1 Initial Setup and Test Guidelines

About this Section

This section contains a general explanation on how to connect and perform the initial setup of your CableEye Tester. A separate booklet included with your system called ***Getting Started*** provides specific information for your CableEye model, and should be read first. Return to this manual after.

You will learn how to install the CableEye Software, setup your tester and any other hardware or accessories.

Once you've connected the test fixture and started the software, you should be able to learn how to use CableEye for many basic operations without referring to the manual. However, to get the most out of the software, you should return to this manual and continue reading. Definitely plan to come back and read about Automatic Testing which can totally automate your repetitive testing procedures. Enjoy!

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

— Click on any entry to jump to the page —

Knowledge Base Recommendation - If you are a new CableEye User, we highly recommend that you read the following documents in the order displayed below and check our demonstration Video Clips.

1	Getting Started Booklet	Printed copy included with your CableEye System and digital copy on the installer CD	Quick guide to setup your tester and install the software.
2	Applications Guide	Printed copy included with your CableEye System and digital copy on the installer CD	Quick guide offering an introduction to every important function of the CableEye tester and software. Often, this guide is enough to setup your tester in a production environment.
3	Web Video Clips	On our website at: camiresearch.com/Web_Videoclips	Multiple video clips demonstrating the use of important software features.
4	User's Manual	Digital copy included on the Installer CD & in our website at: CableEye-Users-Manual.html	In-depth explanation of all CableEye features. Intended for system administrators and technicians.

1.1 Computer Requirements

CableEye requires a Windows® PC, desktop or laptop, that meets the following requirements:

- The operating system should be Windows XP-SP3 or newer. Note that the CableEye test fixture measures the cable under test and transmits raw measurement data to the PC. ***The tester cannot be operated without a computer!***

- System RAM and Video Display Card - Any computer supporting Windows XP or above includes sufficient RAM and Video Capabilities to run CableEye. You should use a monitor with minimum resolution of 1024 x 768. Larger monitors allow a better view of wiring schematics.

- USB Port - The computer should have one USB port for low voltage testers, or two for high voltage testers.

- Printer - Any printer for which you have a windows driver should work with CableEye. Most modern printers will include a USB or Ethernet port.

- Network Operation - You may install the CableEye software on a network, or individually on as many computers as you wish. However, using the standard software license, the software will not start unless the CableEye fixture is attached to the computer and detected during the startup sequence. If you purchase our *Standalone Enabler* option (Item 729), the software will start if the fixture is not present, permitting other users to view and edit cables, view reports, print labels, and perform any function that does not require data acquisition from the test fixture.

1.2 Software Installation (Windows XP-SP3 or Newer)

Follow the same installation procedure whether you receive the CableEye software on a CD or through download from our web site.

1. When you insert the CD into your drive, the installer instructions should appear automatically after a few seconds. If nothing happens, go to *My Computer* and open the CD drive. Double-click on "Install.exe" to open the installer instructions.

2. Follow the installer's on-screen instructions. You may use this CD to install a new copy of the software or upgrade your existing CableEye software as explained in the instructions.

   Once the installer starts, it should finish in about 30 seconds.

   We prepared the CD especially for your order. It includes a *Calibration File* (if required by your tester model) unique to your tester hardware, and a *License File* that activates any optional software you purchased (such as PinMap, Item 708). The Calibration and License files are placed in the proper locations on your disk automatically by the installer and you need not take any special action.

   The installer creates a new folder in your Program Files and Data Files folders named "CableEyeV5" and places the red CableEye Icon on your desktop.

   This completes the software installation and you are ready to setup the hardware!

3. If you have ordered the Applications Programming Interface (API - Item 730), special installation

steps will be required after installing the Primary CableEye software. You will see instructions for this in the CD if you ordered this item.

4. The installation CD contains extensive documentation about the CableEye system, as well as the *Application's Guide*, *User's Manual* and *Videoclip Demostrations,* to help you learn how to use the system.

5. We provide a printed copy of the **CableEye Applications Guide** with your tester. This also appears in .pdf format on your installer CD. The Applications Guide offers a brief, one-page introduction to every important function of the tester. If you have not used CableEye before, this booklet should be read after the *Getting Started booklet*. It provides an excellent introduction to the system and will quickly and easily demonstrate basic software operation.

6. The *User's Manual* (what you are reading) included in the installer CD, will offer an in-depth explanation of all the CableEye features. It is recommended for tester administrators or if you simply want to learn everything about CableEye. You can also download a copy of the User's Manual from: *www.camiresearch.com/CableEye-Users-Manual.html.*

> *IMPORTANT:* Keep regular backups! If your cable files or other custom files are damaged or destroyed by hard disk failure or a software virus, you will need a backup to restore them. Without a backup, all cables you stored must be reentered as well as your notes. Your LOG files and your custom operator notes files will be lost, and all Macros and MAP files must be redeveloped. We recommend using the backup utility built in to the CableEye software; go to /File/Backup to ZIP... Alternatively, using various commercial backup utilities, you may schedule automatic backups to a network hard drive external to your machine. We strongly encourage you to do so!

1.3 Hardware Setup

Your tester was shipped with the booklet "Getting Started". Consult this booklet to find out how to properly setup your specific CableEye model. The following is a common installation for any CableEye Tester:

1. Connect the CableEye tester to an available USB port on the computer. If you use a USB hub, it should be a *powered* hub to ensure accurate data transmission. If you experience inconsistent response or data errors during operation when using a hub, shut down the hardware and try reconnecting directly to a USB connector on the computer.

2. Connect the power module or AC plug to a source of power, and connect the other end to the CableEye tester. If you received a desktop power supply with one or more splitters, you should connect all of them to the available expansion modules.

3. Press the power switch to turn on the tester. You will see the power lamp glow when the circuitry is receiving power. *NOTE:* Expanded M2U or M3U CableEye testers (more than 152 test points) do not have a power switch! In this case, plan to use a power strip with surge suppressor to control the power.

> **CAUTION:** *If you use different CableEye models in your facility, be sure to use the correct power supply with each tester model.* Using an M3U supply with an M2U tester will cause it to overheat and may damage the regulator. Using an M2U supply with an M3U tester will produce incorrect resistance readings.
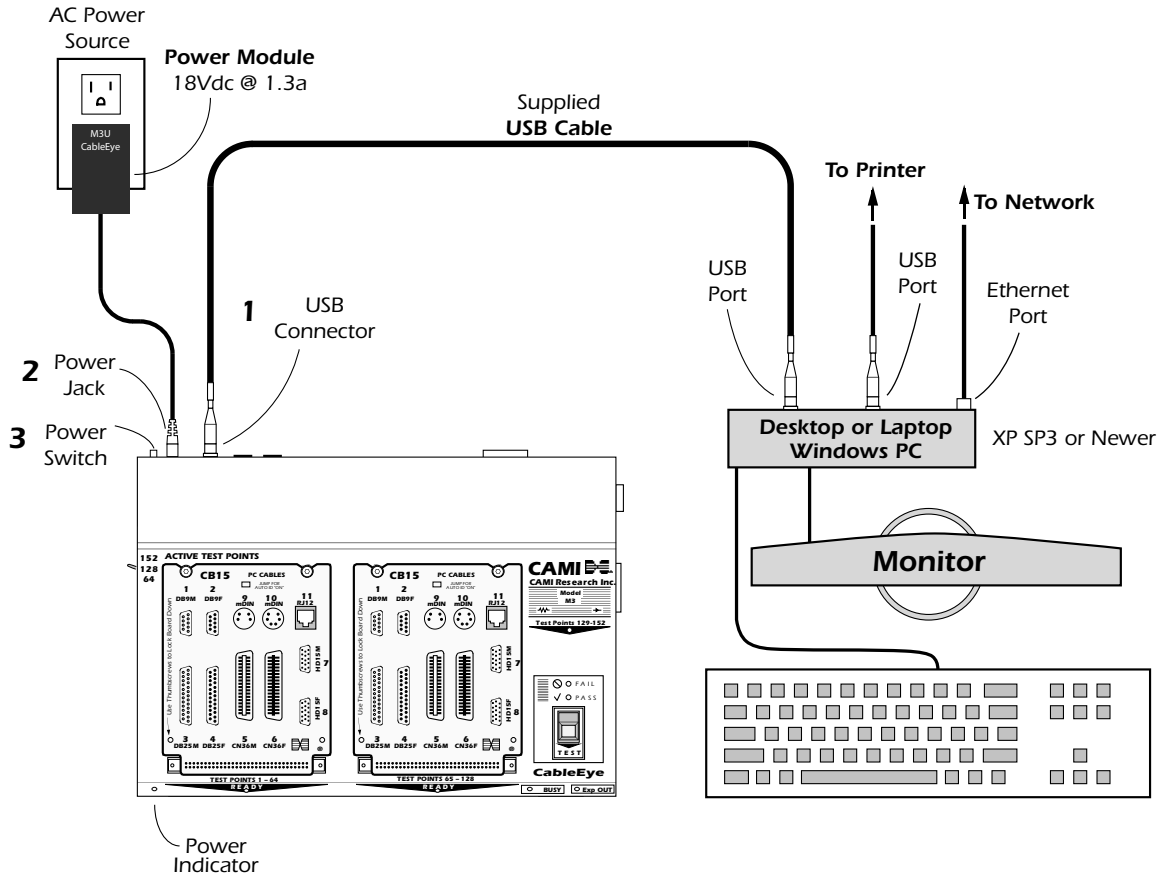
Typical hardware setup between the CableEye tester and the computer. Check the "Getting Started" booklet (included with your tester) for your specific CableEye model.

1.4 Starting the CableEye Software

Be sure your CableEye test fixture is connected and its power is "on" (yellow LED visible). The power switch is located next to the power plug in the rear of the machine. Note that when you turn on a USB tester for the first time, Windows finds your new hardware and acknowledges this with a small message confirming that the driver has been installed correctly. This happens only the first time you turn on the hardware.

The installer placed a CableEye shortcut on your desktop. Double click this icon to start the CableEye application. You should see the CableEye startup screen. When the software establishes communication with the test fixture, the CableEye software screen appears, and green READY LEDs found on the front of the tester will turn on . You may now begin testing cables!
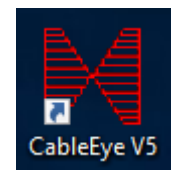
1.5 Possible Startup Problems

1. You've connected the USB cable to an unpowered hub, or a hub that does not conform with standard USB design guidelines. Shut down the software, turn off the test fixture, and try connecting directly to one of the computer's USB connectors.

2. The USB driver was not installed correctly. This might happen if you connected and powered-up the CableEye tester before installing the software. In this case, turn off the tester, uninstall the CableEye software, restart the computer, and reinstall the CableEye software.

3. You have a defective or intermittent USB cable (rare but possible). Try changing cables.

4. If a USB tester will not link to the computer, check the BUSY and PASS LED lamps at the moment of power-up. If the BUSY lamp flashes four times, this indicates that the microcontroller IC in the test fixture is alive and operating. If the PASS light also flashes three or four times, this additionally shows that a low-level link has been made between the USB controller ICs in the CableEye test fixture and the computer. If both lamps flash on power-up and you are still unable to communicate with the tester, then there is likely a driver problem.

If you cannot resolve startup problems having checked all of the above items, call CAMI Research at 800-776-0414 (or e-mail *supportv@camiresearch.com*) and ask for technical support.

1.6 Ready to Test!

We suggest you now refer to the CableEye Applications Guide suggested previously and try working through some of the examples. If your Applications Guide has been mislaid or is not available, please refer to your software installer CD where the Applications Guide is available in .pdf form.

While you are working with CableEye, please observe the following precautions:

> ***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 testing. Attaching a live cable to the tester may cause serious damage that is not covered by the warranty, or render the electronics unrepairable.

> Always discharge static electricity before connecting a cable to the test fixture! Once you are positioned in front of the test fixture, touch yourself to a grounded object before attaching the cable. The hardware can sustain small discharges without damage. Large or repeated discharges may damage internal components.

1.7 Contents of Your CableEye Folder

The CableEye Installer CD creates a new folder on your hard drive:

> *\Program Files\CableEyeV5*

The Software folder inside the CableEyeV5 folder contains important software components of the system, but most important, it contains a shortcut folder named ***Data.***

The **Data** folder resides in a different location in your hard drive, inside the normally hidden **Program Data** system folder in your hard drive.

The following page describes the contents of the Data folder.

API stores examples for the applications programming interface optional software.

AutoBuild stores scripts and logs used with the AutoBuild optional software

Databases holds stored cables, custom fixture maps, and connector graphics definitions. See the next page for more details on the Databases folder.

Event Handlers stores custom events scripts. More details in section 8.14 in page 8-9.

Export and Import act as data receptacles when you use the optional *Exporter* software option (Item 709).

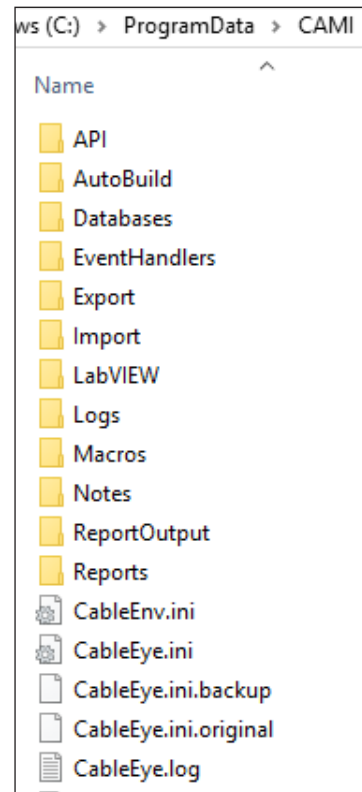**LabView** holds the LabView library included with the API optional software.

Logs contains log files and data archives acquired during production testing.

Macros stores your automatic test scripts.

Notes stores all of your macro notes for operator prompting.

ReportOutput is the default folder to export pdf files of reports and labels.

Reports holds the templates for the many different types of reports that CableEye can print. Your custom reports are stored here as well.

ws (C:) > ProgramData > CAMI

Name

- API
- AutoBuild
- Databases
- EventHandlers
- Export
- Import
- LabVIEW
- Logs
- Macros
- Notes
- ReportOutput
- Reports
- CableEnv.ini
- CableEye.ini
- CableEye.ini.backup
- CableEye.ini.original
- CableEye.log

CableEnv.ini preserves the state of your windows, their sizes and locations, color and format preferences.

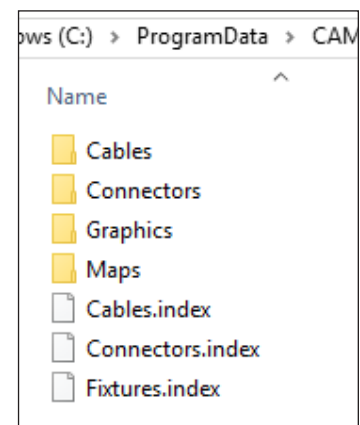**CableEye.exe** is the CableEye application itself

CableEye.ini holds the preferences you select in the *Preferences* menu.

Master.License is a software license that enables the software and any options you may have ordered with it (PinMap, Exporter, AutoBuild, Standalone Software). You will also see an *Update.License* if you purchase options later and enhance the license to activate them.

SerialNumber.cal - If your tester requires calibration, you will find the calibration file in this folder.

The **Databases** Folder contains databases for (a) stored cables, (b) connector graphics, and (c) pin maps. Each subfolder includes a *CAMI* and *Custom* folder so that standard data provided by CAMI Research may be separated from, and updated independently of, custom data that you create while using the CableEye software.

Note that you may redirect these folders to a different location on your computer, or through a Shared folder to another computer or server. Refer to the \Preferences\Directories option to set custom locations for your critical data files. Doing so may benefit by sharing these folders on a network, or backing them up automatically through your server.

ws (C:) > ProgramData > CAM

Name

- Cables
- Connectors
- Graphics
- Maps
- Cables.index
- Connectors.index
- Fixtures.index

1.8 Test Guidelines

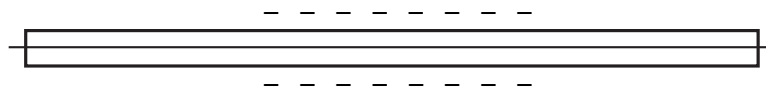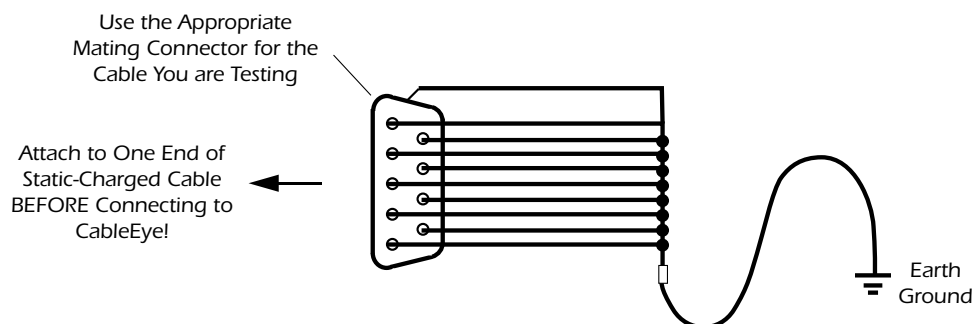### 1.8.1 Static Discharge Precautions

CableEye employs CMOS circuitry in the test fixture, so virtually no heat will be produced by it. Because CMOS inputs have very high impedance, however, the test fixture exhibits sensitivity to static discharge. To minimize static disruption, you should avoid setting up CableEye in a room with carpets, and humidify the room at least to a level of 50% if possible for the benefit of all electronic equipment.

NOTE: In the event that static discharge into the case or a connector should occur, one or more LED lamps may turn on. If this happens, toggle the power switch off (for 10 seconds) and on to reset the circuitry. Alternatively, exit the software program on the PC and restart it (this action generates a hardware reset from within the program).
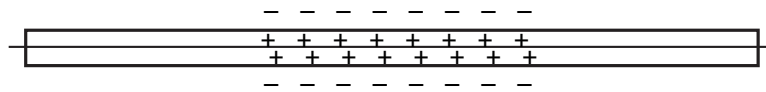
Clamping diodes inside the ICs make the circuit highly resistant to static damage. Although direct discharges into the connectors or case may disrupt the circuit, simply resetting the system as described above should correct any problems.

CAUTION: If you test cables longer than 10 feet (3 meters), static buildup in the copper conductors of the cable will not be discharged before testing, even when you use the normal precautions of a grounded work surface, sufficient humidity, and wrist straps. Long cables may contain a large volume of static charge which may discharge into CableEye's electronics when you connect the cable to the tester. Such a discharge may permanently damage the electronics. The drawing on the right illustrates the cause.

1 Friction on a cable's insulation when it is moved develops charge on the outer jacket.

**2** Opposite charge accumulates on the copper conductors under the insulation.

To ensure the copper conductors of a long cable are properly discharged, build a discharge connector in which all pins are bussed to a common point which is then tied to ground, as shown in the figure below, or purchase the CB25 Transient Suppressor Board, shown in the figure on the next page.
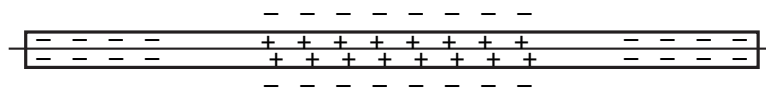
3 Charge in the middle of the copper conductors causes opposite charge to move towards the endpoints. The longer the cable, the larger the quantity of charge that develops. Rubber insulation worsens the problem.

Use the Appropriate Mating Connector for the Cable You are Testing

Attach to One End of Static-Charged Cable BEFORE Connecting to CableEye!

Earth Ground

Use **CB25 Connector Board** when regularly testing cables longer than 10 feet, when testing cables with a large surface area shield or conductor, or when working in a high static environment to guard your CableEye M3U tester against damage from electrostatic discharge. On each board, 64 transient suppressor diodes especially designed for fast switching divert any overvoltages to ground before damage to CableEye's electronics can occur. The CB25 mounts to the CableEye tester like any CB board and is physically secured with supplied stainless steel thumbscrews. Attach the CB boards you use directly on top of the CB25.

If you have attached expansion modules in your system, only the main base unit needs to be protected in this way.

HVX testers do not require and cannot use CB25 boards. Instead, go to /Preferences/Control and check *Isolate M3 Test Module when Fixture is Inactive.* This will switch the test points to Ground at all times except during active testing.
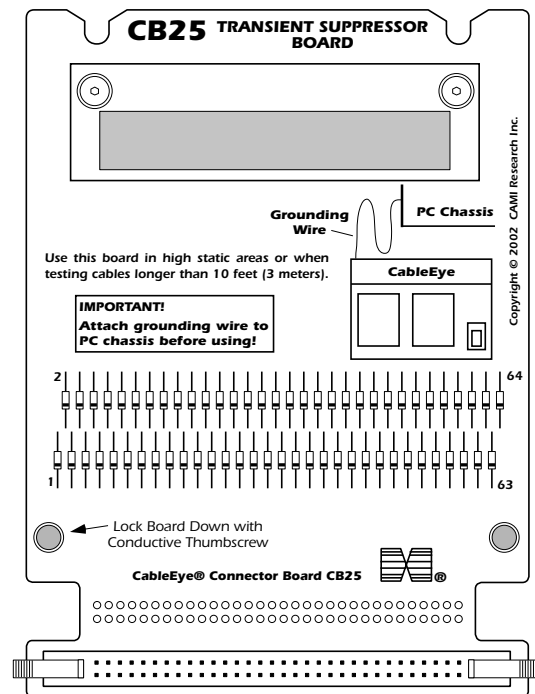
1.8.2 Use of External Ground Wire

If you operate CableEye in a high-static area or experience static disruption, you should connect the tester to the PC chassis. We include a grounding wire for this purpose; see the figure below. To attach the wire, loosen the screw on the underside rear corner of a low voltage tester, or the dedicated screw in a high voltage tester. Insert the lug at one end of the wire and tighten the screw. Attach the other end of the wire to the chassis of your desktop PC (any screw near the USB connector will work). If you use a laptop PC, attachment of a ground wire in this manner is not possible.
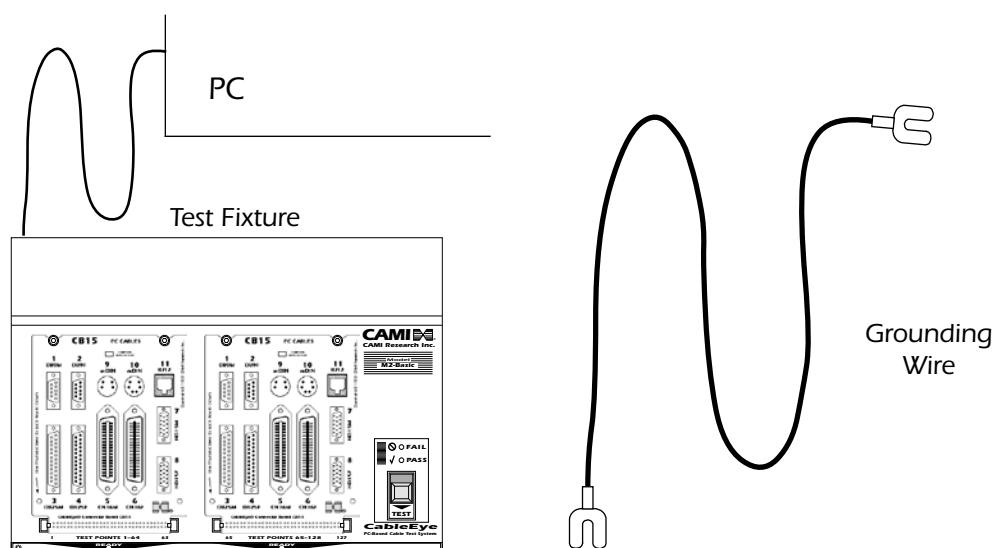
1.8.3 Measuring Long Cables

All models of CableEye apply very fast pulses to the cable when making measurements. Cables longer than 10 feet noticeably distort these pulses and may result in spurious data appearing in the netlist, or a measurement that never stops. When viewed on an oscilloscope, each applied pulse appears to "ring" at the rising and falling edge transition, with the ringing subsiding after a period of time. Capacitance in the copper wire causes this effect and cannot be avoided. Twisting and shielding tend to increase the capacitance per foot, causing the ringing effect to worsen. If the ringing has not subsided at the time we latch a pulse's response from the cable, erroneous data will result This effect may also occur if the cable has capacitors, inductors, coils, or semiconductor components connected to it. You may compensate for capacitive or inductive effects in the cable in the following ways:

1. Increase the *Dwell Time*. Normally, the system ships with a default dwell time set to 200 µS. To increase this, go to the **Test Settings menu** and choose **Tester Control**. In this control panel, a section on *Low Voltage Dwell Times* includes an edit box for **Dwell Time**. Try doubling the dwell time to see if the spurious connections disappear. If they do not, continue doubling the dwell time (400 µS, 800 µS, 1600 µS, etc.) until you see an improvement. The dwell time can be increased to over 100,000 µS, if necessary. Note that above 1000 µS, you will begin to experience a noticeable increase in measurement time.

2. Reduce the *Isolation Threshold* (not possible for M2U testers). Normally, we set the Isolation Threshold (minimum allowed resistance between unconnected wires) to one Megohm. You may change this in the Resistance control panel (double-click on the Default Thresholds shown along the bottom of the screen, or go to the **Test Settings Menu** and choose **Resistance**. Initially, try setting the Isolation Threshold to 100 KΩ. It may be reduced further if the problem persists.

Some combination of increasing the dwell time and reducing the isolation threshold usually corrects problems resulting from capacitance and inductance in long cables. Note that CableEye has been successfully used to measure resistance and connectivity in cables of 7000 meters (23,000 feet, 4.3 miles) in length.