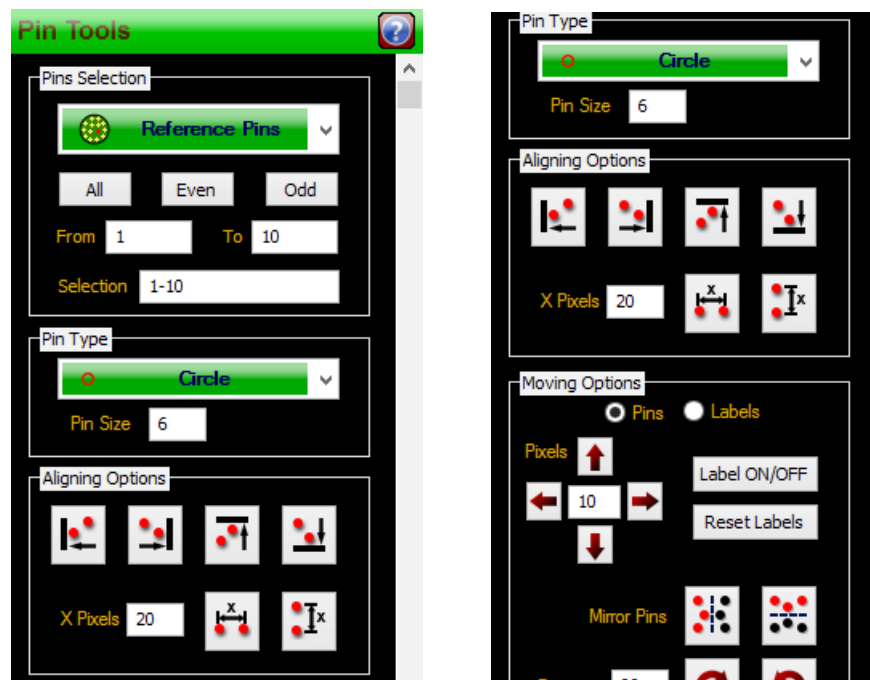
- Change the label of the pin (the Label column)
- Indicate whether or not CableEye should display a label near the reference pin (the Show Label column)
- Change the location of the reference pin on the screen by modifying the coordinates in the X and Y columns (note that the coordinates are relative to the upper left of the connector graphic area)
- Change the location of the label for a reference pin by modifying the contents of the XOfs and YOfs columns (the coordinates for each label are relative to the center of the corresponding reference pin).


	Label	X	Y	Label XOfs	Label YOfs	Show Label	
1	1	97	53	8	0	<input type="checkbox"/>	
2	2	66	75	8	0	<input type="checkbox"/>	
3	3	51	111	8	0	<input type="checkbox"/>	
4	4	56	148	8	0	<input type="checkbox"/>	
5	5	82	177	8	0	<input type="checkbox"/>	
6	6	119	188	8	0	<input type="checkbox"/>	
7	7	156	178	8	0	<input type="checkbox"/>	
8	8	182	150	8	0	<input type="checkbox"/>	
9	9	189	113	8	0	<input type="checkbox"/>	
10	10	175	77	11	0	<input type="checkbox"/>	
11	11	145	54	11	0	<input type="checkbox"/>	
12	12	120	83	11	0	<input type="checkbox"/>	
13	13	89	106	11	0	<input type="checkbox"/>	
14	14	100	143	11	0	<input type="checkbox"/>	
15	15	138	144	11	0	<input type="checkbox"/>	
16	16	151	107	11	0	<input type="checkbox"/>	

10.3.5 Connector Pin Tools

The pin tools window appears at the right side of the Connector Designer panel and allows you to modify properties of several pins at the same time. Use this window to select and modify a range of pins in the connector. This is very useful when you are designing complex connectors with at least 10 pins or more.

The Pin Tools screenshots have been splitted in 2 in the following images:




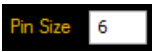
Pins Selection:	
 Reference Pins	Selects between Reference Pins or PinOut Pins
All	Selects all the pins in the connector, including the Shell if present
Even	Selects only the even pins in the connector
Odd	Selects only the odd pins in the connector








The From and To input boxes, allow to select a custom range of pins.



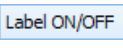
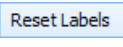

At any time, when a range of pins is selected, the range will be shown and updated in the Selection input box.





A manual selection can be made directly in the Selection input box. To do this, use a comma “,” to select individual pins or a dash “-” to select a range of pins. A combination of the 2 characters is possible as well. Here are some examples:

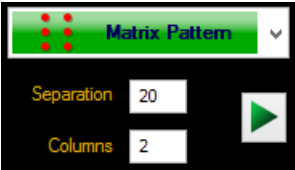
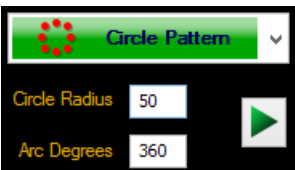
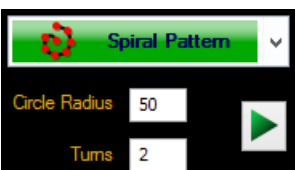
- 1-10 Selects pins from 1 to 10
- 1,4,5 Selects pins 1, 4 and 5 only
- 1-3,5,8-10 Selects pins 1,2,3,5,8,9,10
- SH,1,5 Selects pins SH,1 and 5 only

Pin Type:	
	<p>You can change the type of pin for individual selected pins. Just select a different type from the pull down menu, and the selected pins will change automatically.</p> <p>The options are: Circle, FilledCircle, Rect, FilledRect, HRect, HRectFilled, VRect, VRectFilled and Ring</p>
	<p>You can also change the size of the selected pins. The default size of a pin is 6 pixels wide. You can combine different sizes of pins in those complex connectors with different terminal sizes.</p> <p>Just type in the new size and click anywhere outside the box, and the pins will be re-sized automatically.</p>

Aligning Options:	
	<p>Aligns the selected pins to the left. It finds the most left pin and aligns the rest of the pins to it.</p>
	<p>Aligns the selected pins to the right. It finds the most right pin and aligns the rest of the pins to it.</p>
	<p>Aligns the selected pins to the top. It finds the most top pin and aligns the rest of the pins to it.</p>
	<p>Aligns the selected pins to the bottom. It finds the most bottom pin and aligns the rest of the pins to it.</p>
	<p>Separates the selected pins horizontally. It uses the lowest numbered pin as the left origin and then moves the following pins x pixels to the right.</p>
	<p>Separates the selected pins vertically. It uses the lowest numbered pin as the top origin and then moves the following pins x pixels down.</p>
	<p>The pixels separation between the selected pins for the 2 previous tools.</p>

Moving Options:	
	<p>You can move the labels of the selected pins if you need to. This will move the label only, keeping the pin graphic in the same position. Just click on the Labels radio button to do this and use the moving arrows to move the labels.</p>
	<p>The moving arrows allow you manually move the selected pins or labels to the left, right, top or bottom. The number at the center of the arrows is the amount in pixels that the pins will be moved. You can increase this number to move the pins faster to their final location or make it smaller to move the pins with higher precision.</p>
	<p>Use this button to Show or Hide the labels of the selected pins. This tool is useful in complex connectors, where there are many pins and not enough space to properly show all the labels in the graphic.</p>
	<p>At any time, you can reset the position of the selected pin's labels. The default position of the labels is 12 pixels to the right of the pin.</p>
	<p>Mirrors the selected pins horizontally.</p>


	<p>Mirrors the selected pins vertically.</p>
	<p>Rotates the selected pins clockwise by any amount of degrees specified</p>
	<p>Rotates the selected pins counter-clockwise by any amount of degrees specified</p>
	<p>The amount of degrees to rotate the selected pins</p>

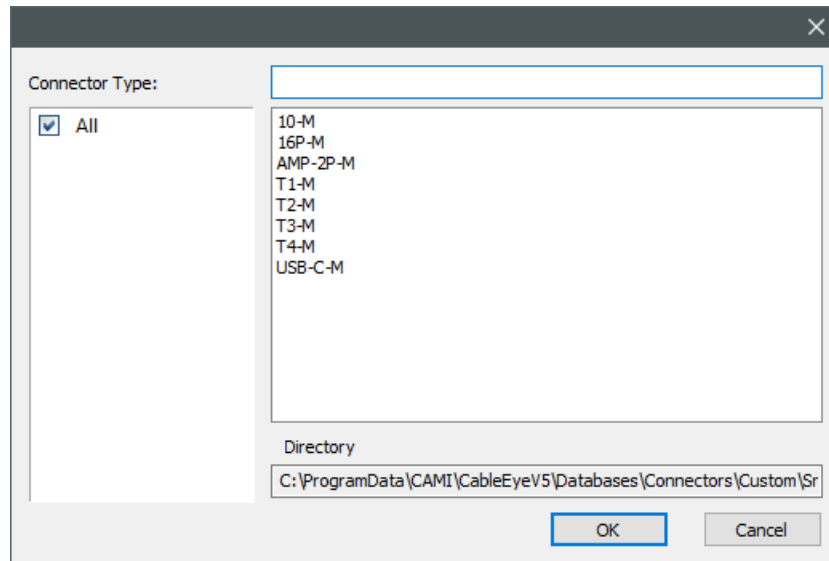
Pattern Options	
<p>Matrix Pattern</p> 	<p>This tool creates a matrix pattern of n number of columns with x separation between pins.</p> <p>Only the selected pins will be included in the creation of the matrix. Just define the separation between the pins, then select the number of columns that you need, and finally click on the green arrow button.</p> <p>The pins will be placed right next to each other until the number of columns is reached, then the next pin will be placed under the first one and so on.</p>
<p>Circle Pattern</p> 	<p>This tool creates a circle or arc pattern with a user defined radius. The default arc is 360 degrees (Full circle).</p> <p>Just select this tool from the drop down menu, then type in the required radius and click the green arrow button.</p> <p>This will create a patter circle with the lowest numbered pin on the top of it. You can easily change the circle size by typing the new value in and clicking the arrow again, until the expected result is achieved.</p>
<p>Spiral Pattern</p> 	<p>This tool creates a spiral with a user defined radius.</p> <p>You can define the number of turns before the pins reach in the center of the spiral. This option creates different spiral shapes, depending on the number of pins selected.</p> <p>Just type in the radius and click the green arrow button to create the spiral.</p>

10.4 Editing and Cloning Connectors

10.4.1 Editing a Connector

You can edit existing connectors that you created with Connector Designer. Please note that standard connectors included with the CableEye library can not be edited or cloned.

To edit a connector, click the Open Existing button  and choose the connector that you want to edit from the list, as shown below. Again, note that only connectors that you created with connector designer will be shown in the list.



Note: If you are planning on saving the connector with a different name after editing it, we recommend you to clone it instead, and then make the changes. Check Cloning a connector in the following section.

You may need to edit an existing connector for several reasons, per example, slightly adjusting pin positions, adding an extra missed pin, changing the pin types, etc. However, make sure to click the two save buttons when you are done editing.

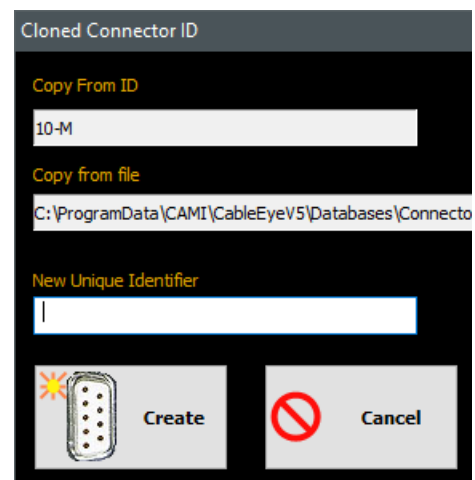
10.4.2 Cloning a Connector



You can clone an existing connector in two different ways.

1. You can click the New Connector button  and select Clone from the options.

A window will open with the list of existing connectors. Once you select the connector that you want to clone click OK and the window displayed on the right will be displayed. Just enter the New Unique Identifier to it and click create.

An identical connector is created and is ready to be edited.



- You can also clone a connector by clicking the Clone Button connector . Note that you have to open the connector first by clicking the Open Existing button  and then clicking the Clone button.

The same Cloned Connector ID window will appear to enter the New Unique Identifier for the new connector. Once the connector is cloned, you can edit it and save it.

10.5 Tips for Importing Connector Graphics

This section offers suggestions to import proper connector graphics into CableEye.

There are many different photo editing programs that you can use to prepare your pictures before bringing them to CableEye. Remember that this section is about importing better pictures to get the best result when displaying results in CableEye. Our preferred ones are Photoshop and Paint.net.

Image File Format - We recommend the use of PNG or BMP files, because they are highly compressed. Also a PNG file contains an alpha channel which can be transparent, and therefore ideal for removing unwanted background from connector images.

Cropping Image - It is good practice to crop your image to only show the connector itself and remove most of the background at the same time. On the right you can see an uncropped image showing a lot of unwanted background.



1

The image in the right has been cropped to the edge of the connector. You can still see the background in some areas, but it looks better than the first one.



2

Painting an Even Background - You can use a photo editing program to paint the background evenly. You won't always have an almost even background like pictures 1 and 2. This will depend on how the picture of the connector was taken which might contain a very distracting background. You can paint the background as a different color to avoid that problem and get a result like the image in the right. Why pink and not white? Keep reading.



3

Transparent Background - You can use a program like photoshop or paint.net to actually remove the background of the picture, making it transparent. Note that the picture has to be saved as a PNG file. The picture in the right is an example of a picture with the background erased or removed.



4

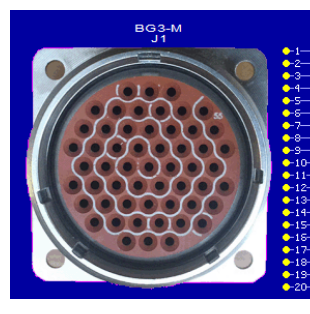
Results after importing the pictures to CableEye



1



2



3



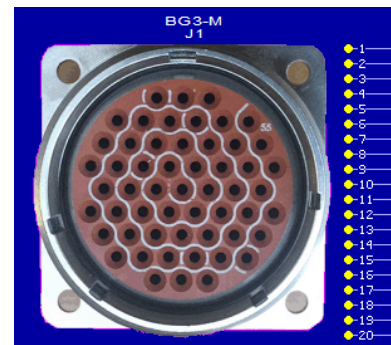
4

As you can see on the results shown in the previous page, the quality of the imported connector improves a lot if the background of the original picture is removed and then saving it as a PNG file.

Notice that most of the pink color in the third connector disappeared and that there are some blue pixels in connectors 1 and 2, and there is an explanation for this:

Connector Designer grabs the color of the pixel in the lower left corner and then erases that color from all the picture. In connectors 1 and 2 that color would have a tint of brown, and you can see some pixels extracted in the lower left color, but only those which exactly match the color.

For the 3rd connector, the background had an even pink color, which means that all of the pink was extracted, leaving an almost perfect result. Note that depending on how the picture is saved when the pink color was added, you might end up having some gradient of pink. This is why you can notice some pink color in the edge of the connector.

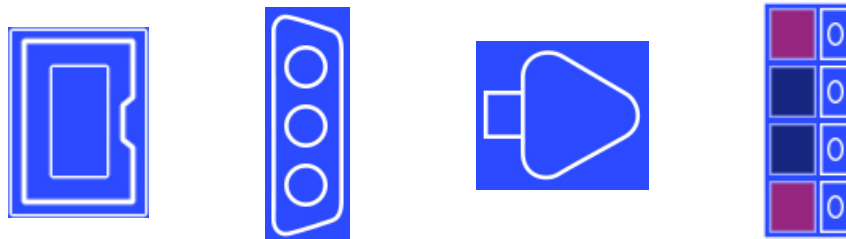


Now, why did we choose pink for this particular connector and not white for example. Well, if you take a closer look of the image of the connector, you can see that the lower section of the shell is very bright, and probably has white on it, which means that some sections of the shell could have been removed as well.

So the consideration is to choose a color that is definitely not present in the graphic.

Size - You can import images of any size, however, Connector Designer will automatically scale the picture to the proper size if you click **Scale** when importing the picture. Note however that if you choose not to automatically scale the picture, you will have more control on how big you want to show the connector on the screen. A standard recommended size is 200 by 200 pixels, however this will highly depend on how dense your connector is.

Wireframes Graphics - Sometimes, an actual picture of the connector might be too complex and distracting. In these cases it could be better to just have a wireframe representation of the connector. A wireframe is basically a drawing of the shape of the shell of the connector, without any pins shown (the pins are added later on with Connector Designer). Below you will see some examples of custom wireframes that you can draw and import into CableEye.



Creating these wireframes is easy. You will need any photo editing or drawing program and use the pencil or brush to draw your connector. We recommend you to use white color to draw your connectors shell in a transparent background and finally save it as a PNG file. You can draw any shape, and paint with different colors if needed as shown in the last wireframe example.