3 Basic Operations

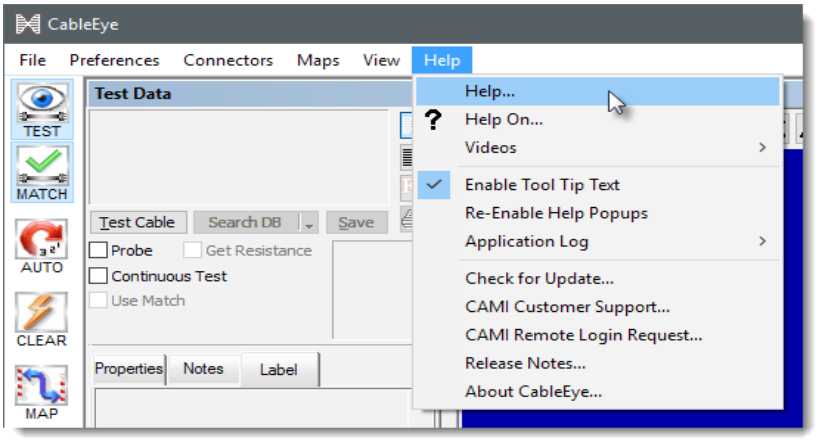
About this Section

This section introduces you to the primary functions of the CableEye system. These functions apply to all CableEye testers. We start with *Measuring a Cable*, and progress through the software functions in their order of importance.

You will learn how to measure, learn, compare, save and load cables as well as edit existing ones. This section also covers the Probe feature, which allows you to test single sided cables and harnesses.

You will benefit by having a CableEye system nearby and operating while you read these pages so that you may try each function after it's described.

The on-line *Help* system provides an instant resource should you need assistance while working and either not have the User's Guide handy, or would like to do an electronic search for a particular topic. Note that the User's Guide and Help system are complimentary, offering different insights and perspectives on the software.



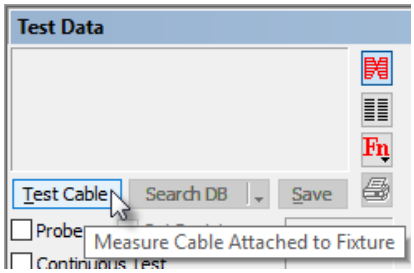
Follow this index to jump quickly to a topic of interest:

— Click on any entry to jump to the page —

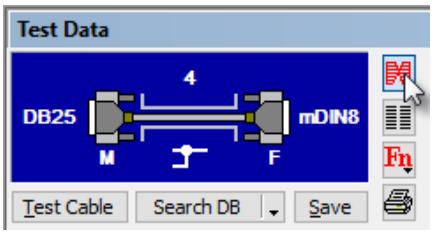
3.1 Measuring a Cable

For the following discussion, we suggest mounting CB15 boards to the left and right sides of a CableEye base unit. If you don't have a CB15 set available, use any board set you have and a cable that fits it. You may mix and match CB boards in any manner to obtain the right combination of connectors for your cable. Then, attach a cable of choice between the left CB board and the right CB board. Use only one connector on each board.

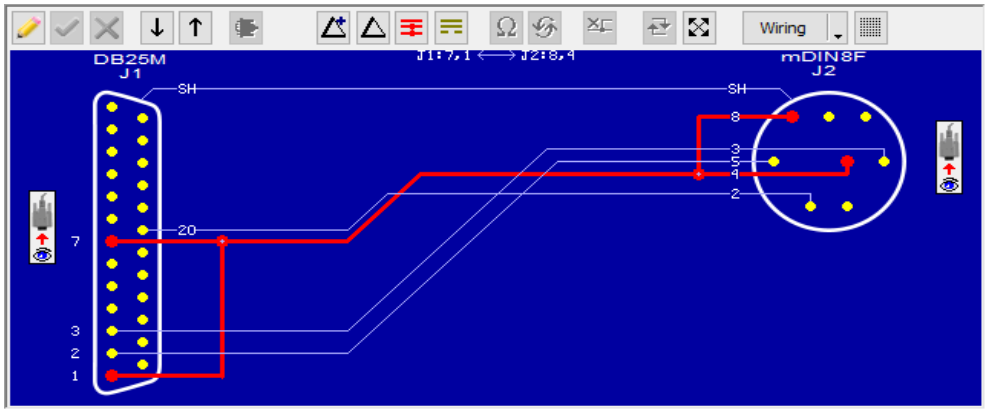
1. **Click Test Cable** in the *Test Data summary box*, or press the **TEST pushbutton** on the tester, to initiate a measurement. Most cables are measured in less than a second. Reading data from a cable in this manner doesn't tell you if a cable is "good" or "bad". It simply acquires connection data from the cable attached to the fixture and displays it for you to see.



2. When the measurement finishes, a simplified diagram appears in the summary box giving you characteristics of the cable. In this case, we have a DB25 male connector on the left, a miniDIN8 male connector on the right, a shield is present, four wires connect the left side of the cable to the right, and internal jumpers connect two or more pins together on the same side of the cable.



3. To examine the wiring of the cable in detail, **click** the **View Wiring** button. You will see the complete schematic of the cable along with connector and pin information. Use the ↑ and ↓ cursor keys to highlight a specific wire in the cable as shown below. This is helpful when reviewing the wiring of complex cables.

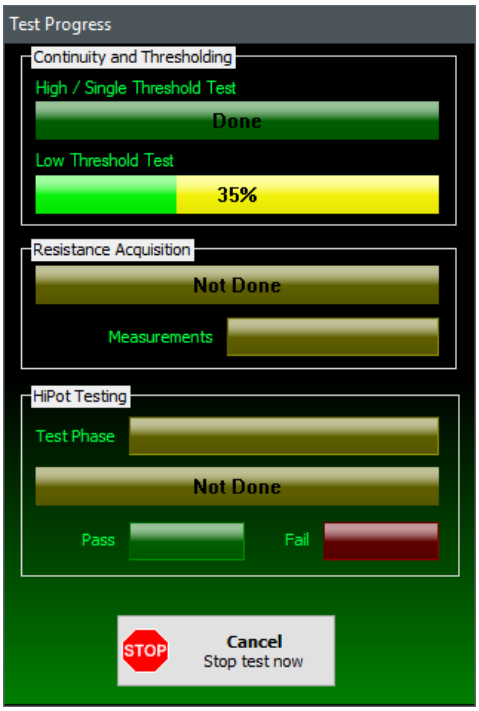


Detailed Description

Clicking *Test Cable* or pressing the *TEST* button triggers the measurement of a cable. During this process, the computer reads wiring from the cable attached to the test fixture and copies it to the *Test Data buffer.* Once test data is available, you may view or print cable wiring, and compare the cable to other cables in the database. Acquiring test data is *always the first step in checking a cable* and must precede the use of any other function in which test data is needed.

While cable data streams in from the fixture, the message "*T E S T I N G. Do not disconnect Cable . . .* " appears in the Summary Box location as seen here. This process usually completes in less than a second for cables of 64 conductors or fewer.

If you test large cables or wire harnesses with more than 128 test points, or when the tester makes numerous resistance measurements, the test time will increase. If testing does not complete within two seconds, a *Test Progress* pop-up window appears as seen in the right. Not only does this inform you that CableEye needs additional time to finish the measurement, but it gives you the opportunity to stop the test before it finishes by clicking the *Cancel* button.



> ***Comment:*** If the test time takes unusually long (more than 30 seconds), one of several problems may have occurred during the test. Cables longer than 6 feet (2 meters) introduce capacitance that may cause many false readings to occur, and this in turn may result in tests that never finish. Increase the *dwell time* to compensate for capacitance in long cables, or for the presence of physical capacitors. You may also need to lower the *resistance isolation threshold* (does not apply to M2-series testers). Also, any fixed connection to ground will cause the same result (a test that never finishes). Any cables or harnesses you test must be completely isolated from ground prior to testing!

Attaching the Cable

Improperly attaching the cable to the CB boards or test fixture may cause false open circuits! *Securely join the cable to the connector board before starting the test.* Verify that the shell of each connector on the cable you are testing is not bent or misshapen to ensure that it makes good contact with the test fixture's connector. Push the cable all the way to the bottom of the connector so that the pins and shell make contact with its mating connector. Insert and remove the cable carefully to ensure that you do not bend pins on either the cable or the connector board.

Cable Orientation

In many cases, you may attach a cable to the test fixture in more than one way. When you use two identical CB boards, you might connect the male on the left and the female on the right, or vice versa. This becomes possible when both male and female connectors are available on both connector boards. Alternatively, you may use different boards and insert board A on the left and board B on the right or vice-versa. When you store cable data, we normally save the *cable orientation as it appears on the screen when you store it.* If you later test an identical cable and happen to connect the cable or the boards in a different orientation (right-to-left instead of left-to-right), it will not matter if you then search the database for a match to the wiring. *Screen orientation of the connectors does not affect a search*. At any time, you may drag the connectors around to different sides of the screen, and then save the cable with these new connector positions. If you wish, you may force the system to match cables *only* when inserted in the same orientation. We explain

this later in a section that describes connector options.

Shield Conductor

Many cables include a shield conductor that surrounds the signal lines and runs the length of the cable. At each end of the cable, the shield is joined to the connector shell. CableEye measures continuity in this circuit and shows this as part of the wiring schematic. If the shield conductor is broken or not present when it should be, it will not compare correctly to a stored cable with the shield intact.

Test Time

This depends on the number of active test points, whether resistance measurements on the conductors are required, and other test options. For 128 test points with threshold measurements only, the test time is less than one second. During this time, the red and green indicator lamps on the CableEye fixture will flicker (M2 serial port testers) or the BUSY indicator will turn on (M3 serial and USB testers, and HVX testers), indicating that data is being acquired. Once this process stops, you may remove the cable under test.

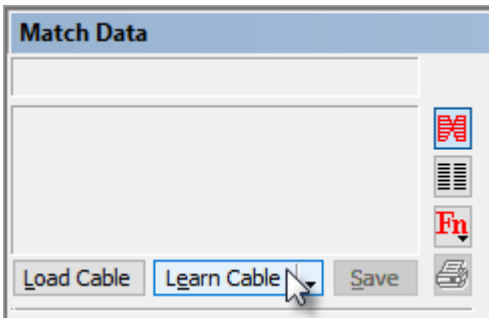
> ***CAUTION:*** *Never insert a live cable into the test fixture!*
>
> Disconnect both ends of the cable from any devices to which it may be connected before attaching it to CableEye. Attaching a live cable to the test may cause serious damage to the electronics, or render the circuit board unrepairable; *the warranty does not cover this type of damage!*

> *Always discharge static electricity from long cables before connecting to the test fixture.*
>
> Cables of 10 feet (3 meters) or longer may accumulate an internal charge on the conductors if the insulation rubs against itself during movement, *even if you, the workbench, and the tester are properly grounded!* If static discharge should occur into one of the test points, the test results may show multiple false diodes present or may loose its communication link to the computer. To correct this problem, immediately shut down the software and switch off the CableEye hardware for about 15 seconds. The hardware can sustain small discharges without damage. A large discharge from a long cable can permanently damage the electronics and require the unit be returned for repair. See Static Discharge Precautions, page 1-7, for more information.

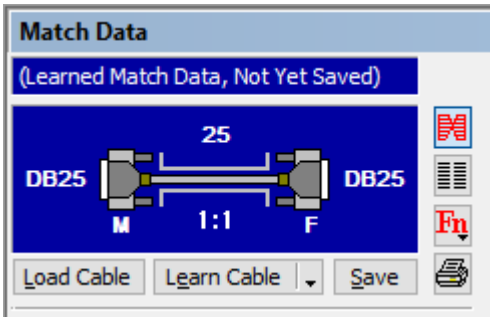
3.2 Learning a Cable

You may learn a cable that you know is good and use it as a model. The program stores wiring data from a learned cable in the *Match Data Buffer*. Wiring data from a cable under test is stored in the *Test Data Buffer*. By comparing Match and Test data, the program finds differences between cables.

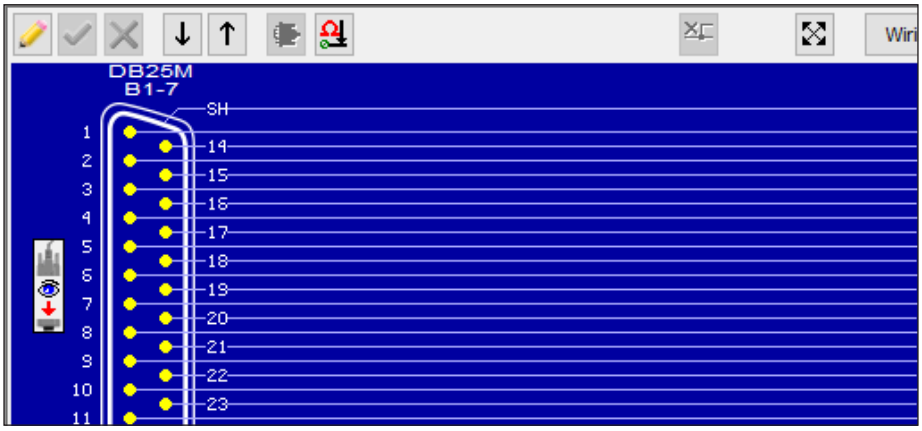
1. **Click Learn Cable** in the *Match Data summary box* located in the lower half of the screen.



2. When the measurement is complete, cable data moves into the Match Data Buffer, and a simplified diagram appears in the Match Data summary box. The summary box gives you enough information to identify this example cable.



3. As before, you may view the actual cable wiring by **clicking** the **View Wiring** button – this button appears at the right and the wiring display appears below. Use the ↑ and ↓ cursor keys to highlight a specific wire in the cable, or click on a wire with the mouse.



Detailed Description

Learn Cable operates exactly like *Test Cable*, except that the acquired cable data moves to the *Match Data buffer* instead of the Test Data buffer. Use Learn Cable when you have a model (master, golden, etc.) cable against which other cables will be checked. By using Learn Cable, you do not need to have a match cable stored in the database to compare two cables. Any cable data in the Match Data buffer, whether it arrives there by learning a known good cable, loading it from the database, or typing in the connections using the netlist editor, serves as a model cable against which Test Data will be compared.

Using Learn Cable

Typically, you will attach the model cable to the test fixture and use Learn Cable to acquire data from it. Without removing the model cable, use Test Cable to verify that the Test and Match data compare perfectly (no differences); the green block with the yellow check shows this.

You may then remove the model cable and check an unknown cable with the Test Cable function. Any differences detected will cause a red "X" to appear instead of the green checkmark. View detailed wiring differences by clicking the "Triangle" button (Greek letter "Delta") in the toolbar above the wiring display . We explain the wiring differences screen in more detail on Section 3.3.

Saving a Model Cable

It is generally a good idea to save a model cable in the database if it is not already there. First, check to see if a cable with identical wiring exists by clicking *Test Cable* if you have not already done so, and then *Search Database*, a button found to the right of *Test Cable*. If no exact match is found, enter some descriptive notes about the cable in the text box (click the *Notes* tab to expose) and then click the *Save* button. Searching the database and saving cable data is discussed in more detail in Section 3-7 on page 3-19.

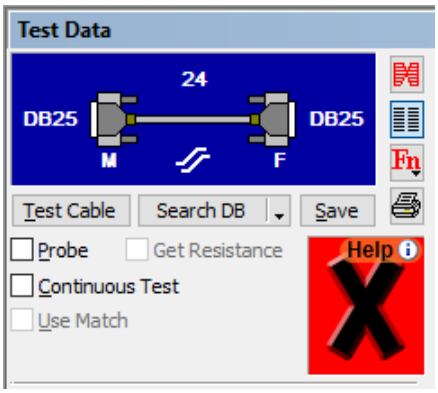
> ***IMPORTANT:*** whenever you add a new cable to the database, always write some notes that describe the cable. The notes may include vendor part numbers, color codes, assembly information, dates, technician names, and customer data. This text helps describe the cable for future reference and will appear on all printed documentation. If you wish to include notes that appear on the computer screen for a technician but will not show when printed, enclose them in curly brackets {like this}.

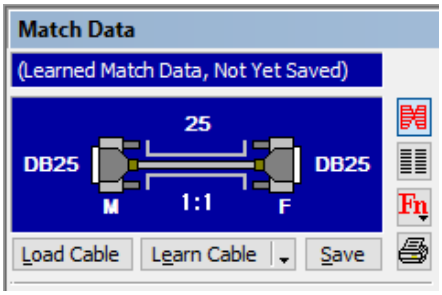
Repetitive Automatic Cable Testing

Use Learn Cable as the first instruction of a ***Macro*** sequence *(more about Macros in section 6)* for repetitive cable testing when you do not wish to load stored data from the database. In this case, *Learn Cable* executes once at the beginning of the Macro to acquire Match data from the model cable. Additional instructions in the Macro acquire data from a test cable and check it for errors. LED lamps on the test fixture turn on appropriately for either "Pass" or "Fail" after the comparison is complete. See the section on Automatic Testing for more information.

3.3 Comparing Two Cables

After you have learned a good cable and measured a test cable, summaries of both will appear.





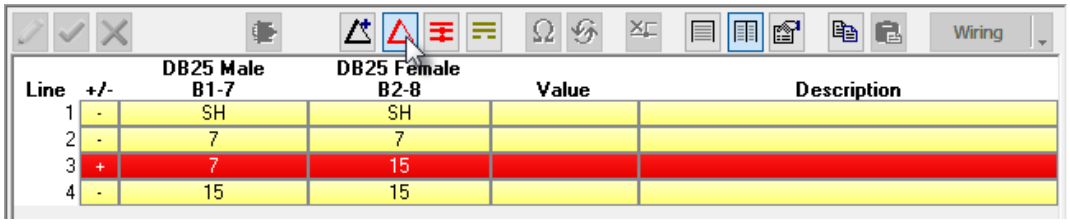
1. If there are no differences, you will see a *green checkmark* just below the *Save* button in the Test Data summary box. In the example shown here, however, the cables don't match and a *red "X"* appears instead.

   What can you tell about the differences between these two cables using just the information in the summary boxes?

   Notice that the match data cable has 25 connections, but only 24 were measured and reported in the Test Data; also notice that the shield is not present in the measured data. Finally, the test data cable is not wired one-to-one anymore (1:1).

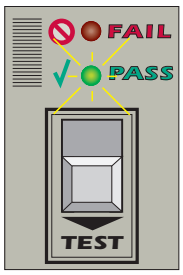
2. Change the Test Data wiring display to a *netlist display* by **clicking** on the **Display Netlist** button.

3. Once the netlist is visible, **click** on the **triangle** button (Greek letter *Delta*) to see a detailed list of all wiring differences. In the first column on the table labeled +/-, a plus sign "+" indicates an extra connection (a short), while a minus sign "–" indicates a missing connection (an open). In this case, we can also see a miswire between pin 7 on the left and pin 15 on the right, and that the shield is missing.

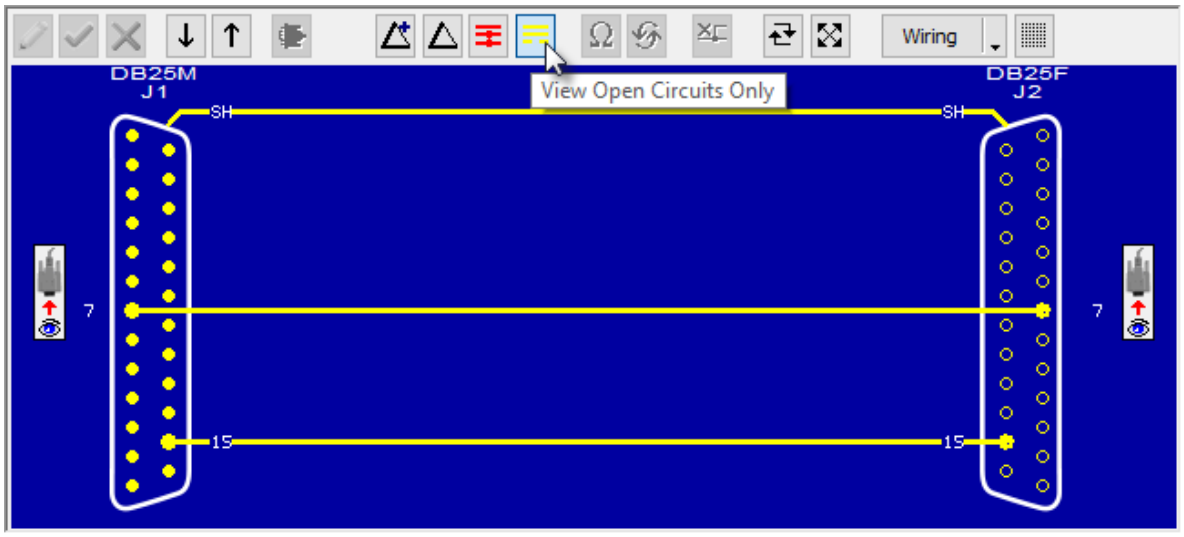


Line	+/-	DB25 Male B1-7	DB25 Female B2-8	Value	Description
1	-	SH	SH		
2	-	7	7		
3	+	7	15		
4	-	15	15		

4. For batch testing of cables, you may *automate* this entire process by using a *Macro* (described in Section 6). In that case, you could press the TEST push button on the CableEye tester and read the PASS/FAIL result on LED lamps.



5. Rather than view the differences netlist as shown in the previous page, you may *graphically* show the faulty cable's wiring, or look at just opens or shorts. With the differences netlist visible, just **click** on the **View Wiring** button, and then **click View Open Circuits Only** to see only the missing wires as shown below. Clicking nearby buttons show only shorts, and a combination of opens and shorts. You can click the *Print* button to print this view.



Detailed Description

Test Data and Match Data are compared. If identical, a green check mark appears in the Test Data Summary Box. If any wiring or connector differences are found, a red "X" appears instead. View exact differences by clicking *triangle* button . The *Differences List* shows both missing connections and extra connections in the test cable.

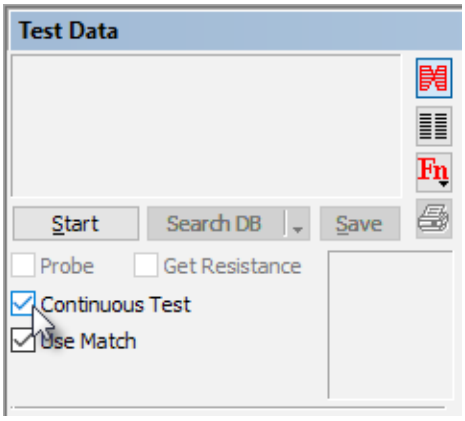
Comment: Different connectors in the Test and Match cables will cause cables to fail during comparison even if the wiring is identical. Connectors of the same type *but different gender* (male instead of female, for example) will also cause the comparison to fail! When this happens, the "X" graphic is replaced by another graphic that describes the type of failure. Different types of failures can occur and they will be displayed with different icons. To find out more about an specific type of failure, click on the Help balloon shown in the image on the right.

3.4 Checking for Intermittent Connections

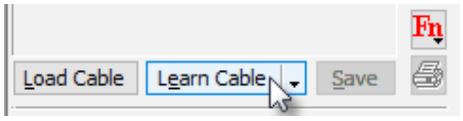
Bad crimps and broken wires, among other things, may cause *intermittent connections*. CableEye tests for intermittent connections with the *Continuous Test* function. When this function operates, test signals are passed through the cable *continuously* while you flex the cable and connectors. Changes in continuity cause a warning tone to sound and a wiring diagram to appear with intermittent connections highlighted.

1. **Check** the **Continuous Test** check box just below the Test Cable button. The name of this button changes to *Start* and the system is now set for *Continuous Test mode*.

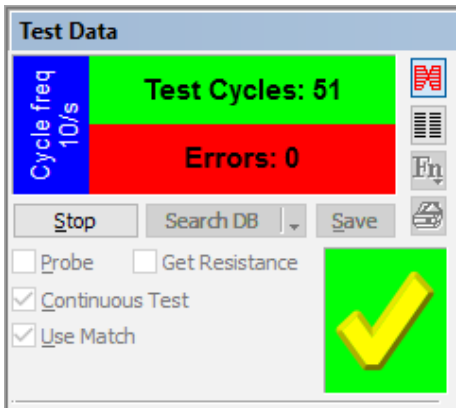
   Checking the **Use Match** check box ensures that we compare data acquired during the continuous testing to Match Data. If this box were unchecked, Match Data would not be necessary, and the program would use the *first scan of the test cable* as a baseline, comparing successive scans to it.



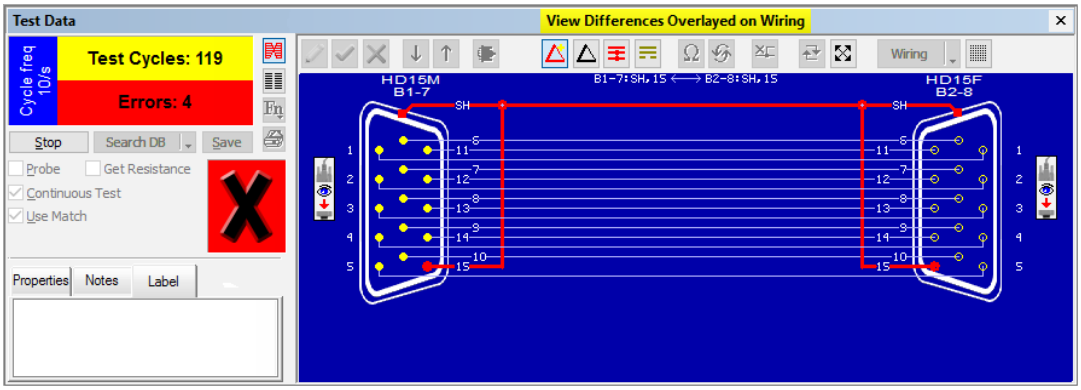
2. With the test cable attached, **click Learn Cable** to acquire Match Data. Once Match Data has been loaded, **click Start** to begin testing.



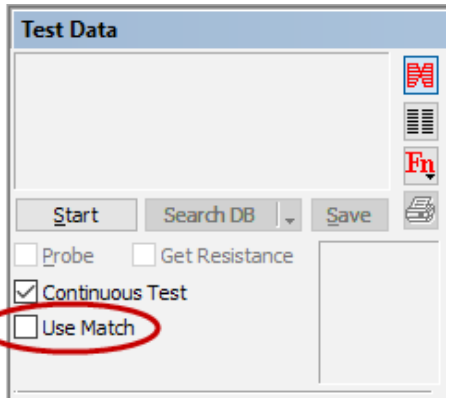
3. As the test runs, you see the test results in the Test Data Summary box. A large green checkmark indicates that no intermittent connections have been found.



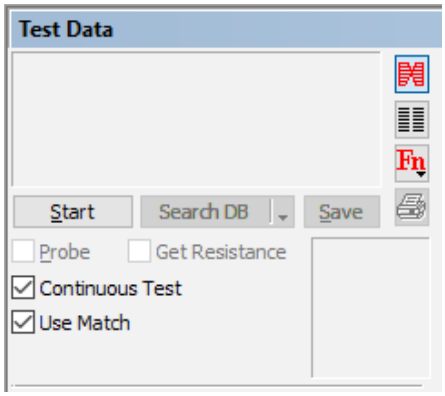
4. Flex the cable and connectors to locate intermittent connections. If any are found, a tone will sound, the error count will increment, and you will see a display with the intermittent connections highlighted (see below). In this case, we see an intermittent short between pin 15 and the shield.



Detailed Description



When started with *Use Match* unchecked (see right), *Continuous Test* measures the test cable and uses this *first measurement* as a baseline. Subsequent measurements that differ from the first represent an interruption in continuity and cause a tone to sound. When continuity is restored, the tone stops. Measurements of the cable continue indefinitely until stopped by the operator by clicking *Stop* or pressing the TEST CABLE button on the test fixture. With this setting, we do not test against a known standard but simply look for inconsistencies between the first sample and those that follow.



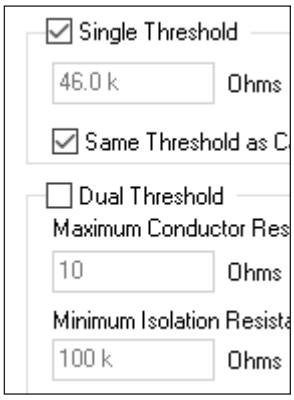
With *Use Match* checked, we use previously loaded or learned *Match Data* as a baseline rather than the first measurement of the test cable. Here, we DO test against a known standard, so if the cables are wired differently, Continuous Test will *always* fail regardless of whether the cable has intermittent connections.

What is an "Intermittent Connection"?

We define an intermittent connection as a radical change in resistance between two points occurring unpredictably when motion or stress is applied or when a change in temperature causes expansion or contraction of an electrical contact.

An *Intermittent Open Circuit* applies to a low resistance connection which, for a short period of time, becomes disconnected (high resistance). An *Intermittent Short Circuit* applies to two normally unconnected conductors which, for a brief period of time, short together (low resistance).

Resistance Thresholds



Continuous Test uses your *Single Threshold* setting to determine whether an intermittent connection exists. Changes in continuity that cross this threshold during scanning trigger an alarm. For general applications we recommend a value of at least 46 kΩ to ensure that high-resistance shorts are detected. We use a single resistance threshold to maximize the scanning rate. If you need to measure resistance and can tolerate a slower scan rate, we provide a Macro sequence to do this; turn on *Automatic Testing* mode (described in Section 6) and choose "Continuous Test with Resistance".

Scanning Time

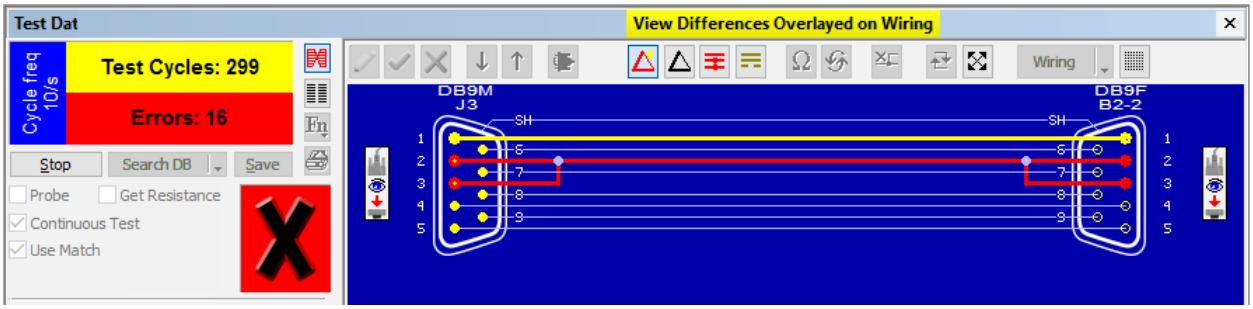
Each complete scan cycle during a Continuous Test checks every test point with respect to every other test point. Thus, for one 128 test point scan, 128x128 (=16,384) tests occur. The CableEye systems with a USB interface will scan about 10 cycles per second for 128 test points active. The rate will be reduced as you increase the number of test points. The fastest possible intermittent scanning occurs when the Active Test Points are set to 64; this can be used when your cable can be interfaced to the tester using *only* Bank 1 (a single CB board). In this case, the system scans much faster, and with a special software assist (contact us) can be increased to scan at about 90 cycles per second.

Note that if an intermittent connection changes so rapidly that it opens and rejoins *during a scan,* it may not be detected. Thus, if your tester scans slowly because of a large number of active test points (greater than 256) or a long dwell time (more than 500 µs), be sure to flex the cable slowly enough so that *at least one full scan cycle completes between flexing in one extreme and then the other.*

Intermittent Connection Alerts

If intermittent connections are found during the test, a short beep will sound to alert you. The beep occurs at the end of a test cycle whenever the response differs from the baseline response. The beep will repeat indefinitely as long as the differences persist. The beep will cease when the response again matches the baseline. Thus, by flexing the cable in very specific places and moving the point of flexure, you should be able to isolate the problem to a particular area of the cable.

Any intermittent connections found produce a wiring diagram or netlist showing the location of the problem. Red highlights denote shorts while yellow highlights denote opens. You may switch between wiring view and netlist view *during scanning* if desired. Intermittent connections *accumulate as they are found*, so even if a momentary intermittent exists for a short period and then returns to normal, the wiring or netlist display will remember this error. If new intermittents occur on different wires during the test, these will be added to the wiring report.

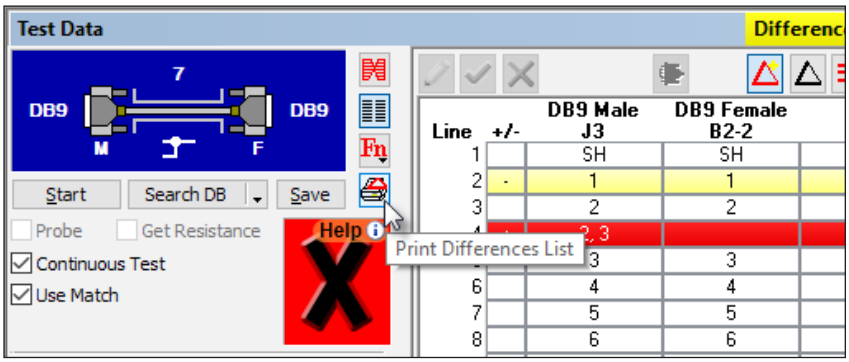


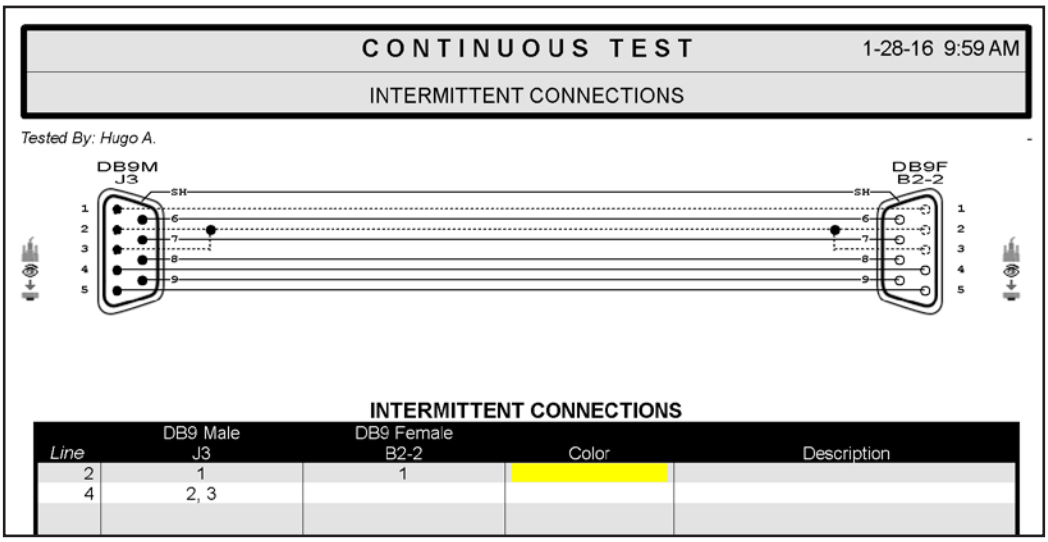
Stopping the Test

Click Stop or the **TEST** button to end the *Continuous Test*. Any accumulated errors remain on the screen and may be printed. You may immediately restart the test, if desired, to try to induce the same failure again, or to isolate multiple intermittents.

Printing Intermittent Connection Reports

Click the **Print** button to print an intermittent connection report. Note that the Print button has a *red triangle (Delta)* overlaid on it to denote that you will print the *Differences List*, not a standard report. Intermittent connections print as *dotted lines*.





Cautions and Comments

False intermittent connections may be caused by a loose connector. While you flex the cable near a connector, hold the connector down with one hand while flexing with the other.

Check for oxidation on both the cable-under-test connectors and the test fixture connectors. Corrosion on the connector pins and shell may cause false intermittent connections to appear while the wiring is intact and the cable is otherwise good.

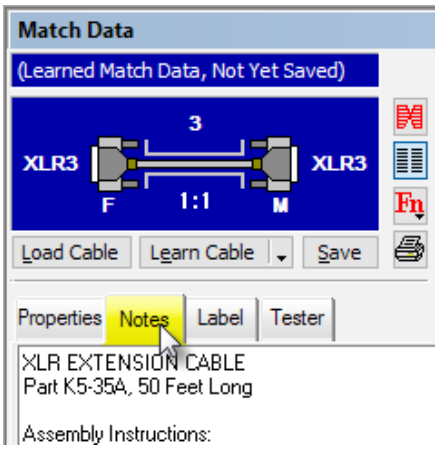
Static discharge into the cable or CB board may cause a false reading. Either sit or stand on static-suppressing materials and minimize your movement during the test.

3.5 Saving Cable Data in the Database

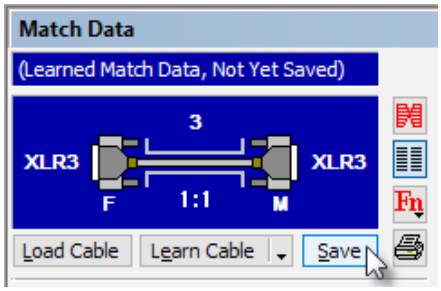
After measuring a good cable, you may wish to annotate it with descriptive notes and save it in the database using a name or part number of your choice. Later, you may reload the cable, or search the database for a match to the cable's wiring.

1. **Click Learn Cable** to acquire new cable data, and then **click** on the **Notes** tab to open the *Notes editor*. **Type in descriptive notes**, part numbers, names, dates, color codes, or any other information you deem important. You may also copy notes from another cable to the clipboard and paste them here using standard Windows methods, and then edit the notes as necessary. *The first line of these notes appears in the title block of printed reports*, so you should choose this first line thoughtfully.

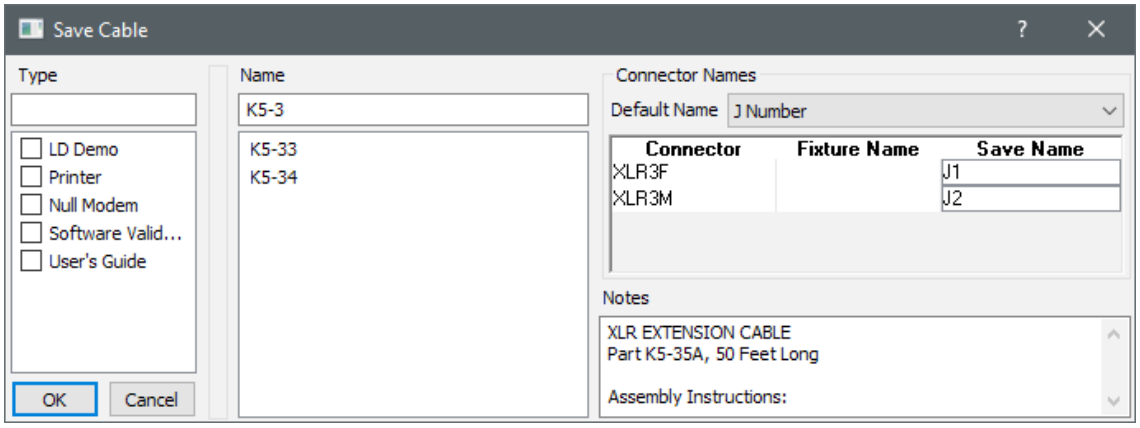
   If desired, **click** the **Label** tab and **enter any label notes** that you wish to appear on a printed label.



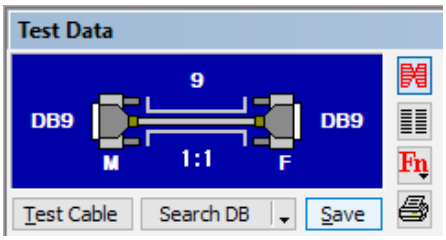
2. **Click** the **Save** button when you are ready to save the cable data, and the *Save Cable* dialog box will appear (below).



3. Use as many characters as you need to name the cable. You may use spaces, dashes, and most other special symbols in the name as long as you obey Windows file-naming conventions. As you type the name, the file list below it shows all other cable files that begin with the characters you have typed thus far. Continue typing until no other files appear, indicating that you have selected a unique name. You may also check a **Type**, or **define** a **new type**, to assign this cable to a special group which may help find the cable when you load it later. **Click OK** to save the cable.

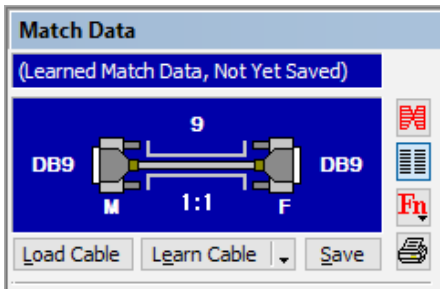


Detailed Description



Save stores cable wiring, descriptive notes, label text, and other information about the cable in the database for future reference. Clicking the *Save* button in the *Test Data* area saves the contents of the Test Data buffer. Clicking the *Save* button in the *Match Data* area saves the contents of the Match Data buffer. *Save* functions identically whether you are saving Test Data or Match Data.

Editing Saved Cable Data



If you wish to change the netlist or notes of a previously saved cable, first load it using **Load Cable**, make your editing changes, and then **Save** it under the same name.

Cable Notes and Other Data

Prior to saving cable data, you can enter descriptive notes about the cable; *your notes are very important for future reference.* They might include the types of equipment for which the cable is used, the cable's function and signal assignments, the manufacturer and part number, assembly information, customer name, and the cable's owner. You can also add descriptive information, wire numbers, and color codes on a wire-by-wire basis in the netlist.

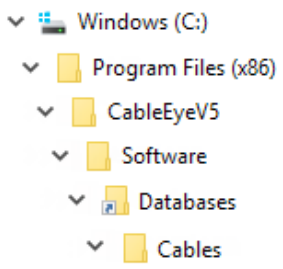
Other information automatically stored with the cable data and notes include:

a – resistance thresholds in effect at the time the cable was measured,
b – the connector position and orientation on the screen,
c – your current setting for measurement type (Full or Fast) applicable to resistance measurements,
d – custom pin labels you may have applied,
e – the name of any custom pin map you have activated when the cable was measured (custom pin maps apply to any fixturing that does not use standard CAMI CB boards - More about custom pin maps in Section 9 - Adapting to Custom Fixtures).
f – trace resistance values for the CB board or fixture you used when learning the cable.

When you reload this data in the future, any custom pin map associated with the cable reloads automatically.

> Note that we store the *name* of the map file, not the map file itself, so that if the map has been moved to a different directory or deleted, you will see the cable data in the Match Data area when the cable reloads, but will be *unable to test any new cables without restoring the map!*

Where Cables are Stored



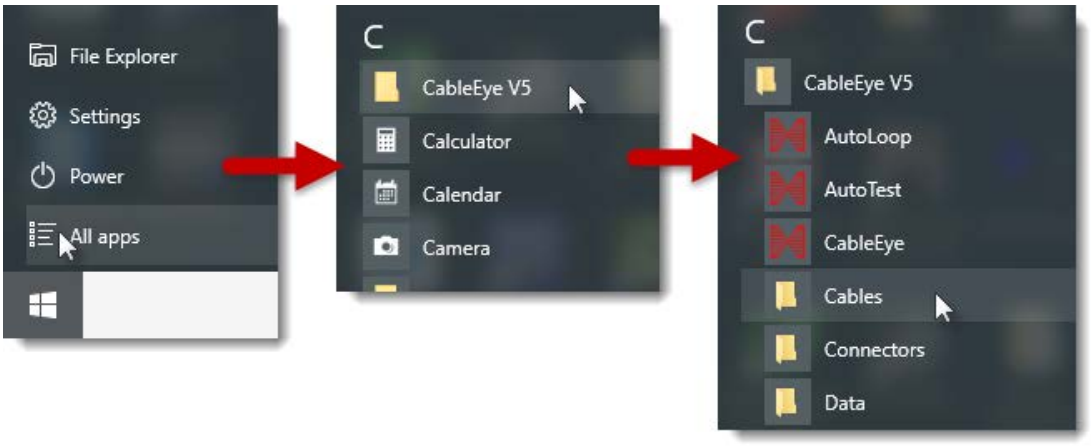
CableEye by default saves each cable as an *individual file* in:

\Program Files(x86)\CableEye V5\Software\Databases\Cables

Within the *Cables* folder you will see two folders: the *CAMI* folder containing standard cables included with your software and the *Custom* folder containing cables you store. You may also create a additional folders to keep your cables organized.

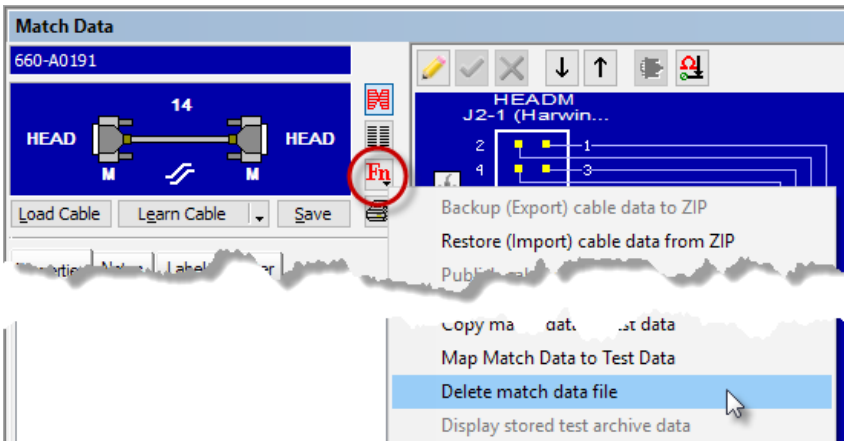
Using the START Menu to Access Cable Data

In addition to following the address path in Windows Explorer to access CableEye's data, you can also use the Windows START menu as shown below. The following image was taken from a Windows 10 system. Older or newer operating systems might differ:



Deleting Cable Data

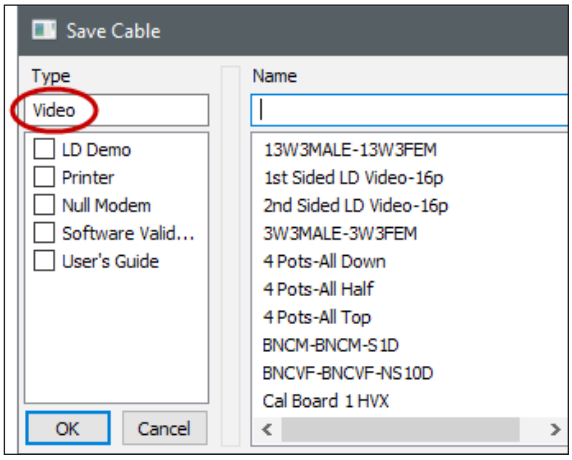
To remove cable information from the database, first load the cable from the database, then **click** on the **Fn Special Functions** button and **select** the **Delete Match Data File** function. Because we store each cable file as a Windows file, you may also navigate to the Cables database in your CableEye folder and **delete** the file using standard Windows methods.



You cannot undo a cable deletion.

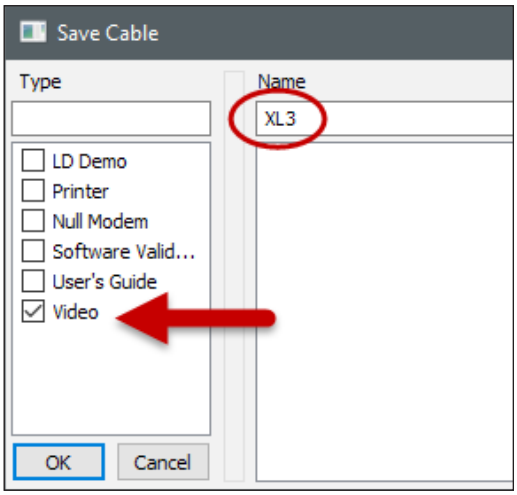
Organizing your Cable Database

Before saving a cable, you may assign it to a listed category, or create a new category for it. In the example on the right, we are creating a new category "Video" for an HDMI extension cable. **Click** in the **Type** edit box, **type "HDMI"**, and **press Enter** to create it. The new category appears in the list with a checkmark next to it. If the category had existed, you would just have checked the desired box to select it.

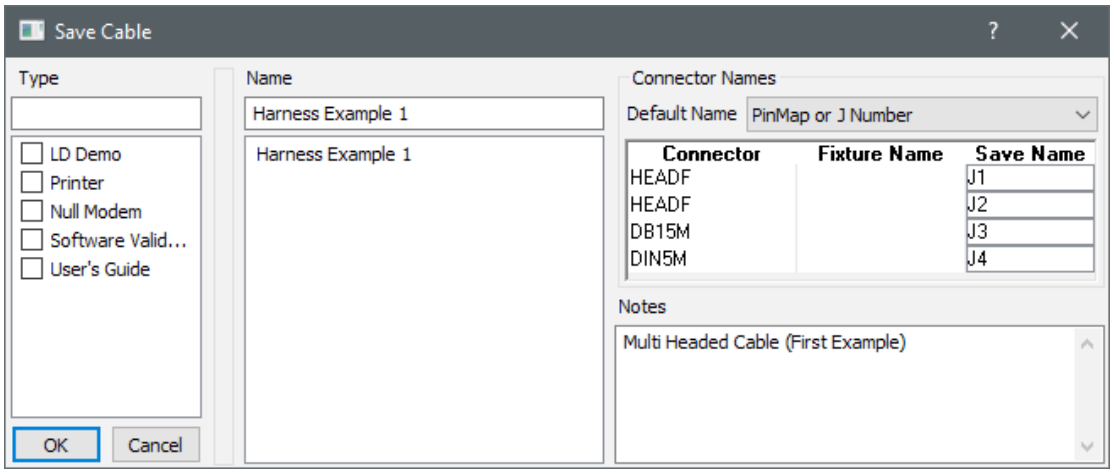


Having checked a category, type in the cable name. As you type, all cables in the database starting with the characters you have typed so far appear in the list below (in this case, none do). Once you have a unique name, the list becomes empty, then **press Enter** or **click OK** to save the cable.

When you later use *Load Cable* to retrieve stored data, you may check the category to restrict the listed cables to only those in that category.

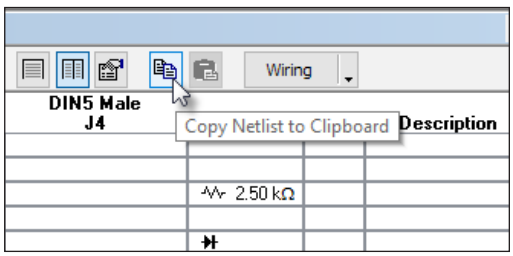


When saving multi-headed cables or wire harnesses, the *Connector Name* you apply to each connector may be helpful. We assign the default names J1, J2, J3, etc. to connectors in the order they are detected. If a custom pin map was active when you measured the cable, we use the names assigned in the map. Before saving, you may overwrite the default names by entering any changes on the right side of the *Save Cable* dialog under "Save Name", as it appears below.



Exporting and Importing Cable Data

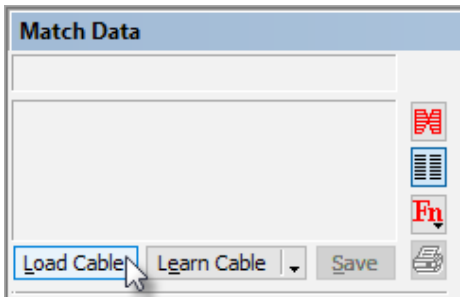
You may use the clipboard to transfer the netlist of an individual cable between CableEye and an external program like Excel. Look for the standard Windows *Copy* and *Paste* icons in the Netlist toolbar as shown in the right and use these buttons to move the data between applications.



Use the optional Exporter software (Item 709) for more involved requirements to export or import multiple cables from various formats. See Section 11, Database Utilities for more details.

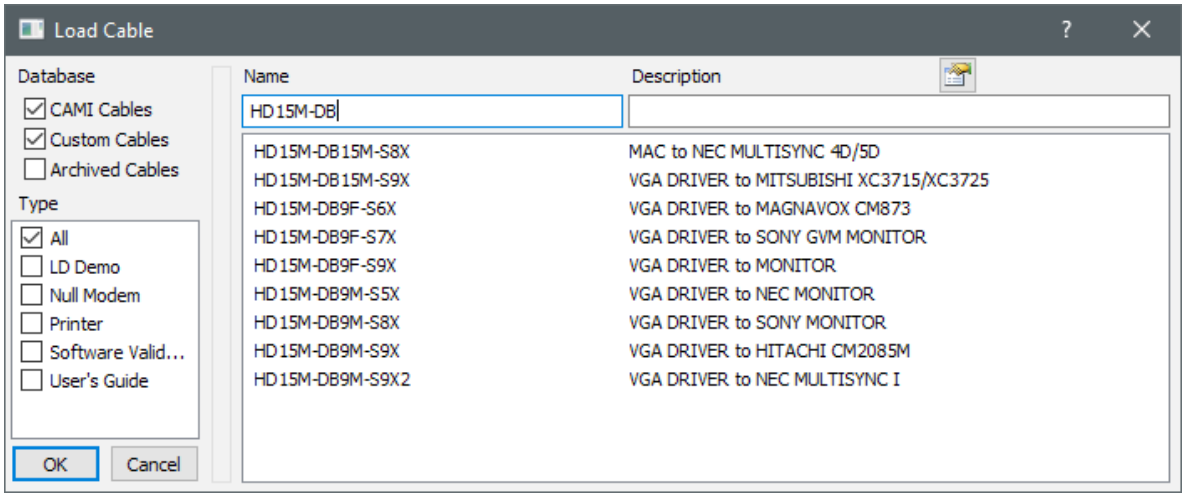
3.6 Loading Cable Data from the Database

You may wish to recall previously saved cable data to read the descriptive notes, view its wiring, print a label, or compare the wiring to a test cable.

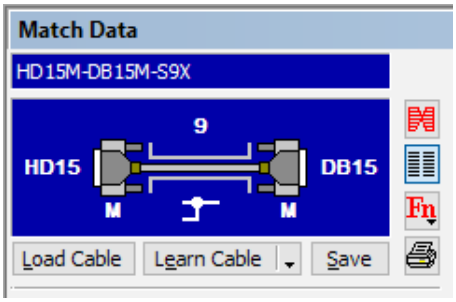


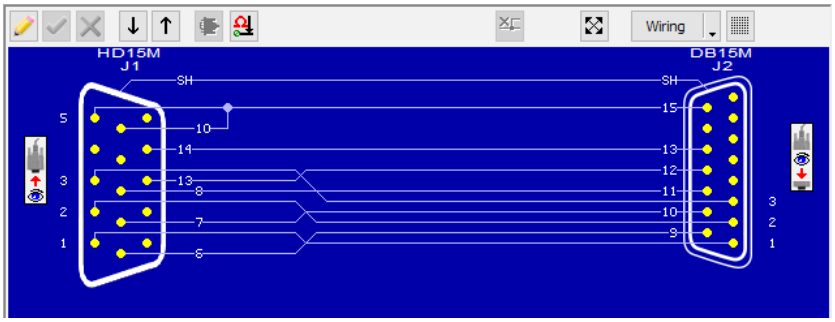
1. **Click Load Cable** in the Match Data summary box.

2. **Select the cable** by its Name or its Description by typing into the appropriate entry box. As you type, the file list below the entry box gives all files that begin with the characters you have typed. At any time, you may scroll into this list with the ↓ key to choose a file, or click directly on a cable of interest. **Click OK** to load the cable, or **Cancel** to dismiss this window.



3. The Match Data summary box describes the cable just loaded. Note that the cable's database name appears at the top. **Click** the **View Wiring button** to see the cable's schematic (below), or the **Netlist button** to see a wire list.





Detailed Description

Stored cable data loads from the database into the Match Data buffer. Standard CAMI cable files come from

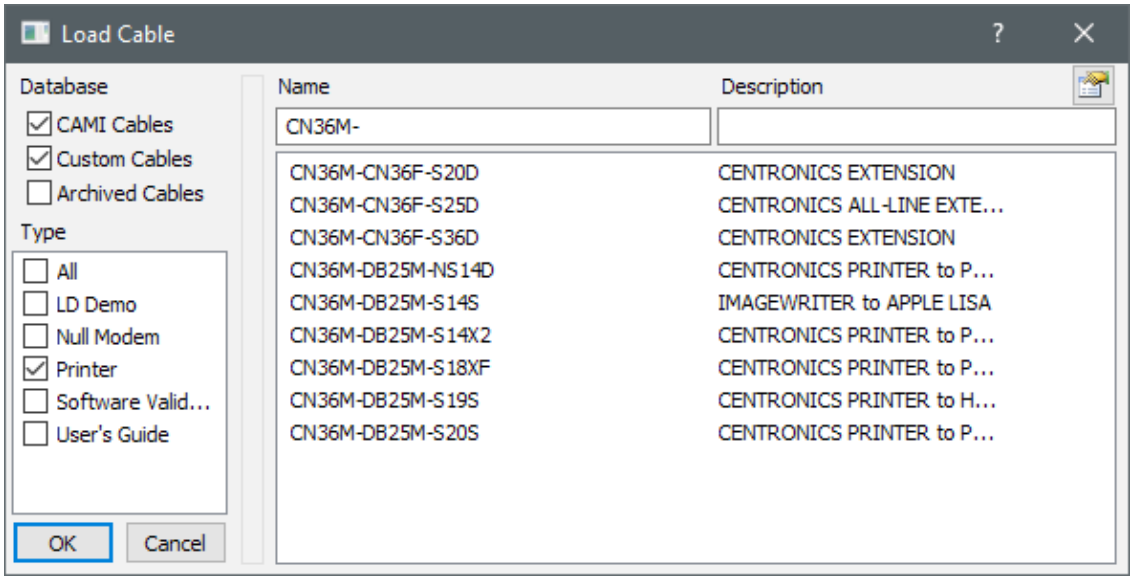
\Program Files(x86)\CableEye V5\Software\Databases\Cables\CAMI

and cables you previously stored come from

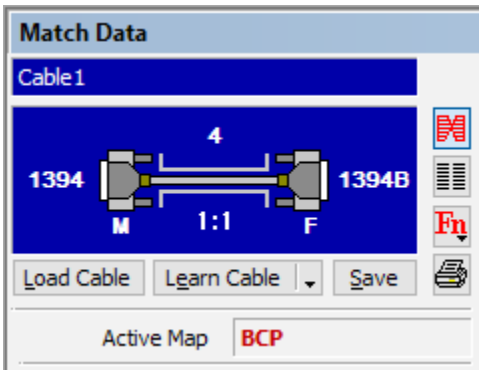
\Program Files(x86)\CableEye V5\Software\Databases\Cables\Custom

Once a cable is loaded, you may compare its wiring to the test cable, read the descriptive notes, edit the data, print a cable drawing, and print labels based on the label text stored with the cable.

The *Load Cable* dialog appears below. To simplify locating the right cable in a large database, preselect the cable type to limit the list to only cables of that type. Then, either type in the cable name to zero in on the correct cable, or if it seen in the list, just double-click on it.



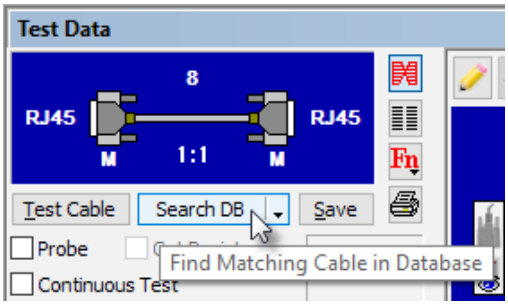
Any cables you load that have an embedded pin map name will *activate that map automatically* when loaded. In this case, you will see the Map file's name in red letters on the main screen. On the right, you see the map "BCP" has been activated with the cable file "Cable1".



The function *Search Database* (described next) is another way of loading data. It uses measured Test Data to search for an identical cable stored in the database and automatically load any match that is found.

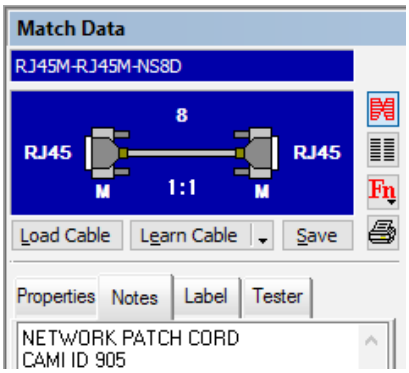
3.7 Searching the Database for a Match

Unlabeled or unknown cables with complex internal wiring may cause damage if connected to inappropriate equipment, or may go unused or be discarded. To avoid problems like these, you may measure an unknown cable and search the database for a match to its wiring. If CableEye locates a match, it loads it and displays the descriptive notes to give you the cable's name and some information about it.

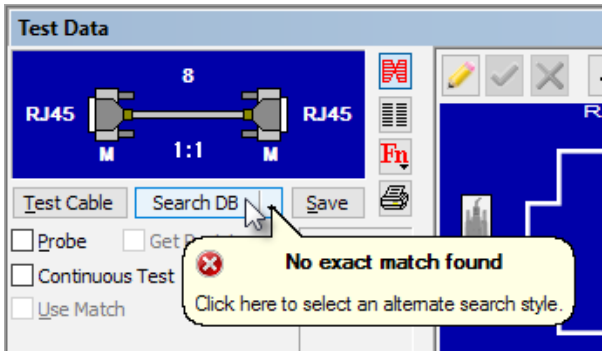


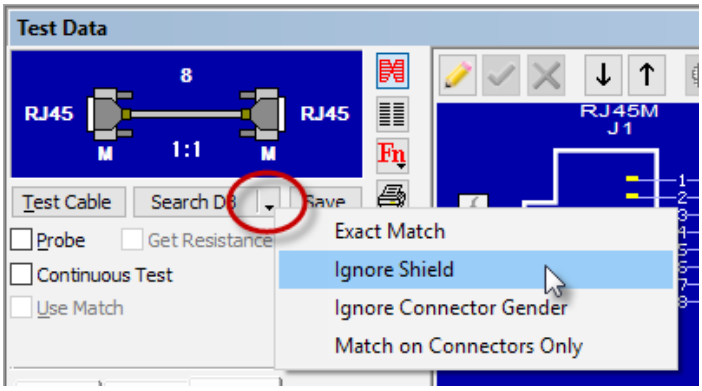
1. Measure a cable using **Test Cable**. Then **click Search Database** (top right).

2. If a matching cable is found, it loads immediately for your review (right).



3. If an exact match cannot be found, a pop-up window alerts you (right). **Click** the **down arrow tab** to activate a pull-down menu with additional search criteria (bottom), and try again.





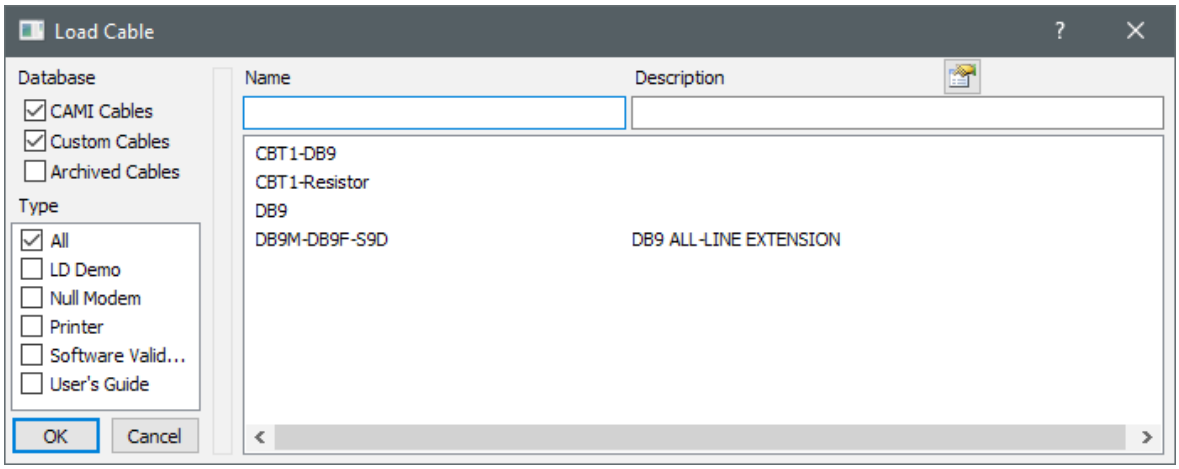
If you would like to *automatically* search the database after clicking Test Cable, **turn on** the **Auto Search after Test** option in the **Preferences/Control** menu.

With this option on, the database will be searched silently after each test. If an exact match is found and the MATCH DATA is empty, the new match will be loaded.

Detailed Description

Software scans the cable database searching for a match to your Test Data. If a cable with identical connectors, genders, and wiring is found, that cable's data is copied to the Match Data buffer including its descriptive notes, label text, threshold settings, and screen orientation. You may then examine or print cable notes and label text for the matching cable.

Note that either by intent or by mistake, it is possible to store two identical cables (same wiring and connectors) under different names. If this is the case, then the *Search* function will find more than one match. In this case, a scrollable list appears from which you may select the desired cable – either type in its name, or double click on its entry in the list.



Cable Orientation

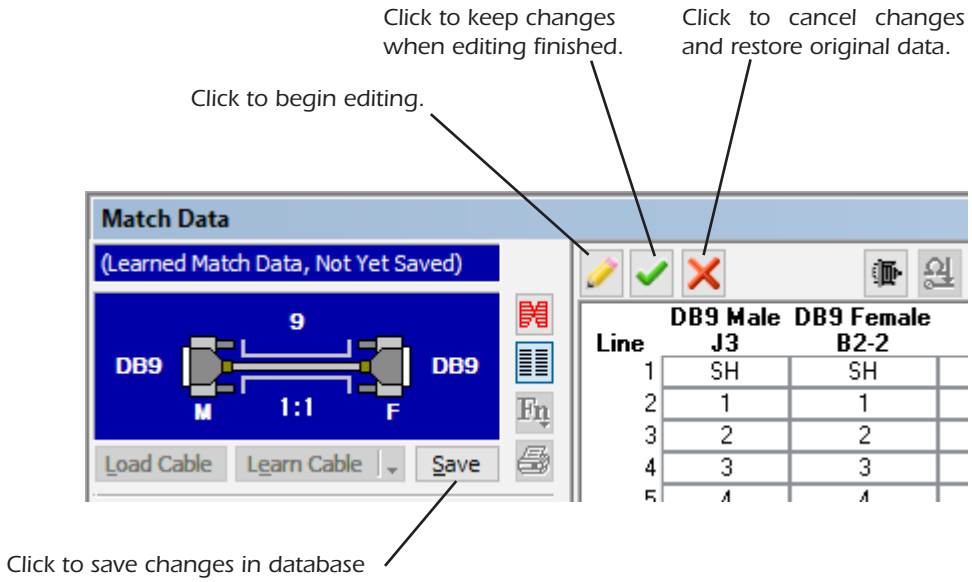
In many cases, you may attach a cable in different orientations. For example, if you test a DB9 male to DB9 female cable using two CB15 boards, you may connect the male side to either board since each board offers both genders. In general, the screen orientation will match the board orientation. However, if you search the database for a match, or load a match manually, the Test Data orientation may be changed to match the orientation of the cable you loaded from the database.

Searching for Wire Harnesses

Because of the many and varied connector combination possible in a wire harness, searching the database for other than an exact match when any errors exist in the Test Data may not succeed, even though a very close match may be present. The number of connector and wiring combinations possible with multiple connectors present quickly becomes explosive, and the search algorithm we use limits the search depth to reasonable limits. If you know a close match exists in the database, try searching for a match to connectors only – if there are not too many choices, you should be able to quickly determine if any harnesses in the list have similar wiring.

3.8 Editing Cable Data

You may sometimes need to change the wiring or connectors in a cable you learn or load from the database. Accomplish this easily using either the Netlist grid or the Graphic wiring display; varying needs may make one display method preferable. We describe both below. For either Netlist and Graphic editing, four buttons in the display window control the process:



Clicking the yellow pencil button opens the cable file for editing.

> **Note:** You must be logged-in to CableEye as either a supervisor or administrator to edit cables. If logged-in as an Operator, you will not have sufficient privileges to edit data and this button will be grayed-out.

Once you have made the desired changes, click the green Check button to save your changes temporarily. At this time, you may use Test Cable to compare the edited Match Data to a test cable prior to saving the edited cable to the database. If you click the Red "X" instead, any changes you made will be discarded and the original data restored.

Finally, when finished editing, click the Save button to store your changes in the database. If you choose to save changes using an existing name, the original cable data will be overwritten. Alternatively, you may save changes to a new name to create a new entry in the database.

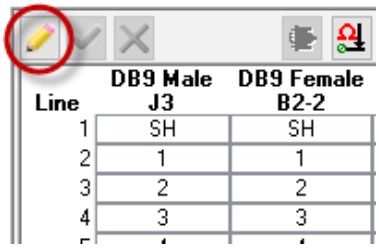
3.8.1 Editing the Netlist

A netlist shows cable connections numerically in a table. In cases where components like resistors and diodes are connected or when a cable has a large number of connectors, the netlist view may be preferable to the graphic view to depict a cable's wiring. Also, note that the program stores cable wiring as a *netlist*, not as a graphic wiring display, so that when you choose to show a wiring graphic, CableEye's special software generates the graphical display from the wire list.

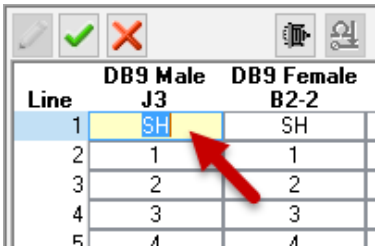
To edit existing cable data:

1. **Measure** a cable using **Test Cable** or **Load** a cable from the database.

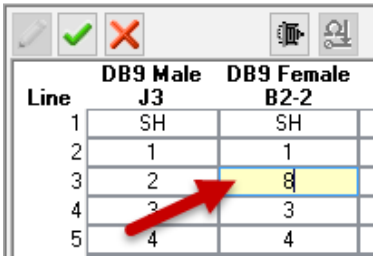
2. **Click** on the **yellow Pencil** button to begin editing.



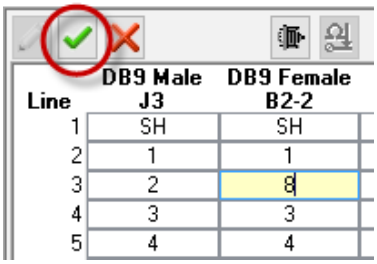
3. When the Edit mode starts, the first cell highlights. Note that the yellow pencil becomes gray to show you have entered the Edit mode.



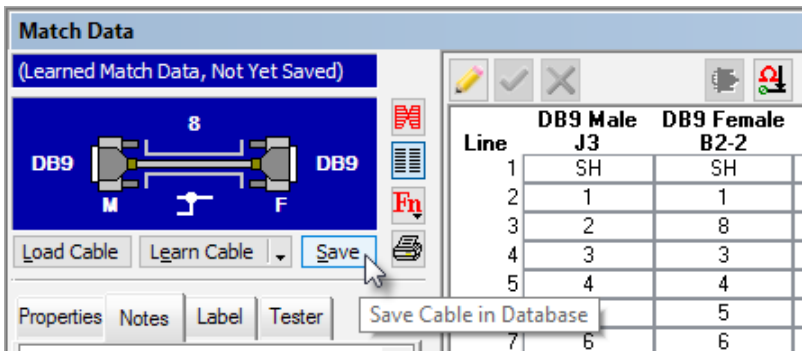
4. **Click** on the **cell** you want to edit and type in the new connection.



5. When finished editing, **click** on the green **checkmark** to accept your changes.



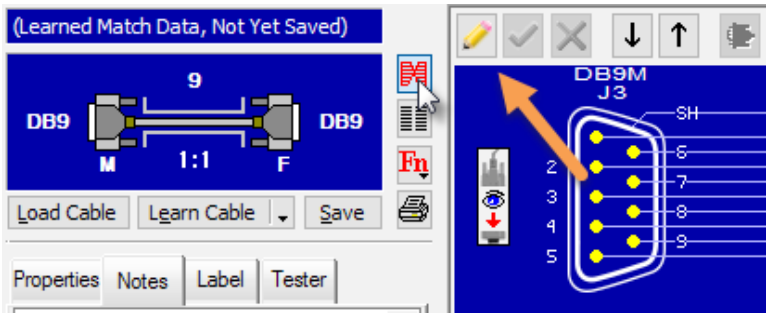
6. If you are happy with the changes, **click** the **Save** button to store the cable in the database. You can overwrite the existing file or save the cable with a new name.



3.8.2 Editing the Graphic Display

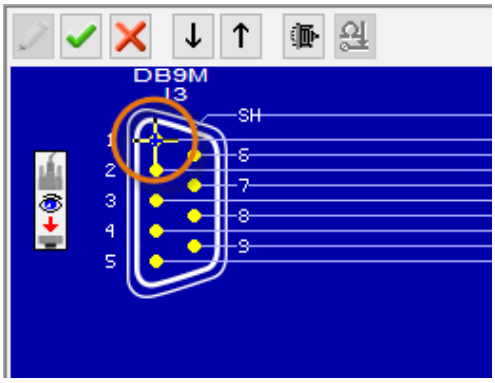
In a similar way, the wiring data can be edited from the Graphic Display.

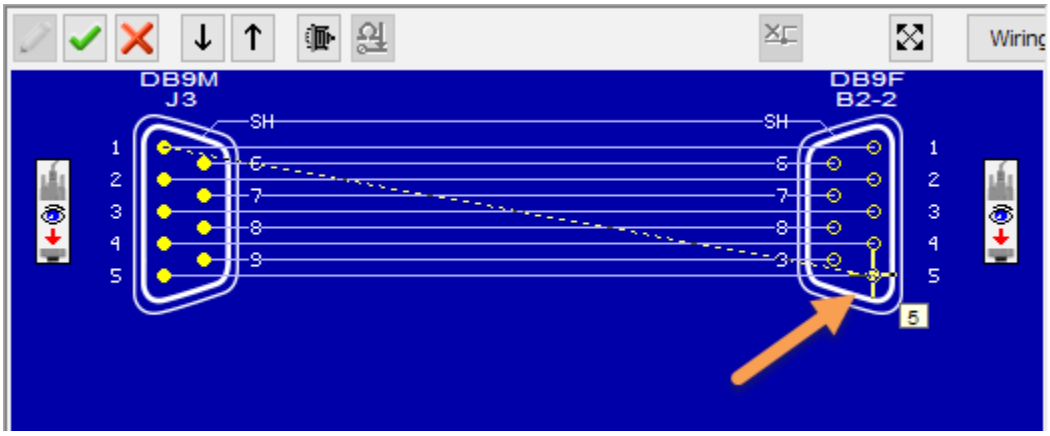
1. **Click** on the **Display Wiring Graphic** button to show the graphic display and then **click** on the **yellow pencil** to enter edit mode.



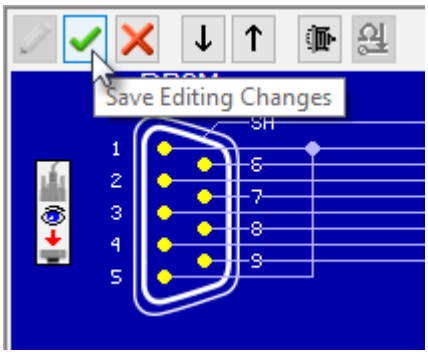
2. To add a new connection, you need to **click** the **pin** from where you want to create the connection and **hold it down**. Note that the cursor will change to a crosshair before clicking on the pin.

3. **Keep holding** the mouse down and **drag it to the second pin** to where you want to create the connection. Note that a dotted line is drawn from the starting pin to the mouse pointer. **Release the mouse on top of the second pin**. (See Below)





4. Once the new connection is created, **click** on the green **checkmark** and **Save** button to save the changes, just like in the netlist view.

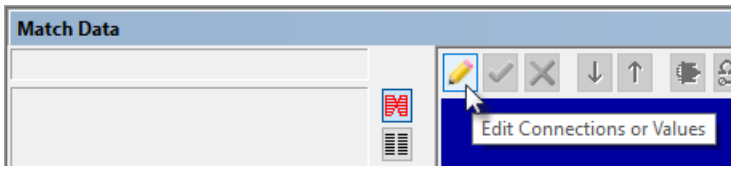


3.9 Designing a New Cable

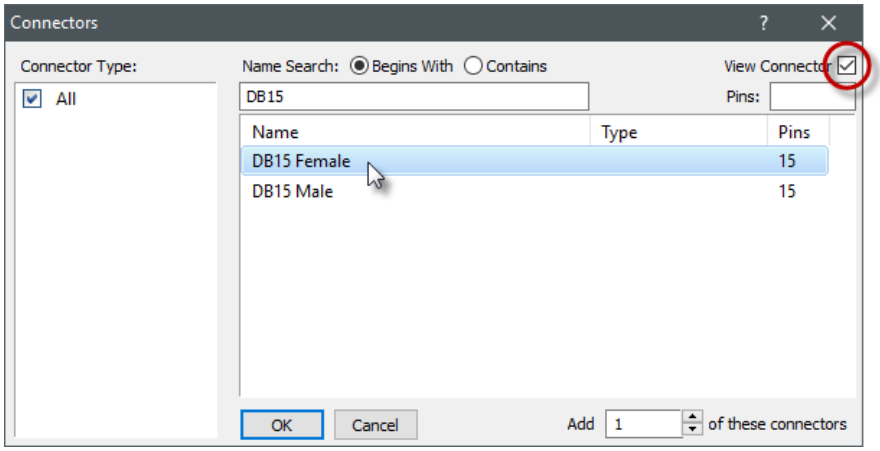
You may design a completely new cable while at the same time creating test data against which the first prototype can be measured.

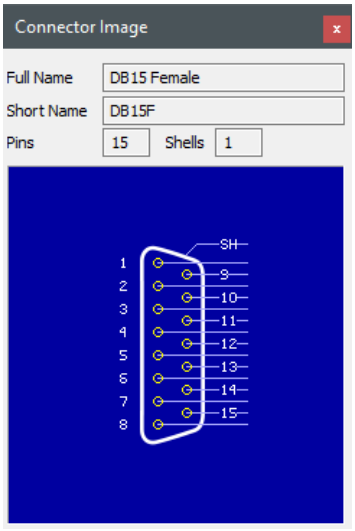
1. Start by clearing the Match and Test buffers by **Clicking** in the **CLEAR** button.

2. **Click** on the **Edit** button (pencil) in the Match Data Window.



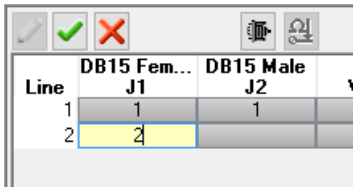
3. A new window titled Connectors will appear, in which you will **choose the first connector** for your cable. Note that if you check the View Connector checkbox in the Connectors Window, you will get another window with a preview of the connector as show in the right. This preview is very useful to help you find the proper graphic for you cable.





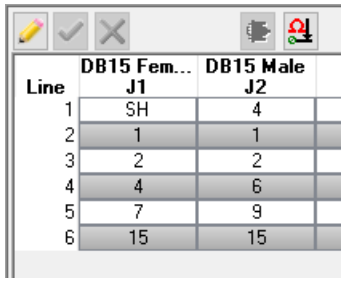
4. After selecting the first connector, you can **click the Add New Connector** button  **if you have to add another connector**. The same Connectors window will appear allowing you to choose another one. You can add as many connectors as you need repeating this step.

5. You can now **start adding connections between the connectors** as shown in the right. This is very similar to how you edit a cable, as explained in the previous section. The only difference is that the netlist is empty.



6. Once you are done adding connections to your cable, you can proceed to **add description, colors and any other required information for your cable**.

7. Finally, you will **click the Save button** and **name your cable** accordingly. Note that we recommend you to save your cable several times during the creation, so you don't loose any changes in case a mistake is made. The final result might look something like the image in the right. This is a very simple example of a DB15M to DB15F cable with only 6 connections.

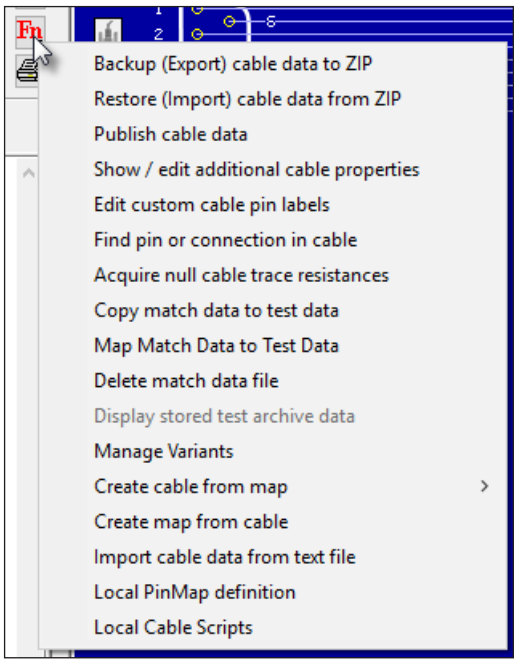


8. Note that you can also add connections in graphics mode, the same way you edit in graphic mode as explained in the previous section.

9. Once your cable is saved, review the cable wiring to confirm the design. Remember that this will be your golden cable loaded into the match data, which you will use to compare against, so extra precautions should be taking before proceeding into production testing.

3.10 Special Functions

Clicking the **Fn - Special Functions** button Fn just above the *Print* button opens a pull-down menu that reveals several *Special Functions*. Both Test and Match data have special functions, which are software functions that are less commonly used than the basic operations and thus are hidden from view until needed.



1. Click the Fn button in the Match Data Window.

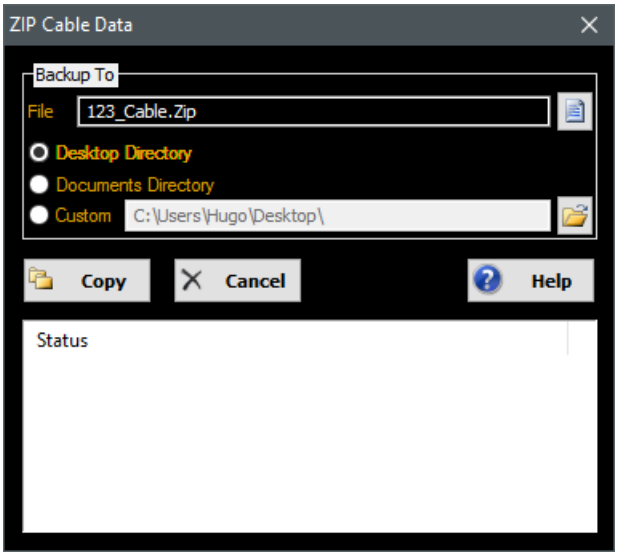
2. Select an option from the drop down menu. The drop down menu for the match data window is shown on the right.

Note that the Fn button in the Test Data Window will show a smaller drop down list and all the options shown in it are available for the match data as well.

Below we will explain each one of these options:

3.10.1 Backup (Export) cable data to ZIP

This option allows you to copy your cable data file, and any related files it depends on (maps, connector files, etc.), to a ZIP archive.



Choosing this option opens a new pop-up window as shown in the right.

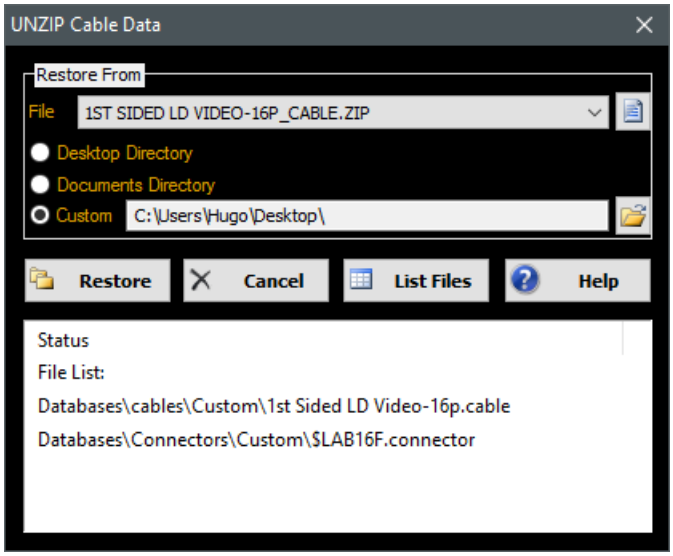
Use the Backup To section to specify the filename and directory that you want to write the ZIP archive to, then click the Copy button to create the ZIP file and copy the cable information to it.

The Status window indicates which directories are scanned and displays any errors that occur. When the copy completes, the Cancel button changes to Done (click this to exit).

For more detailed information on how the Backup utility works, click the Help button shown in the ZIP Cable Data window. This will open CableEye's online help system in a new window.

3.10.2 Restore (Import) cable data from ZIP

This option allows you restore or import a previously exported cable file.

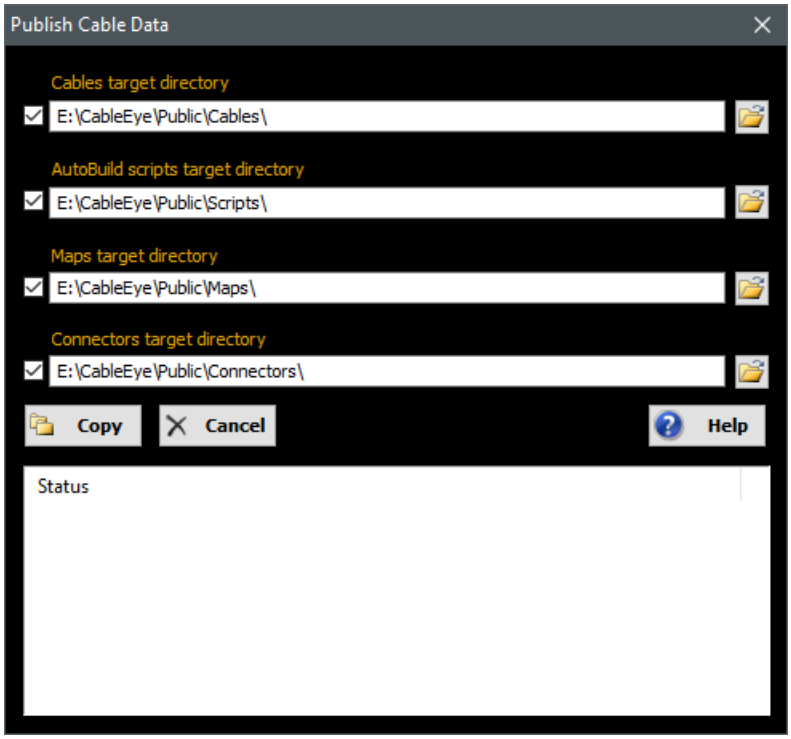


First, select the ZIP file that you wish to restore in the drop down box. Note that ZIP files saved with the Backup cable data function generally are named cable-name_CABLE.ZIP, where cable-name is the original name of the Match Data cable. When you specify a directory using the fields below, the drop down box is automatically filled in with the names of the ZIP files found there.

Clicking the List Files button will display the contents of the zip file. In the example, 2 files will be restored, a cable file and a connector file.

Click the Restore button when ready. This will copy the contents of the zip file to the proper places in the CableEye folder.

3.10.3 Publish Cable Data



With this option, you can copy your cable data file, and any related files it depends on (maps, connector files, etc.), to public directories. CableEye will display the window shown in the right.

Your shared cable data must include cable files. It may also include pin maps, AutoBuild scripts, and custom connector definitions. If you are sharing cable data amongst multiple computers, you should have separate directories for each of the required file types on your server.

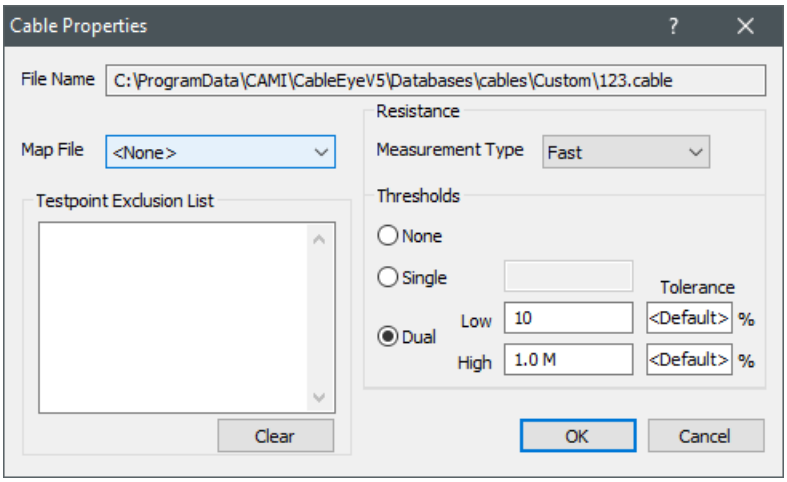
In the example on the right, we have a server on the E:\ drive, which has a CableEye structure with a Cables, Scripts, Maps and Connectors folder in it.

Click the Copy button to copy the cable files and any associated maps, scripts, or connector files to the specified shared locations.

For more details, click the Help button. This will open the CableEye help system automatically.

3.10.4 Show / edit additional cable properties

This option allows you to edit several properties of the cable.



The File Name area displays the directory location and file name of the cable. You cannot change the file name or location from here.

The Map File drop down allows you to select the fixture map file associated with the cable.

To select a map to associate with the cable file, click on the Map File drop down and select the map.

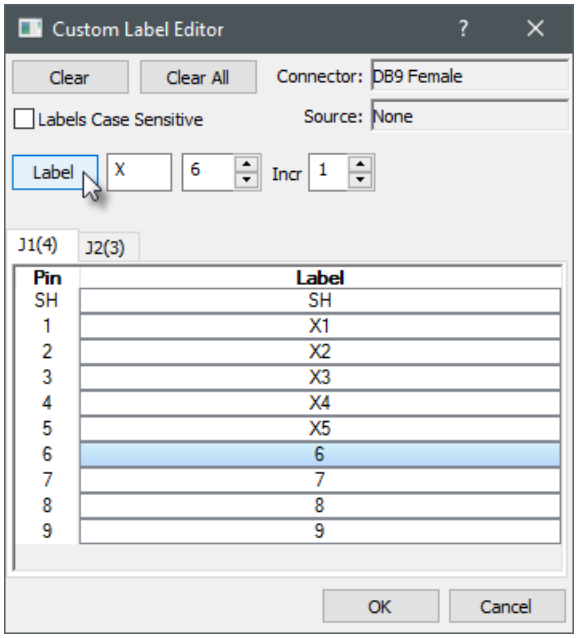
Testpoint Exclusion List allows you to set an specific exclusion list that only affects the loaded cable. To learn more about exclusion lists, check section 3.11, on page 3-32.

Resistance Measuring Type allows you to choose between fast or full. A full resistance test will provide better more accurate resistance measurements, whereas a fast resistance test will be faster but might have some inaccuracies reporting the value of the resistors. Use Full is your application requires accurate resistance measurements.

Use the Thresholds settings to specify the resistance threshold values that are associated with the cable. When the cable is used as Match Data, these values override the default threshold settings specified in the Resistance Limits Preferences page. Check Section 4, Measuring Resistance for more information about resistance thresholds.

3.10.5 Edit custom cable pin labels

CableEye allows you to edit the pin labels of your cable using this option. **Select the tab of the connector** that you want to edit, then you can either **manually type** in the **new label** or use the **Label** button to automatically generate the labels as shown in the right.



Fill in the **fixed text** field (containing "X") with the prefix part of your labels. Fill in the **numeric** field (containing "6") with the next number to use. Fill in the **increment** field (containing "1") with the number to increment (if >0) or decrement (if <0) the numeric field by, once the next label is assigned.

Click the Label button to assign the label to the highlighted pin. In the example, the Label button has been pressed 5 times.

Click the Clear or Clear All buttons in the top to remove the custom labels.

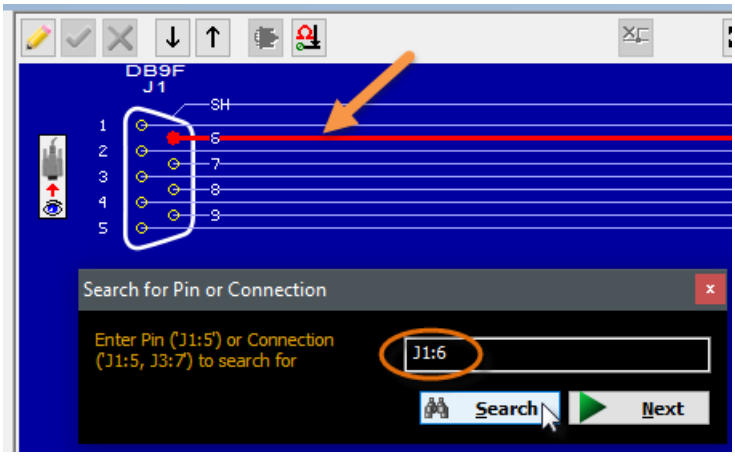
3.10.6 Find pin or connection in cable

This option allows you to find a pin or a connection in the cable.

Just type in the pin number in the following format:

Connector:Pin, Ex. J1:6 or Con5:X1, etc.

Typing J1:6 searches for pin 6 in the J1 connector. Click the Search button and the typed pin is highlighted in the cable as shown.



Acquire null cable trace resistances - Trace Resistance is explained in detail in section 4.11, page 4-16.

Copy match data to test data - With this option you will copy the contents of the Match Data window to the buffer in the Test Data Window.

Map match data to test data

Delete match data file - Select this option to delete the cable file from which the current Match Data was read. The Match Data panel is cleared.

Display stored test archive data - Select this option to show variables saved in the cable file when the SAVE TEST DATA Macro instruction was executed. This menu entry is valid only for "Archived" cables; that is, cables stored by the SAVE TEST DATA Macro instruction.

Create cable from Map - When you select Create cable from map, you will see a list of fixture map (pin map) files. Select one of these to create a new cable as Match Data based on this map. The new Match Data contains no wiring, but the connectors are those that are listed in the map. Read section 9 for more details on maps.

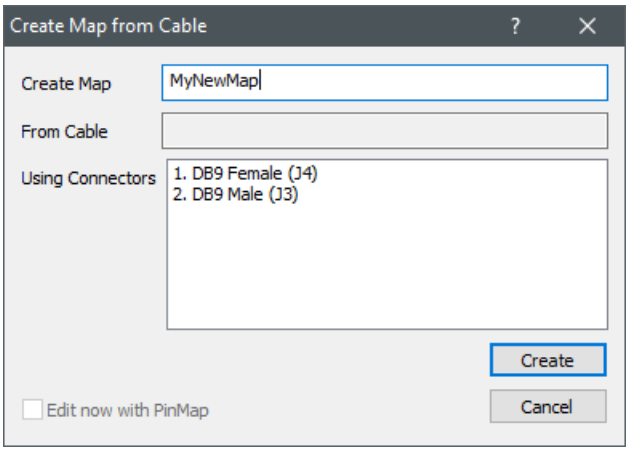
3.10.7 Create Map from Cable

This option allows to quickly create an empty map with the connectors used by the cable.

You can choose the name of the map as shown in the right. You will also see a list of the connectors that will be added to the map.

Click the Create button when ready. The new map should be available under Fixtures in the PinMap software.

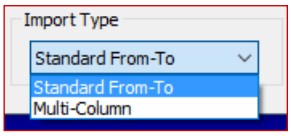
More information about PinMap and CableEye maps can be found in detail in section 9.



3.10.8 Import cable data form text file

You can import cable wiring as Match Data from sources other than CableEye using specially formatted tab-separated text files. You can easily create these files using programs such as Excel or a simple text editor. To read a text file as Match Data, select the Import cable data from text file option, and then use the file explorer dialog to navigate to your text files location and select the file you want to import.

Note the Import Type selection at the bottom of the dialog. You can select one of two import formats, depending on how the text file is formatted as shown in the right. Section 2.1.5 on page 2-10 explains the difference between the Standard From-To and Multi-Column options.



CableEye creates a cable using the connectors you specified and copies the wiring into the Match Data netlist grid. Press the Save button to save the cable to your cables database. The default name of the cable in the Save Cable Dialog will be the filename of your text file.

If the imported wiring list contains errors, the netlist grid remains in the edit mode with the first found error highlighted. You will need to correct the error(s) and press the Edit Done button before proceeding to save the imported cable.

Import Text File Format (From-To)

This format applies when you select the Standard From-To import type. The text file contains a list of connectors and a wiring list. The format of the text file must be exactly as follows:

```
<con-count>
<cami-con1-name> <tab> <your-con1-name>
<cami-con2-name> <tab> <your-con2-name>
.
.
<cami-conN-name><tab><your-conN-name>

<pins> <tab> <resistance>
```

where:

<tab> is a Tab character.

<con-count> is the number of connectors in your cable.

<cami-conX-name> is the full name of a connector from the CAMI database (e.g., “DB25 Male”).

<your-conX-name> is the name that you want to assign to the connector (e.g., “J1”).

<pins> two or more fully-specified pins (<connector>:<pin>) separated by commas, where <connector> is the name you assigned in the connector list, and <pin> is the pin number on that connector. For example, “J1:3, J4:10”.

<resistance> is the resistive value of the connection, if it has one. This field is optional.

EXAMPLE

Importing a text file that contains the following:

```
3
HDR-20 <tab> Base
DB9 Male <tab> X1
DB9 Female <tab> X2
Base:1, X1:1
Base:2, X1:3
Base:3, X1:5
Base:4, X1:7
Base:5, X2:1
Base:6, X2:3
Base:7, X2:5
Base:8, X2:7
X1:9, X2:9 <tab> 57k
Base:15, Base:16, Base:17
Base:20, X1:SH, X2:SH
```

results in a netlist as follows:

Line	Connections	Value
1	Base:1, X1:1	
2	Base:2, X1:3	
3	Base:3, X1:5	
4	Base:4, X1:7	
5	Base:5, X2:1	
6	Base:6, X2:3	
7	Base:7, X2:5	
8	Base:8, X2:7	
9	Base:15, Base:16, Base:17	
10	Base:20, X1:SH, X2:SH	
11	X1:9, X2:9	57.0 kΩ

Import Text File Format (Multi-Column)

This format applies when you select the Multi-Column import type.

The text file contains a list of connectors and a wiring list.

The format of the text file must be exactly as follows:

```
<connector-count>
<cami-con1-name> <tab> <your-con1-name>
<cami-con2-name> <tab> <your-con2-name>
.
.
<cami-conN-name> <tab> <your-conN-name>

<con1-pins> <tab> <con2-pins> <tab> ...
<conN-pins> <tab> <resistance>
```

where:

<tab> is a Tab character

<connector-count> is the number of connectors in your cable and is also a count of the connector description lines that follow

<cami-conX-name> is the full name of a connector from the CAMI database (e.g., "DB25 Male"). You can see the connector names by clearing Test Data (press the Clear button on the main toolbar) and then entering cable edit mode (press the Edit button,).

<your-conX-name> is the name that you want to assign to the connector (e.g., "J1"). This field is optional.

<conX-pins> zero, one, or more pins that are attached to the corresponding connector for the connection. If there is more than one pin attached to the same connector, separate the pin numbers with commas (e.g., "7, 8, 9").

<resistance> is the resistive value of the connection, if it has one. This field is optional.

EXAMPLE

For example, importing a text file that contains the following:

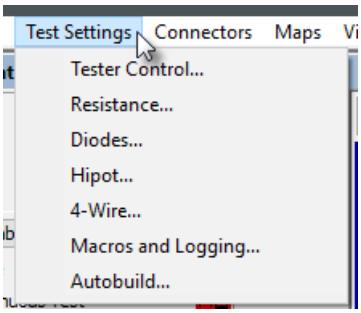
```
3
HDR-20 <tab> Base
DB9 Male <tab> X1
DB9 Female <tab> X2
1 <tab> 1
2 <tab> 3
3 <tab> 5
4 <tab> 7
5 <tab> <tab> 1
6 <tab> <tab> 3
7 <tab> <tab> 5
8 <tab> <tab> 7
<tab> 9 <tab> 9 <tab> 57k
15,16,17
20 <tab> SH <tab> SH
```

results in a netlist as follows:

Line	HDR-20 Base	DB9 Male X1	DB9 Female X2	Value
1	1	1		
2	2	3		
3	3	5		
4	4	7		
5	5		1	
6	6		3	
7	7		5	
8	8		7	
9	15, 16, 17			
10	20	SH	SH	
11		9	9	57.0 kΩ

Some special functions were being developed at the time this manual was written. These functions include "Manage Variants", "Local PinMap Definition" and "Local Cable Scripts" which will be developed to completion and added to this section when ready.

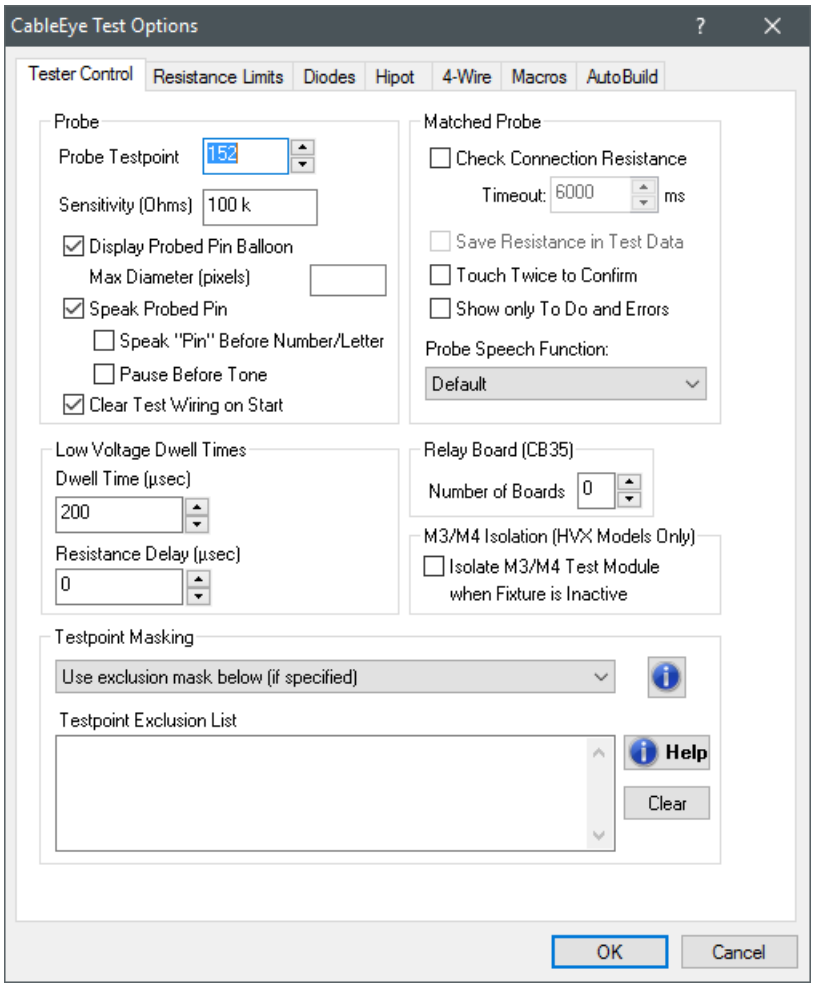
3.11 Test Settings Menu



The Test Settings menu offers controls and settings for the different types of tests that CableEye can perform. Clicking the Test Settings menu in the top, displays a drop down menu as shown on the right.

Select an option from the drop down menu to open the panel. All these panels are explained in detail in their corresponding sections except for Tester Control, which is covered below. For Resistance, Diodes and 4-Wire, refer to section 4 - Measuring Resistance. For HiPot, refer to the Getting Started Booklet included with your tester. For Macros and Logging refer to section 6 - Automatic Testing, and Finally for AutoBuild refer to section 12 - Guided Assembly Software.

3.11.1 Tester Control



This panel offers some generic options for multiple purposes. The first two sections, **Probe and Matched probe** are explained in detail in the next section 3.12 Using the Probe, on page 3-33.

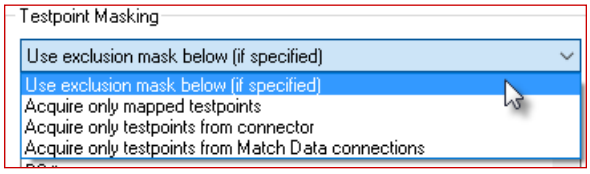
Low Voltage Dwell Times offers a control to set the testing Dwell Time and a Resistance Delay.

Relay Boards (CB35) - Type in the number of CB35 relay boards that you have connected to the tester. This setting affects directly the use of the boards in Automatic Testing. For more information about using relay boards, check Section 6 on page 6-14.

M3/M4 Isolation (HVX Models Only) - Enabling the Isolate M3/M4 check box, activates all the relays on an HVX CableEye tester.

Testpoint Masking - You can define an exclusion list of test points, which will mask out or ignore the test points in it during testing. In other words, any connection going to these points will not be reported by CableEye. Sometimes this is useful when an specific connection is unrelated to the cable that you are testing, and you don't want it to be displayed on the report.

You can choose from the drop down menu how to exclude test points during testing. The first option, **Use exclusion mask below** will use the list of test points specified in the Testpoint Exclusion List entry box.



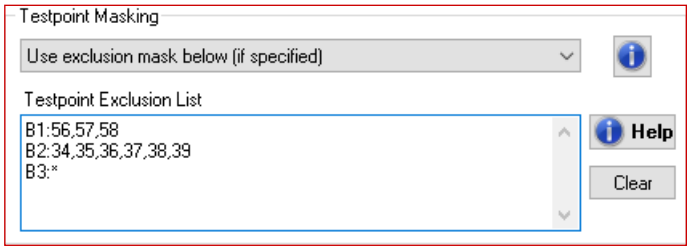
The Testpoint Exclusion Lists is a list particular testpoints that the CableEye software should ignore when interpreting raw data received from the tester. You can specify the default list to use in this field.

Note you are excluding raw testpoints not connector pins. You specify the testpoints to ignore as follows:

- Specify the tester bank ("B1", "B2", ...), followed by a colon (":"), followed by a comma-separated list of testpoints to ignore.
- To ignore an entire bank, specify an asterisk ("*") after the tester bank. For example "B2: *".
- To ignore testpoints on the 24-pin extension bank on the base unit, specify "EXTN" as the bank identifier. For example "Extn: 5, 7, 8".

To clear the list entirely, press the Clear button.

The example on the right excludes the test points 56, 57 and 58 from Bank 1, test points 34 to 39 from Bank 2 and the entire Bank 3.



If for example, we have a connection in our cable between TPs 35 and 36 on bank 2, CableEye will not report that connection. Note that even, if we have a connection between a valid test point, like TP 12 to TP 36 in bank 2, the connection is as well not reported by CableEye.

> Note that this exclusion list globally affects every cable tested, however you can set up an exclusion list for a single cable as explained in section 3.10, page 3-27.

From the Drop Down Menu:
Choosing **Acquire only mapped test points** will automatically create an exclusion list containing every raw test point not defined in the loaded map.

Choosing **Acquire only test points from connector** automatically creates the list with test points not used by the connectors learned.

Choosing **Acquire only testpoints from Match Data connections** automatically ignores any raw test point that is not included in the loaded match data.

3.12 Using the Probe

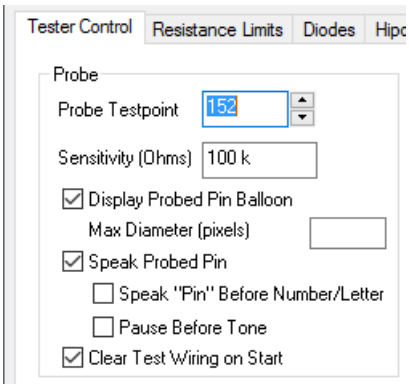
Most CableEye models include a hand probe. Use the probe to check cables with *flying leads* (unterminated ends), or tracing wiring in a molded or otherwise sealed connector. An optional wrist strap may be used (M3U or HVX testers only) when identifying wires without resistance measurement. Typically, this involves a cable with a connector attached to one end only.

3.12.1 Hardware Setup

Attach the probe to the **DB9 connector** on the right side of your tester and secure it by tightening the thumbscrews. Then, **set the Active Test Points** switch on the left side of the tester **to 152** test points.

3.12.2 Preferences Setup

Choose Tester Control in the **Preferences menu** to view the basic probe setup. As long as the probe connects to the DB9 port on the right side of the tester, the Probe Testpoint should remain at 152. When using an electrical probe as pictured above, the sensitivity may be 1 Megohm or less as shown here. When using the wrist strap, the sensitivity should be increased to 2 Megohms or higher.

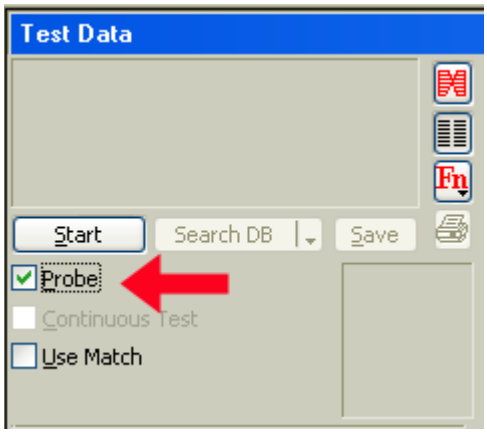


When the probe touches an unterminated wire, the software will respond by highlighting the associated pin in the netlist or on the graphic display. Optionally, you may also choose to show a large circle with a magnified pin number, ask the system to speak the detected pin using a synthetic voice, and choose to say “Pin” before the number. Finally, you would normally wish to clear the test data wiring prior to starting, so this box should be checked.

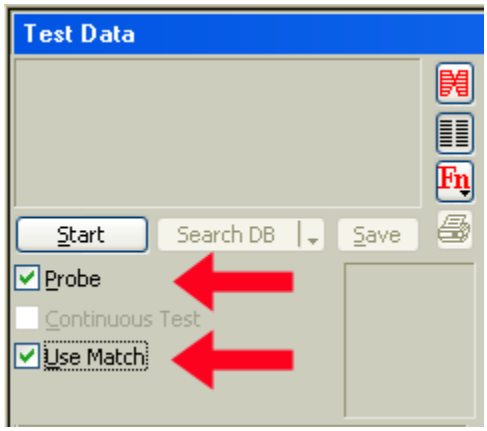
3.12.3 Software Functions

The probe operates in one of two modes as set by checkboxes in the Test Data window.

Mode 1, Probing: If you wish only to see the wiring of an unknown connector or cable, **click** on the **Probe** checkbox alone. Notice that the *Test Cable* button changes to *Start*. This mode simply reports what the probe touches and *does not* perform any test function by comparing this measurement to an ideal model. Software keeps a memory of the wires touched by the probe which you may view either as a graphic display or as a netlist. If desired, you may also print the result when finished.



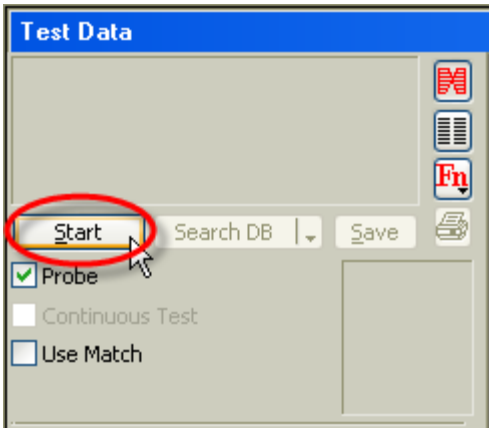
Mode 2, Matching: **Clicking** on the **Use Match** checkbox as well activates a *comparison function* enabling software to check each wire probed against the wiring loaded in the Match Data buffer. As the software detects individual flying leads you touch, it marks corresponding wiring in the Match Data as present, and stops automatically once all wiring has been seen. This "test" function will also check wire resistance if resistance values appear in the Match Data.



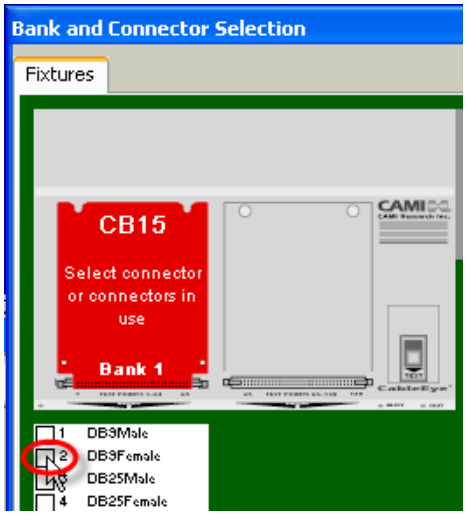
3.12.4 Example 1, Probing Function

Attach a single-ended DB9 cable to a CB15 board. We will probe the unconnected wires at the other end to trace connections to the DB9.

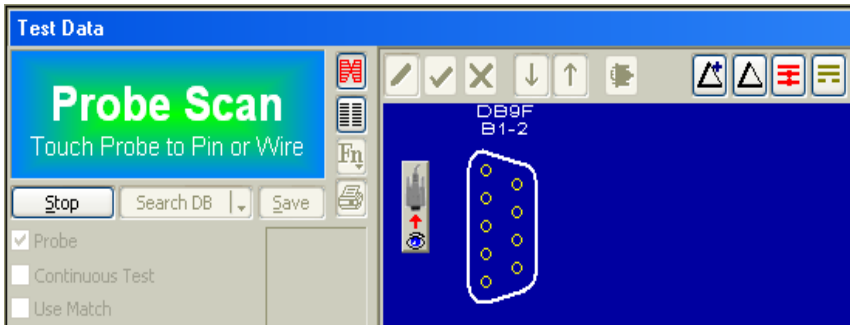
1. **Check** only the **Probe** checkbox to set the Probing function. Then, **click** the **Start** button to begin scanning.



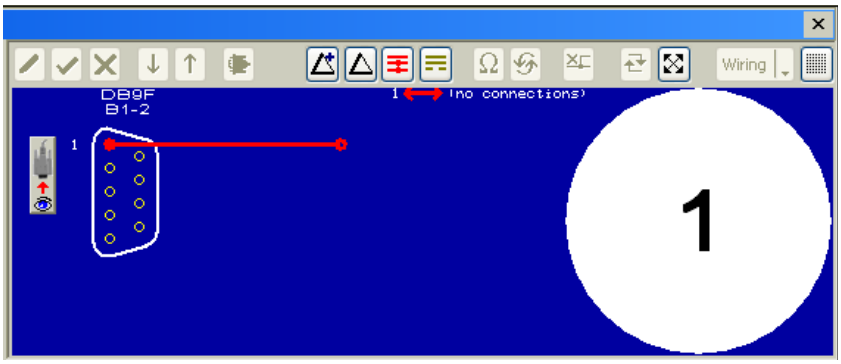
2. In this example, the software is not capable of automatically identifying where the cable was attached in the CB15 board. A pop up message appears asking to select the proper socket number. We have attached this single-ended DB9 female connector to Socket 2 on the CB15, so **check Socket 2 - DB9 Female** when asked.



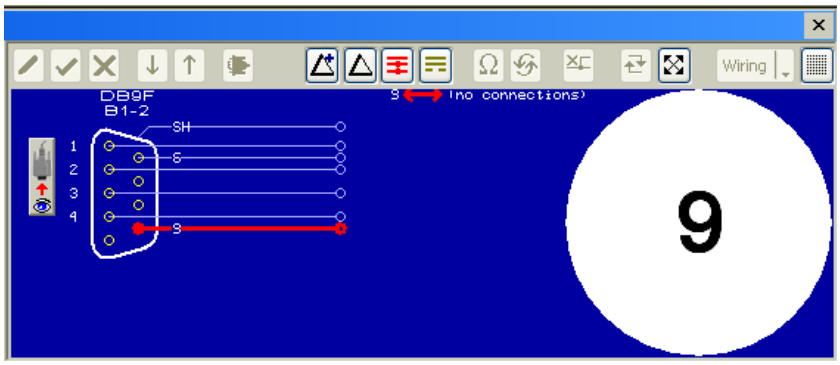
3. The system now begins scanning. You will see the *Busy* LED flashing on the CableEye tester to indicate this. Thus far, no wiring has been detected.



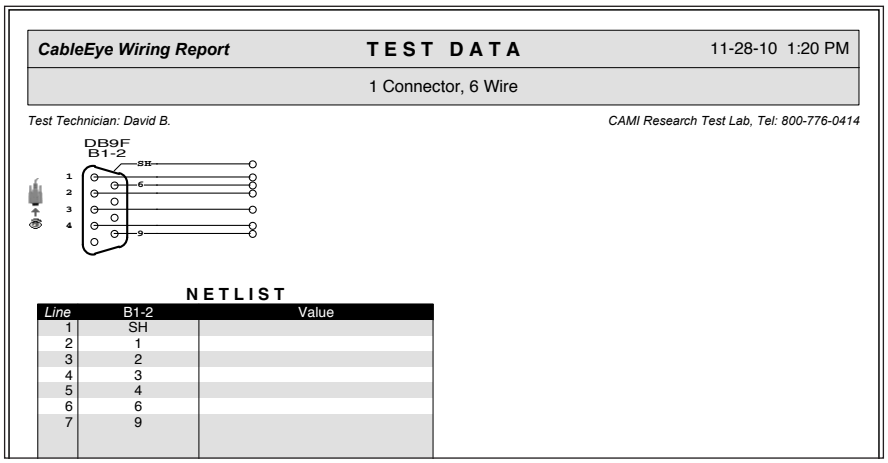
4. **Touch Pin 1 with the Probe**. A wire leading to this pin appears in the display along with a large white balloon on the right with an easy-to-see depiction of the pin number. You will also hear "Pin One" spoken if you have a synthetic voice font active in your computer.



5. Continue probing and **touch all pins one at a time**. The last pin touched appears highlighted in red with all previously touched wiring remaining visible.



6. **Click** the **Stop** button to finish probing and **click** the **Print** button to create a record of this wiring.



CableEye Wiring Report **TEST DATA** 11-28-10 1:20 PM

1 Connector, 6 Wire

Test Technician: David B. *CAMI Research Test Lab, Tel: 800-776-0414*

DB9F
B1-2

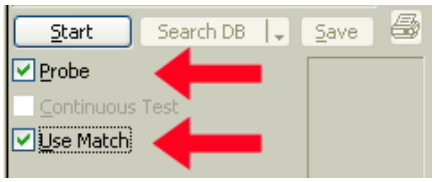
NETLIST

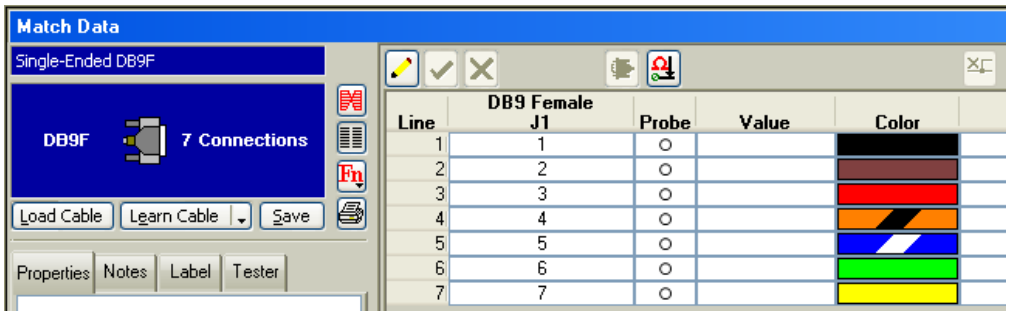
Line	B1-2	Value
1	SH	
2	1	
3	2	
4	3	
5	4	
6	6	
7	9	

3.12.5 Example 2, Matching Function

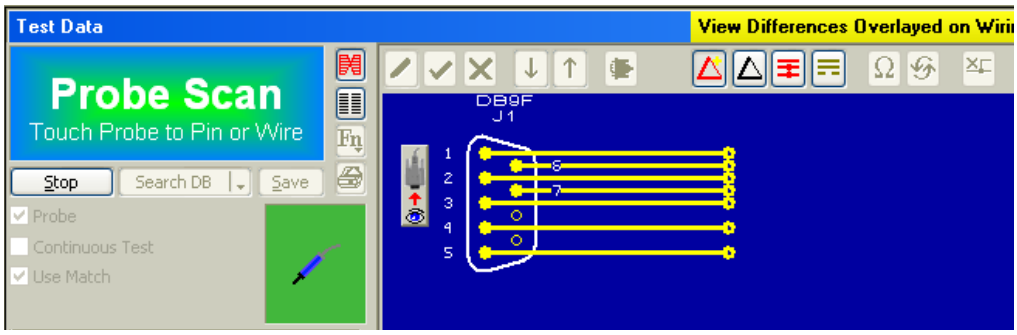
Attach a single-ended DB9 cable to a CB15 board.

1. **Check** both the **Probe** and **Use Match** checkboxes to set the Matching function. Then, **load** a model cable from the database, as seen below. Note the assigned color codes. Finally, **click** the **Start** button to begin scanning.

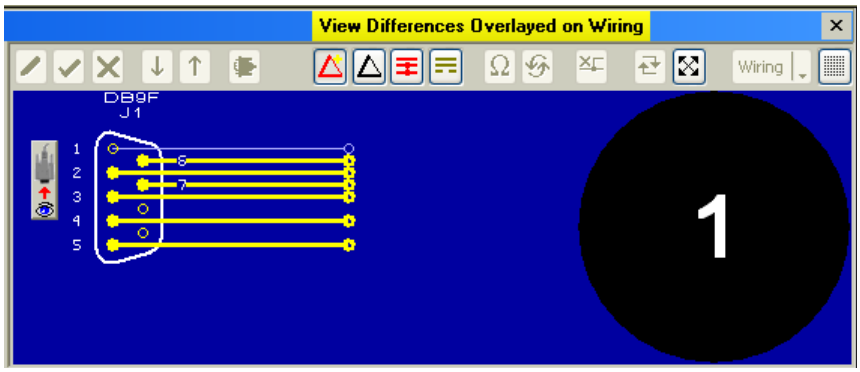




2. After you press the Start button, the system announces “Build Started” and shows a wiring screen with all expected wires highlighted in yellow.
3.

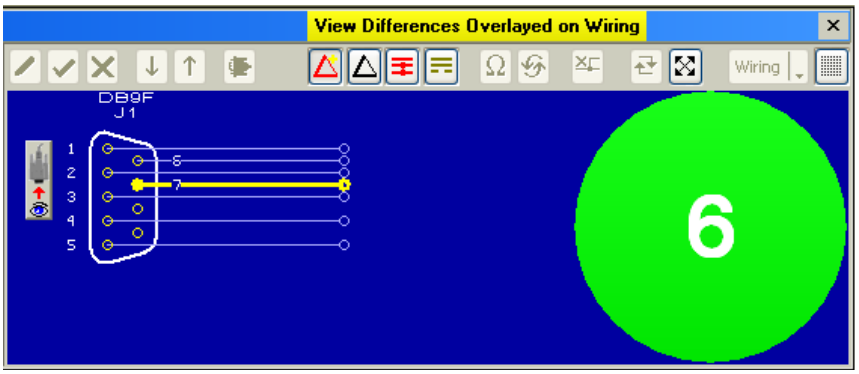


4. **Touch Pin 1** with the probe. This confirms the connection to that pin and the wire changes from yellow to white, and the system reads “One, Black”. Because the wire leading to Pin 1 should be black, the balloon appears with a black background which you may match to the wire between your fingers to check the color code.

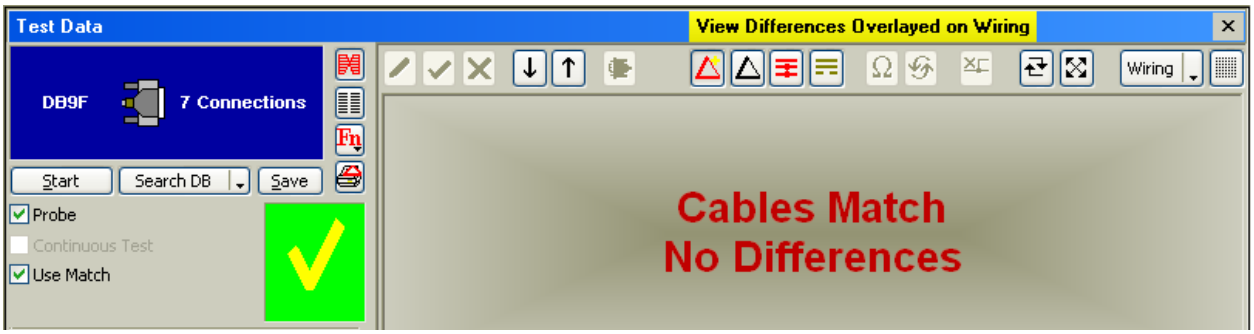


Note that if you touch a pin not represented in the Match Data, a red highlight will show on that wire to indicate the error.

5. **Continue probing** all the remaining wires. The image shows that one wire remains to be probed and no errors have yet occurred.

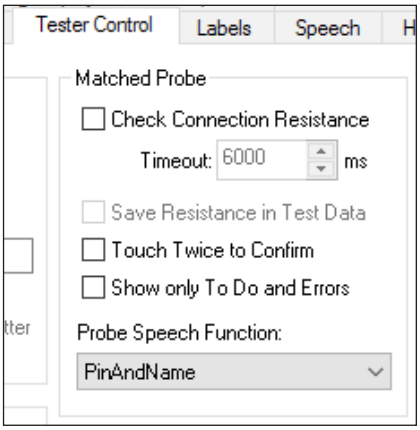


6. With all wires touched by the probe, the system reads “Build Complete” and the screen below confirms that no errors have been detected. Note that this method of test does not impose any order in the probing of wires; you may touch them in any sequence, and may touch the same wire several times without causing a problem. As long as all wires have been seen at least once by the probe and no incorrect wires found, the system will end with a Match. Although not apparent here, the system also checks resistance thresholds as you probe each wire. A probed wire that comes in with a resistance above the threshold will flag an error.



For hands-free probing, use a wrist strap, as seen on the right, to detect the presence of wire connections. However, you will not be able to measure resistance or check resistance thresholds in this case.

3.12.6 Matching Probe Test Options

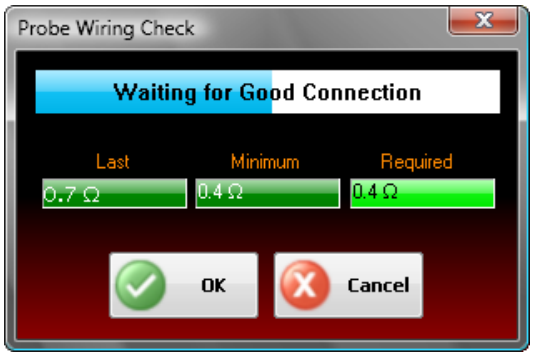


You can run the Matching Probe function in one of 4 possible modes. These modes can be activated from the **Preferences menu | Tester Control**, as shown in the right, under Matched Probe.

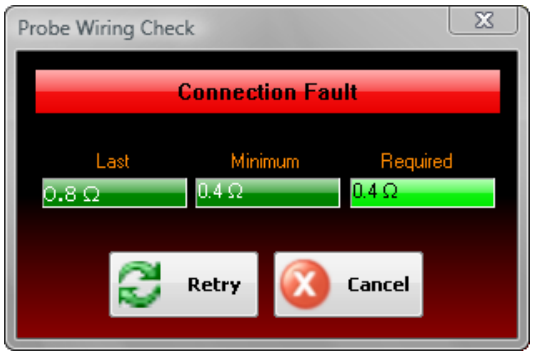
Simple Connection **-** The default option without any check box selected. When you touch the probe to a lead, the corresponding connection in the Test Data differences view is changed from Missing to Good. No other connection verification is required. This is how *Example 2* on page 3-36 works.

Resistance Checked **-** To enable this mode, **check** the **Check Connection Resistance** box.

In this mode, the resistance of the flying lead is measured. If a connection is sensed, the popup dialog shown in the right is displayed.



The resistance measured through the probe must be *below* a *threshold value* for the wire to be declared as *Good* (read Section 4, Measuring Resistance, to learn more about resistance thresholds). It checks the connection for a minimum resistance value. If the wire has a defined *resistance value in the Match Data* (e.g. 0.4 Ω), then the measured resistance must be below 0.4 Ω for the wire to be accepted as *Good*. If the wire has no defined Match Data resistance value, then the low resistance threshold is used.

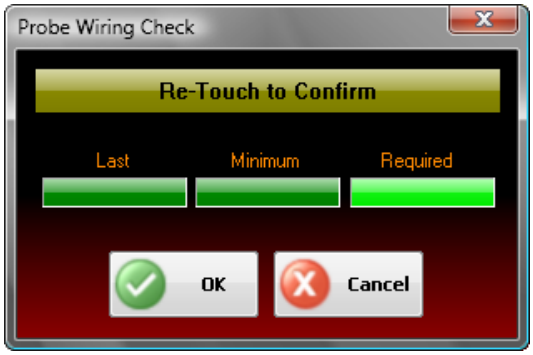


The resistance check continues for a determined time (6,000 ms by default). If the probed resistance never drops below the required value in that time, then an error tone sounds and you may either click Cancel to skip the wire or Retry to resume checking the resistance.

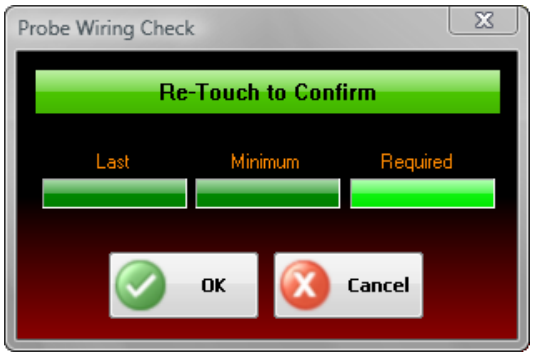
Re-Probe Confirmed - To enable this mode, **check** the **Touch Twice to Confirm** box

In this mode, to accept the wire as Good, the operator must touch the lead once as before, but then remove the probe from the lead, wait for some sort period of time (350 milliseconds by default), and then touch the lead with the probe once more.

When the connection is initially sensed, CableEye displays the popup in the right. If you remove the probe from the pin very quickly, you might not be able to notice the brown background color of the Re-Touch to Confirm box. This box changes to a green background in the following step.



When the probe is removed from the lead and CableEye is ready to sense the confirming re-probe, a “tick” sound is played and the top field is changed to a green background.



Re-Probed Resistance Checked - This is a combination of the previous two modes. The probed resistance must dip below the value as described in the *Resistance Checked mode*. An initial success tone is then played. The operator must then remove the probe from the lead and re-probe it in order to confirm the wire as Good.

To enable this mode, **check** both **Check Connection Resistance** and **Touch Twice to Confirm** on the Tester Control preference menu.