LOW VOLTAGE PRO ™

LOW VOLTAGE PRO

LINK ○ 3 ○ VOLTS

VOICE RJ11	VIDEO COAX	SPKR ALARM	DATA RJ45

CABLE TEST · CABLE TEST · CABLE TEST · CABLE TEST

ID TEST RLΩ VOP CAL

- □□□ HD FD FEET METERS

SUB CTR
CL TL TR
SL SR
SBL SBR
LOAD

OHMS DELAY SKEW VDC VPP

CONNECT ID
REMOTE ID
PAIRS USED
WIREMAP

123456789S
12345678S

PoE

TONE PAIR

© PASS FAIL SAVE

OPEN SHORT CROSS REV SPLIT

TONE   CABLE ID   EXIT

MODEL 3 SHOWN

MODEL 1

MODEL 2

MODEL 3

Includes web upgrading information

The next generation of technology and testing

The LVPro employs the latest technology to get you the highest quality testing for your low voltage projects at the best price. The TIA 586 tests, PASS/FAIL, wiremap, timing tests (delay, skew) and impedance measurement (ohms) are standard on all Low Voltage Pros. And if you need more, you can upgrade your tester via the web.

Add to the cable testing powerful device tests; web downloadable test APPS to expand the capabilities of the LVPro, a connection to your PC for the easy setting of parameters, upgrading the tester, downloading reports (Model 3) and you have a tool that will be your job partner for many years.

Video Training

Don't think you need to be a computer genius to use the Low Voltage Pro. It is remarkably easy to use because all of the tests available on your model are displayed at the same time on the LCD. Plus, we have short training videos for each test APP that makes mastering the LVPro a *lot quicker than reading this manual.*

   View training using your computer:
     Go to www.bytebrothers.com/lvpro

   View training using your smartphone or iPad:
     Click on the QR code below.

Video Training Intro

**Learning the Low Voltage Pro
From the web:** Go to
www.bytebrothers.com/lvpro
or
From you smartphone or iPad :
Scan the QR code

A note about QR codes: A QR code is a barcode-like system that saves you the time of having to key in the web address (available on smartphones, iPhones, iPads, Android, etc only). First, download a QR Reader APP to scan the QR code. We recommend "I-nigma". It is popular and free. Scanning the QR code starts our videos without any web address entry required. If you don't have a smartphone or iPad, don't worry. You can use your computer's browser address line to go to www. bytebrothers.com/lvpro and see the exact same videos.

Limited Warranty

The manufacturer warrants to the original consumer that this product is in good working order for a period of one year from the date of manufacture or date of purchase. During this period the product will be repaired or replaced without charge for either parts or labor. The warranty does not cover damage caused by improper use. Repair or replacement as provided under this warranty is the exclusive remedy of the purchaser.

Table of Contents

Have you ever wanted a tester that did the whole low voltage job? A tester that has super accurate cable testing plus testing APPS for many of the low voltage devices that you work everyday? Devices such as switches, PoE, CCTV and Dolby speaker installations? If you are one of those people, then The Low Voltage Pro (LVPro) is the tester family for you.

More and more cable installers are now doing "device" installations... installing IP phones, IP cameras, CCTV equipment. They are working with devices like switches, PoE power, and surroundsound speakers. Cable testing is still a major part of the job but only one part of the larger job. The LVPro is the "Whole Job™ tester".

But that's not to say we have forgotten about bread and butter quality cable testing. All models of the LVPro include the basic CABLE TEST APP that includes TIA586 tests (opens, shorts, split pairs) plus ohms. The LVPro Models 2 and 3 add the LVPro Length-RLQ APP, a comprehensive test package that includes length and "RLQ" (Return Loss Quality).

The popularity of our many testers is because over half of all network problems are caused by faulty cables. And our testers spot those problems so they can be fixed quickly. But with the explosion in the popularity of electronic devices there are now lots of other devices to fix. So, when we designed the Low Voltage Pro we wanted it to be a tester that does the WHOLE JOB. And we wanted it to be able to grow as your needs grow.

250 REPORTS: Not everybody needs the printed reports that are available in the Model 3 but it's nice to know that you can upgrade your tester later should you need it.

WALL JACK AND SPEAKER IDENTIFIERS: Low voltage work also calls for wall jack identifiers... and speaker identifiers that help with Dolby speaker installations. All models of the LVPro have this capability standard (wall jack and speaker ID kits available separately).

WORKS WITH ALL CABLE TYPES. Many of you work with speaker cable, coax, alarm cable and Category cable (CAT5,6). The LVPro works with them all. And, if you have a unique cable, the LVPro has adjustable VOP, a technology that allows the LVPro to be tuned to your cable.

PROTECTED CIRCUITRY. Like any electronic device, you need to care for the LVPro like any sensitive instrument. But you will be happy to know that it is protected from voltage up to 60 volts.

WHOLE-JOB™ TECHNOLOGY: The Low Voltage Pro is a breakthrough in "Whole-Job" technology. We hope it helps you solve the many challenges that you face keeping all this great cabling and equipment working.

WEB UPGRADEABLE: The Low Voltage Pro makes it easy to start small and grow as your needs grow. The list on the right shows the progression of TESTER APPS as you upgrade the unit. And, upgrading is easy, using the LVPro Manager software (downloadable from bytebrothers.com) and USB cable that comes with every LVPro. See "LVPro Software Manager" in this manual.

Low Voltage Pro
List of Functions by Model

MODEL 1 APPS

CABLE TESTING PACK
Includes TIA586 cable diagram, Pass/Fail, timing (delay, skew) and impedance (ohms). Models with the Length-*RLQ* Pack APP (2 and 3) have length in the wiremap.

Locate multiple wall jacks for CAT5/6 and coax. Requires Remote kit(s)

TONE CABLE DETECTION
Place a tone on one end and detect it on the far end. Requires optional Remote Tone Probe.

SPEAKER POPPER
Locate speakers by audibly "popping" them. Alligator clips included with all LVPro Models.

SPKR 7.1 ID# MAPPER
Especially designed to properly map and label A/V speaker wires. Requires remote kit.

PORT BLINK CABLE DETECTION
Locate a cable connection to a switch port by blinking the switch's Link LED.

APPS ADDED WITH MODEL 2

LENGTH-*RLQ* PACK (MODEL 2 AND 3 ONLY)
Get perfect length. Use built-in values or calibrate with your cable. Adds length readout to Cable Test App (cable length, distance to open or short). Also includes *RLQ* (below).

RLQ Included with the Length-*RLQ* APP, Return Loss Quality tests for load mismatches that affect the wire's power and data transfer capability. "Green" colored adapters (3 pcs) used with the RLQ test are included.

APPS ADDED WITH MODEL 3

10/100/1000 DETECTION/DISPLAY
Plug into any active port (computer, switch, VoIP, access point) and display its capabilities.

POWER OVER ETHERNET / PAIRS USED
Detect PoE voltage and display its amplitude and location on the cable (midspan, endspan or both).

CCTV / Vpp (peak to peak voltage)
CCTV systems require a minimum of 1Vpp to DVR. Measure and display Vpp of video signal.

ALARM BATTERY TEST (LOADED)
Test alarm system and other backup batteries by doing a loaded battery test.

SAVE **STORE AND PRINT UP TO 250 REPORTS**
Store for later printing up to 250 tests (all cable types). All data is stored except *RLQ*. USB and software included.

Green colored adapters used for RLQ Test (part of Length-RLQ Pack) for later printing

PUSH BUTTONS

ARROW / OK BUTTONS

DIRECTIONAL PAD "D-PAD"

◄ CABLE TYPE ► SELECTION
▲ TEST APP ▼ SELECTION

1. USE ARROWS TO FIND TEST
2. PRESS OK START TEST

LVPro SUPER SCREEN

◄ SELECT CABLE TYPE ►

▲ SELECT TEST ▼

VOICE RJ11	VIDEO COAX	SPKR ALARM	DATA RJ45
CABLE TEST	CABLE TEST ℛ	CABLE TEST	CABLE TEST ℛ

POP ID

PoE

TEST RESULTS

ID TEST RLQ VOP CAL
HD FD
FEET
METERS
OHMS DELAY SKEW VDC VPP

SUB CTR
FL FR
SL SR
SBL SBR
LOAD (ma)

CABLE WIREMAP

CONNECT ID
REMOTE RLQ
PAIRS USED
WIREMAP

12345678S
12345678S
© PASS FAIL SAVE
OPEN SHORT CROSS REV SPLIT

TONE PAIR

HAMMERING LVPro IS WORKING

OTHER BUTTONS

TONE LOCATOR
WALL JACK LOCATOR
CABLE ID
MORE INFO (WHEN LIT)
EXIT
PUSH TO QUIT APP
ON / OFF

3. PRESS EXIT STOPS TEST

60 DEGREE ANGLE (BEST VIEWING): The LVPro LCD is designed to be brightest at a 60 degree angle.

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CABLE TESTING APPS

CABLE TESTING PACK (ALL MODELS)
Includes TIA586 cable diagram, Pass/Fail, timing (delay, skew) and impedance (ohms). Models with the Length-RLQ Pack APP (2 and 3) have length (see below).

LENGTH-RLQ PACK (MODEL 2 AND 3 ONLY)
Get perfect length. Use built-in values or calibrate with your cable. Adds length readout to Cable Test APP (cable length, distance to open or short). Also includes RLQ (below).

RLQ Included with the Length-RLQ APP, Return Loss Quality tests for load mismatches that affect the wire's power and data transfer capability. "Green" colored adapters (3 pcs) used with the RLQ test are included.

SAVE **PRINT UP TO 250 REPORTS (MODEL 3 ONLY)**
Store for later printing up to 250 tests (all cable types). All data is stored except RLQ. USB and software included.

DEVICE TESTING APPS

DATA DEVICES

PORT BLINK CABLE DETECTION
Locate a cable connection to a switch port by blinking the switch's Link LED.

10/100/1000 DETECTION/DISPLAY
Plug into any active port (computer, switch, VoIP, access point) and display its capabilities.

PoE **POWER OVER ETHERNET / PAIRS USED**
Detect PoE voltage and display its amplitude and location on the cable (midspan, endspan or both).

SPEAKER / ALARM DEVICES

SPEAKER POPPER
Locate speakers by audibly "popping" them. Alligator clips included with all LVPro Models.

SPKR 7.1 ID# MAPPER (8 PCS)
Especially designed to properly map and label A/V speaker wires. Requires remote kit.

ALARM BATTERY TEST (LOADED)
Test alarm system and other backup batteries by doing a loaded battery test. Adapter included.

VIDEO DEVICES

CCTV / Vpp (peak to peak voltage)
CCTV systems require a minimum of 1Vpp to DVR. Measure and display Vpp of video signal.

PHONE DEVICES

PHONE
Detect central office telephone connections. Display voltage and cable location (up to 4 phones).
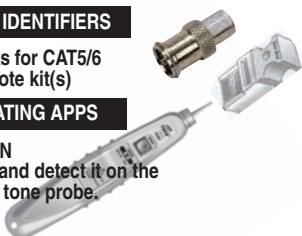
WALL JACK IDENTIFIERS

ID Locate multiple wall jacks for CAT5/6 and coax. Requires Remote kit(s)

TONE LOCATING APPS

TONE CABLE DETECTION
Place a tone on one end and detect it on the far end. Requires remote tone probe.
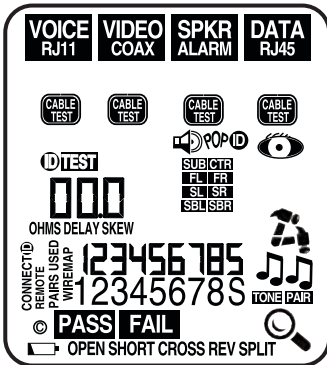
5

WEB UPGRADEABLE

The Low Voltage Pro gives you a choice: Buy the model you wish now or upgrade it later (using the web). Below are the LCD display screens for Models 1, 2 and 3. Trick: While the LVPro is powering up, press the TONE and DETAILS (magnifying glass) buttons to see your display.
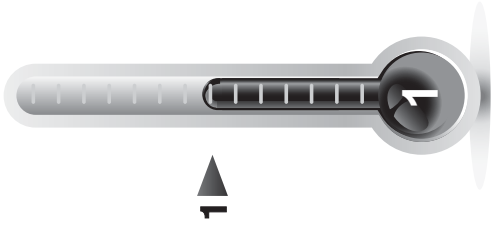

MODEL 3

MODEL 2

MODEL 1

6
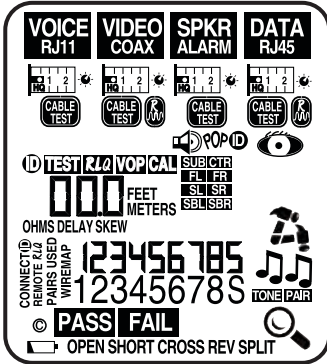
PRELOADED TEST APPS

1

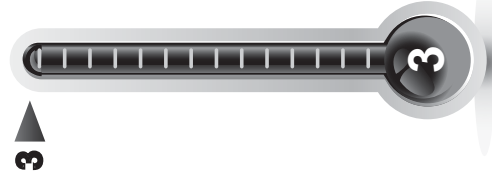ALERT LEDS
TONE LOCATOR
PORT BLINK
SPEAKER POP
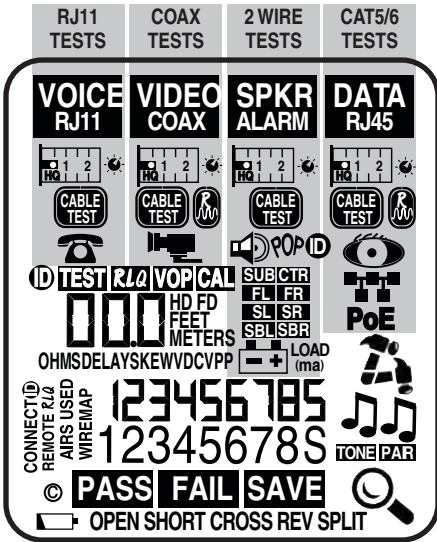SPEAKER 7.1 ID
WALL JACK ID
CABLE TEST PACK

2

LENGTH-RJ Q PACK
ALERT LEDS
TONE LOCATOR
PORT BLINK
SPEAKER POP
SPEAKER 7.1 ID
WALL JACK ID
CABLE TEST PACK

3
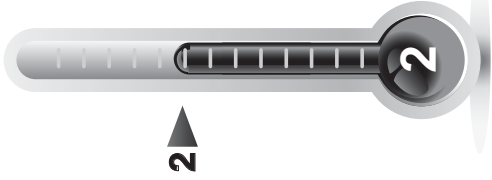
PRINT RESULTS
BATTERY LOAD
CCTV SIGNAL
PHONE VOLTS
PoE VOLTS
10/100/1000
LENGTH-RJ Q PACK
ALERT LEDS
TONE LOCATOR
PORT BLINK
SPEAKER POP
SPEAKER 7.1 ID
WALL JACK ID
CABLE TEST PACK

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OPERATION

CABLE SELECTION
(LEFT / RIGHT ARROWS)

DIRECTIONAL PAD
"D-PAD"

TEST APP SELECTION
(UP / DOWN ARROWS)

INTRODUCTION Soon you will appreciate the ease-of-use of the LVPro LCD because it displays all available tests. Follow these steps to start a test APP:

1 **Use the LEFT / RIGHT arrows to select the cable or cabled device that you are working with.**

2 **Use the UP / DOWN arrows to select the specific test or the specific device to be tested**

PRESS OK and the hammer goes to work letting you know the TEST APP is active. The EXIT button stops the TEST APP.

FAQ : WHAT MODEL NUMBER DO I HAVE: 1) Compare the APPS on your LCD to those shown on page 6. To latch the display ON: Hold the TONE and DETAILS (magnifying glass) buttons down together immediately after power. 2) Connect the LVPro to your PC and run the LVPro Manager software. It will display the list of APPS installed (see USING LVPRO MANAGER SOFTWARE in this manual).
Note: Because LVPros are web upgradeable, the labels might not properly show the model number (why: a label was left unchanged after a web upgrade).

TEST APPS for both Cable and Devices. There are APPS for both the testing cable and APPS for testing devices associated with those cable types. Your LVPro Model number (1,2,3) and possible prior upgrades determines which of the following APPS you have loaded on your tester. If there is an APP you do not have and think you would find useful, you can use the web to add it (see USING LVPRO MANAGER SOFTWARE (in this manual).

TRAINING VIDEOS are the quickest and most complete way to learn about the LVPro. The 3 minute movies will make you an expert with each Test APP. To view the movies either 1) go to www.bytebrothers.com/lvrpo or 2) use your smartphone (Iphone, Android, iPad) and scan the QR codes. See how simple it is to be an expert at testing both cables and devices. Information on finding a free QR reader and other links are in the VIDEO TRAINING section.

Video Training Intro

CABLE TESTING PACK (MODELS 1,2,3)
1. **Connect cable** to *Main unit* and *4xRemote*.
2. **Select and start Test APP** (D-PAD button).

4 x Remote

Test Active
3. **Hammering** says it's active. **EXIT** returns to menu.
RESULTS (vary with cable type):
All models: Pass/Fail, Wire map, Opens, Shorts, Split Pairs, Delay, Skew, Ohms. When lit, press Details glass (and use down arrow to show more results).

Details available

Save Results
Models 2,3: Length-RLQ APP: Length is integrated into wire-map results as is distance to open/short.
Model 3: Save test results: After test is complete, press the lit Details glass followed by the OK button to save the test. The Test # is flashed (max storage is 250 tests).
Note: See Glossary for definitions.

LENGTH-*RLQ* PACK (MODEL2 AND 3 ONLY)
Adds "Length" and "Distance to opens/short" to the Cable Test APP's wiremap (above). When to use the Ruler APP: 1) When you need only length 2) When you want the tune the LVPro to the specific cable you are testing (see VOP Adjustment below).

Ruler APP
1. **Connect cable** to *Main* unit (*no Remote connected*).
2. **Select and start Test APP** (D-PAD button).

Test Active
3. **Hammering** says it's active. **EXIT** returns to menu.
RESULTS:
Models 2,3: Length of the shortest pair is displayed (pair number is indicated).

VOP Knob
VOP ADJUSTMENT: The LVPro Ruler APP has adjustable VOP so you can tune the tester to the cable. The default VOPs used by the LVPro are listed on the back of the tester (most people stick to the default values).

Ruler APP
WHAT IS MY VOP SETTING: This is an important number because it affects the LVPro's length measurements in the Ruler APP and the Cable Test APP. To see the VOP value, cursor over to the Ruler icon. The number displayed is the current VOP value stored in the LVPro for that cable type.

VOP Knob
ADJUSTING THE VOP IS EASY: 1) Adjust manually ("VOP") or 2) Calibrate ("CAL") the tester from a known length of cable (*no remote connected*). Minimum length required 100' (35m).

VOP
Manual: Select the VOP KNOB; select VOP and use the UP/DOWN arrows. When done press OK to SAVE the VOP.

CAL
Calibrate: Select the VOP KNOB; select CAL and use the UP/DOWN arrows to match the cable length ("110" for 110 feet). When done press OK to SAVE the VOP.

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RLQ Included with the Length-RLQ APP, Return Loss Quality tests for load mismatches that affect the wire's power and data transfer capability. It is a powerful quality test that should be used if quality problems are suspected with the cable. The RLQ test works with DATA cables and VIDEO cables.

ACCEPTABLE: Ratings of 1 and 2.

1. Connect cable to *Main unit* and green *RLQ Remote*.
2. Select and start Test APP (D-PAD button).
3. Hammering says it's active. **EXIT** returns to menu.

Green RLQ Remotes

RESULTS (Models 2,3): Shown as a single integer 0, 1 or 2. "0" indicates the cable measures as if it is unterminated. "2" indicates it is perfectly terminated. Quality issues can arise in a transmission cable (Cat5/6 or coax) for a variety of reasons, including physical damage caused by crushing or bending the cable too sharply, improper termination, moisture intrusion, etc.

Test Active

ACCEPTABLE: Ratings of 1 and 2.

Note: See Glossary for *RLQ* definition. If you have a Model 3 (saves test results), the RLQ rating is not saved. RLQ results are not saved.

NETWORK DEVICE TESTING

Use these Test APPS if you are working with switches, NIC cards, PoE, IP cameras, VoIP phone and access points... any computerized device. The operation is the same for all APPS.

1. Connect the LVP RJ45 jack to the device (use included patch cable).
2. Select and start Test APP (D-PAD button).

Test Active

3. Hammering says it's active. **EXIT** returns to menu.

PORT BLINK CABLE DETECTION
Use: Locate a cable connection to a switch port by blinking the switch's Link LED. The green link LED on the switch will slowly blink so you can locate the cable end.
RESULT: Port's green link LED will blink.

10/100/1000 DETECTION/ADVERTISED SPEED/PAIRS USED
Use: Plug into any active port (computer, switch, VoIP, access point) and display its capabilities (10,100,1000 HD, FD).
RESULT: LVPro will display the advertised speed of the port (10,100,1000, HD, FD) and the cable pairs used to transmit.

POWER OVER ETHERNET / PAIRS USED
PoE **Use:** Detect PoE voltage and display its amplitude and location on the cable (midspan, endspan or both).
RESULT: PoE voltage is displayed (just like a voltmeter) as are the cable pairs used (1,2 3,6 or 4,5 7,8 or both).

SPEAKER / ALARM DEVICES

Use these Test APPS if you are working with speakers, Dolby surroundsound installations, or testing the quality of alarm batteries. The operation is the same for all APPS.

RJ45/Clip Adapter

1. Connect the LVP RJ45 jack to the speaker wires or alarm battery using the RJ45/alligator clips (included).
2. Select and start Test APP (D-PAD button).

Test Active

3. Hammering says it's active. **EXIT** returns to menu.

SPEAKER POPPER
Use: Locate speakers by audibly "popping" them. 1) Connect the alligator clips to the loose speaker wires using the RJ45/ Clips adapter included with all LVPro Models (shown above).

Test Active

RESULT: The speaker will make and audible popping sound.

SPKR 7.1 ID# MAPPER (8 PCS)
SUB CTR FL FR SL SR SBL SBR Use: Colored and labeled to help properly map and label Dolby 5.1 and 7.1 A/V speaker wires. 1) Connect Speaker ID# Mappers to the far end of each pair of speaker wires (speakers

RJ45/Clip Adapter

Test Active

disconnected). 2) Using the RJ45/Clips adapter, connect speaker wires to the LVPro's RJ45 port.
RESULT: The icon that matches the speaker will light. Requires remote kit. **Order:** P/N LVProSpkrID Kit (8 pcs).

ALARM BATTERY TEST

RJ45/Clip Adapter

Test Active

Use: Test alarm system and other backup batteries by doing a loaded battery test. Better than a voltmeter test because this test places a 100ma load on the battery. Use RJ45/Alligator clips included with all LVPro Models (shown above) to connect the battery to the RJ45 port. After test starts, pressing the OK button puts a 100ma load on the battery.
RESULT: For the battery to be OK, the battery voltage should remain stable after the load is applied.

VIDEO DEVICES

CCTV / Vpp (peak to peak voltage)

Test Active

Use: CCTV systems require approximately 1Vpp to the DVR for reliable recording. This APP measures and displays the Vpp of video signal. Perfect for quick debugging of CCTV systems.
1) Connect the CCTV camera video output to the coax connector on the LVPro. 2) Select the Camera icon and press OK.
RESULT: The voltage LED will light and voltage is displayed. Note: The voltage display varies with the whiteness of the camera's image.
BNC adapters: Various adapters are avaialable for different connectors.
Note: The CCTV/Vpp APP can also be used to detect CATV (cable TV) signals. But some CATV signals may be too small for the LVPro to detect.

PHONE DEVICES

Test Active

Use: Detect central office telephone connections (48V). Display voltage and cable location (up to 4 phones). 1) Connect the cable to the RJ11/RJ12 connector on the LVPro. 2) Select the Telephone APP and start the test.
RESULT: The LVPro scans the 6 pins and displays up to 3 pairs of central office connections; the pairs used (typically 3,4; 2,5; and 1,6); and the amplitude of voltage on each pair.

WALL JACK IDENTIFIERS

Test Active

Use: Large wiring jobs end up with unlabled runs. Plugging these wall jack identifiers into each socket makes identifying the wall jack's location a snap. 1) Connect the unidentified cable into the correct LVPro jack. 2) Press the button labeled "Cabel I.D." to start the scan. Press EXIT when done.
RESULT: As an example, RJ45 ID#4 plugged in a RJ45 outlet will light both the "RJ45" icon and the number "4" digit on the LVPro. The same is true for coax outlets. Order:
P/N LVPro-RJ45ID (20 pcs)
P/N LVPro-CoaxID (20 pcs)
P/N LVProRJ45CoaxID (10 pcs/ea. Total of 20 pcs).

TONE LOCATING APPS

TONE CABLE DETECTION

Use: Locating the far end of a cable. Place a tone on the near end of the cable with the LVPro and detect it on the far end with a Tone Probe (available separately). 1) Plug the cable to be "toned" into the LVPro's socket. 2) Select the proper cable type and then press the TONE button 3) Choose from 3 tones (down arrow) and/or the pairs that you wish to tone (right arrow and select "Pair" and down arrow to scroll through pairs). 4) Detect tone on the far end using a tone probe.
RESULT: A quick and handy way to locate cable ends. Another popular method if you are tracing data cables that are plugged into active ports: Use the Port Blink APP. **ORDER:** LVPro-Probe Lighted probe

WHAT DOES IT DO? LVPro Manager link together your PC and LVPro (use the included USB cable to connect the two). It performs 3 tasks:

1. Adds Test APPS to your LVPro: As an example, let's say you want to move from Model 1 to Model 2 or buy a single Test APP. For this task, LVPro Manager acts like a shopping cart. It lists the cost of the APPS and handles the downloading of the APPS to the LVPro.

2. Upgrades LVPro firmware. Firmware is the code buried in the LVPro that makes the computers perform their functions. On the rare occasion that you may need to upgrade your firmware, it's nice to know that you can stay up to date without sending the tester back to the factory.

3. Prints and Delete Reports (LVPro Model 3 only): If you own a Model 3 and are storing test results, use the LVPro Manager software to download the reports to your PC. Plus, use it to delete reports from the LVPro after they have been safely downloaded to the PC.

4. Configure the LVPro Length APP (LVPro Model 3 only):
　Select Tester > Configure length
　VOP: Set values for each of the cable types. Reset the VOP
　　　back to factory settings.
　Feet/Meters: Set the LVPro to Feet or Meters.
　　Note: This can also be done manually without the LVPro software.
　　For VOP adjustments, select the Knob icon (on the LCD).
　　For Feet/Meters, disconnect and reconnect the battery.

Install
LVPro Manager

1. Don't look for a CD (it's on the web).
　Go to **www.bytebrothers.com** and follow directions to the *Low Voltage Pro page* where you will see this.

LVPro Manager Software?
Click here.

"Nails it every time!"

2. Click on the above hammer to start the download and installation.
When asked security questions, answer YES or OK. The LVPro Manager icon soon appears on your Windows START menu. The LVPro Manager Software is now ready to run.

**This icon appears on your Windows START menu after the software is installed.**

LVPro Manager

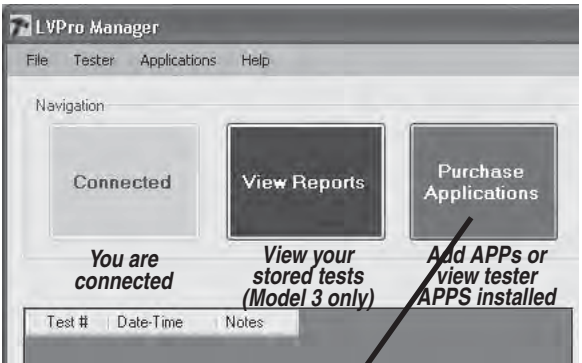**3. Run the LVPro Manager Software:**
　1) Connect the LVPro to your PC with the included USB cable.
　2) Turn on the LVPro tester.
　3) Click the LVPro Manager icon.

USING THE LVPro Manager Software: As an example, let's say you want to move from Model 1 to Model 2 (add the Length-RLQ Pack) or simply find out what is installed on your tester. After launching the software, the following screen appears:
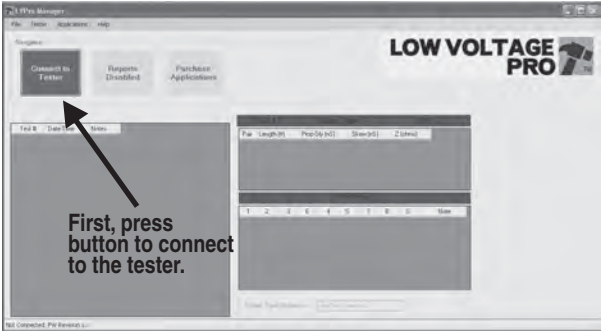
First, press button to connect to the tester.

You are connected   *View your stored tests (Model 3 only)*   *Add APPs or view tester APPS installed*

See YOUR INSTALLED APPS

LVPro Applications Store

Cable Test

Cable shorts/opens, split-pair detection, wire map.

Applications	
☑ Cable Test	INSTALLED
☑ Cable ID	INSTALLED
☑ Speaker ID	INSTALLED
☑ Speaker Pop	INSTALLED
☑ Port Beacon	INSTALLED
☑ Tone Locator	INSTALLED
☑ Alert LEDs	INSTALLED
☑ Length-RLQ	INSTALLED
☑ LAN - 10/100/1000	INSTALLED
☑ POE	INSTALLED
☑ Telephone	INSTALLED
☑ CCTV	INSTALLED
☑ Battery	INSTALLED
☑ Reports	INSTALLED
☑ LVPro 3 Bundle	INSTALLED
☑ LVPro 3 Bundle	INSTALLED

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TOOLBAR MENUS

Open a saved test file (.lvp file)
Save a test file (.lvp file)

Print test reports

Exit LVPro Manager

LVPro Manager Test Report
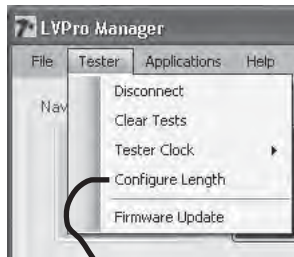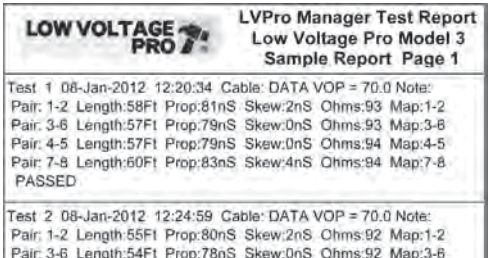**Low Voltage Pro Model 3**
Sample Report Page 1

Test 1 08-Jan-2012 12:20:34 Cable: DATA VOP = 70.0 Note:
Pair: 1-2 Length:58Ft Prop:81nS Skew:2nS Ohms:93 Map:1-2
Pair: 3-6 Length:57Ft Prop:79nS Skew:0nS Ohms:93 Map:3-6
Pair: 4-5 Length:57Ft Prop:79nS Skew:0nS Ohms:94 Map:4-5
Pair: 7-8 Length:60Ft Prop:83nS Skew:4nS Ohms:94 Map:7-8
PASSED

Test 2 08-Jan-2012 12:24:59 Cable: DATA VOP = 70.0 Note:
Pair: 1-2 Length:55Ft Prop:80nS Skew:2nS Ohms:92 Map:1-2
Pair: 3-6 Length:54Ft Prop:78nS Skew:0nS Ohms:92 Map:3-6
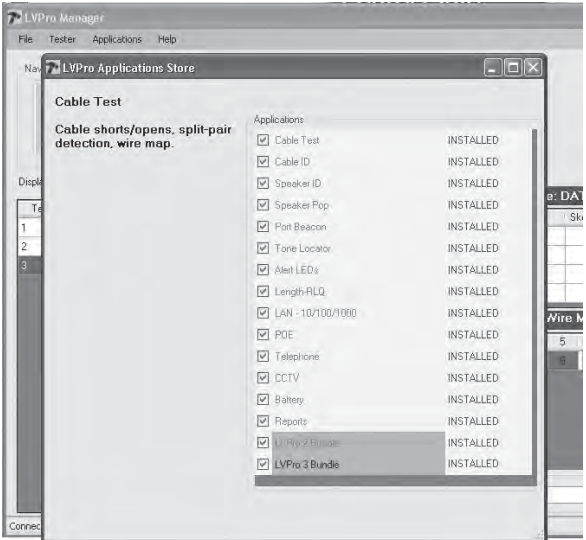

Disconnect from the LVPro
Delete tests from the LVPro
Set the LVPro's clock
Set VOP, Feet/Meters
Change LVPro's firmware

LVPro Length Configuration

Units
Selected Units: Feet / Meters

VOP

VOP - Voice (%)   66.0

VOP - Video (%)   83.0

VOP - Speaker (%)   72.0

VOP - Data (%)   70.0

Cancel

Select Factory Defaults

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Add new Test APPS and see the Test APPS installed on your tester.

LVPro Manager

File Tester Applications Help

LVPro Applications Store

Cable Test

Cable shorts/opens, split-pair detection, wire map.

Applications	
☑ Cable Test	INSTALLED
☑ Cable ID	INSTALLED
☑ Speaker ID	INSTALLED
☑ Speaker Pop	INSTALLED
☑ Port Beacon	INSTALLED
☑ Tone Locator	INSTALLED
☑ Alert LEDs	INSTALLED
☑ Length-RLQ	INSTALLED
☑ LAN - 10/100/1000	INSTALLED
☑ POE	INSTALLED
☑ Telephone	INSTALLED
☑ CCTV	INSTALLED
☑ Battery	INSTALLED
☑ Reports	INSTALLED
☑ LVPro 2 Bundle	INSTALLED
☑ LVPro 3 Bundle	INSTALLED

THE TEST APP STORE: Many users enter the APP store to see what APPS are installed on their tester. If adding APPS, press the BUY button. An email is sent to Byte Brothers letting us know. We will then contact you and give you an encrypted code that upgrades your tester.

**LVPro Manager
Software**

**See video of LVPro Manager Software at
www.bytebrothers.com/lvpro**

MOBILE VIDEO TRAINING
QR CODES

Video Training Intro

LVPro introduction

<u>**TRAINING FOR TEST APPS ON MODEL 1**</u>

LVPro Cable Test

LVPro Wall Jack ID

LVPro Speaker ID

LVPro Speaker Pop

<u>**TRAINING FOR TEST APPS ADDED FOR MODEL 2**</u>

LVPro Length

LVPro RLQ

<u>**TRAINING FOR TEST APPS ADDED FOR MODEL 3**</u>

LVPro CCTV Vpp

Alarm battery test

LVPro Network

LVPro PoE

LVPro Basic Navigation

**LVPro Manager
Software**

Tone Generator

LVPro Port Blink

TRAINING VIDEOS are the quickest and most complete way to learn the LVPro. The 3 minute movies make you an expert with each Test APP.

Learning the Low Voltage Pro
From the web: Go to
www.bytebrothers.com/lvpro
or
From your smartphone or iPad :
Scan the QR codes

A note about QR codes: A QR code is a barcode-like system that saves you the time of having to key in the web address (only on smartphones, iPhones, iPads, etc). First, download a QR Reader to scan the QR code. We recommend "I-nigma". It is popular and free. Scanning the QR code starts our videos without any web address entry required. If you don't have a smartphone or iPad, don't worry. You can use your computer's browser and go to www.bytebrothers.com/lvpro and see the exact same videos.

LVPro Alert LEDs

LVPro Print

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CABLE TEST EXAMPLES
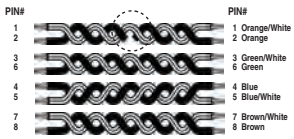
CABLE TEST PACK (ALL MODELS)
The Cable Testing Pack is standard on all LVPro Models. These following are examples of the TIA 568 test that the LVPro performs on Category cable. In addition to PASS/FAIL and wiremap that is shown here, there are also timing tests (delay, skew) and impedance measurement (ohms). Models with the Length- *RLQ* **Pack APP (Models 2 and 3) add Length and the RLQ quality.**

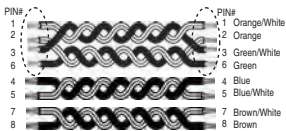**GOOD CABLE**

EIA/TIA 568B
STRAIGHT THRU CABLE
(MOST POPULAR)

OPEN on PAIR 1-2

OPEN

**SPLIT PAIRS
(PAIRS 1,2 AND 3,6 SPLIT)**
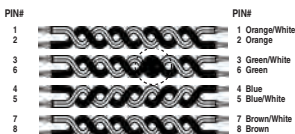

SPLIT

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CABLE TEST EXAMPLES
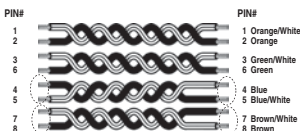
TECHNOLOGY FOR PERFECT CABLE TESTING
The LVPro employs the latest technology to get you the highest quality testing for your low voltage projects at the best price. The TIA 568 tests, PASS/FAIL, wiremap, timing tests (delay, skew) and impedance measurement (ohms) are standard on all Low Voltage Pros. And it you need more, you can upgrade your tester via the web.

CABLE TEST

SHORT on PAIR 3,6

PIN#		PIN#	
1		1	Orange/White
2		2	Orange
3		3	Green/White
6		6	Green
4		4	Blue
5		5	Blue/White
7		7	Brown/White
8		8	Brown

WIREMAP

12-45-78-
12345678S

FAIL
SHORT

A WIRE ON BOTH PAIRS 4-5 AND 7-8 IS FLIPPED (CROSSED)

PIN#		PIN#	
1		1	Orange/White
2		2	Orange
3		3	Green/White
6		6	Green
4		4	Blue
5		5	Blue/White
7		7	Brown/White
8		8	Brown

CROSSED

WIREMAP

12345678-
12345678S

FAIL
REV

---

1 2 3 4 5 6 7 8

**RJ45 SOCKET/PLUG
PIN DIAGRAM**

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"OHMS" Cable impedance

The high-frequency nature of 21st century CATV and data signaling requires cabling that preserves the integrity of the signal between transmitter and receiver. This requires a good impedance match along the transmission route. Standard Cat5, Cat5e and Cat6 data cables employ twisted pair transmission lines, with a specified 100-ohm characteristic impedance on each pair. Any deviation from this impedance, or impedance "mismatch", along the transmission medium causes some portion of the transmitted signal energy to be reflected back to the transmitter, and resulting in distortion at the receiver. The LVPro impedance measurement reports the near-end impedance of the attached cable - the characteristic impedance as seen by the transmitter. ACCEPTABLE: +/- 10% deviation from a cable's ohms rating.

"RLQ"

RLQ is a measurement of the impedance match along the entire length of cable - including the receive-end termination - without regard for the specific cable impedance. That is, RLQ is a representation of the "flatness" of the impedance along the entire transmission line. A higher RLQ number indicates a good match, and a lower number indicates a poorer match. For example, a 100-ohm data cable with a good quality 100-ohm Cat5e transmission cable and a solid 100-ohm termination at the receive end will report an RLQ of 2. The same system with an unterminated cable will report an RLQ of 0. Quality issues can arise in a transmission cable (Cat5/6 or coax) for a variety of reasons, including physical damage caused by crushing or bending the cable too sharply, improper termination, moisture intrusion, etc. See "OHMS" above for the problems impedance mismatches can cause. ACCEPTABLE: Ratings of 1 and 2.

"DELAY" Propagation Delay

Propagation delay is the travel time for a signal applied at the transmit end of a transmission line or system to arrive at the receive end. For an individual cable, propagation delay is determined mainly by the velocity of propagation (VOP), which is a characteristic value of the particular transmission medium. VOP is typically represented as a percentage of the speed of light in a vacuum (nominally 300×10^6 m/s). E.g., a VOP of 66% indicates a propagation velocity in that transmission line of 66% of the speed of light, or 198×10^6 m/s, or approximately 5nS per meter. ACCEPTABLE: 550ns is the maximum allowed delay.

"SKEW"

On a multi-pair transmission line, skew is the difference in signal propagation delay between pairs. It is caused mainly by differences in the physical lengths of the cable pairs. This physical difference, in turn, results from the fact that the pairs are twisted at different twist rates (number of twists per foot of cable) to minimize crosstalk between pairs.

Skew is important because modern data transmission systems transmit symbol data coincidentally on multiple pairs, and expect to receive that data more or less coincidentally at the receiver. While data systems can accommodate some amount of skew, if the skew is too large, it results in unreliable data transfer. The Cat5e standard specifies a maximum skew of 55ns over the length of the transmission cable. This indicates that worst case difference that can be tolerated between the shortest (fastest) pair and the longest (slowest) pair.

ACCEPTABLE: 50ns is the maximum allowed skew.

"VOP" Velocity of Propagation (Models 2 and 3)
All cables, no matter what type, have a VOP. It is usually listed on the cable's datasheet. Or, the LVPro's Length-RLQ APP can measure it in what we call VOP "CAL" mode. The best way to describe VOP is to relate it to "Propagation delay" ... the travel time for a signal applied at the transmit end of a transmission line or system to arrive at the receive end. For an individual cable, propagation delay is determined mainly by the velocity of propagation (VOP), which is a characteristic value of the speed of a cable. VOP is typically represented as a percentage of the speed of light. As an example, a VOP of 66% means the velocity of the cable is 66% of the speed of light. The default VOP values used by the LVPro are listed on the back of the tester (most people stick to the default values).

The LVPro Models 2 and 3 include the LENGTH + RLQ APP. It includes extremely accurate length measuring using the cable's VOP as the basis for the results. Additionally, the LVPro gives you the ability to 1) adjust the VOP manually to better match a cable or 2) have the LVPro determine the VOP automatically of any cable sample: Minimum 100" (35m) required. You can tune the LVPro for any cable that you use. .

How to adjust the VOP for a particular cable type: Each cable type has its own VOP. Use the VOP ADJUSTMENT KNOB icon (to the right of the RULER icon) to adjust the VOP (use the VOP icon) or let the LVPro determine the VOP of your cable by connecting a sample of the cable to the LVPro (use the CAL icon). A minimum length of 100' (35m) is recommended.

If you accidentally change the VOP of a cable type and would like to reset it to the factory value, you can do that two ways 1) Use the VOP ADJ KNOB and manually change it for each cable type (look at the label on the back of the tester for typical values) or 2) Connect the tester to the LVPro Manager Software; select TESTER; CONFIGURE LENGTH. Then select SELECT FACTORY DEFAULTS.

What is the VOP of each of my cable types?: Move the cursor to the Ruler icon (Length) for each of the cable types. The number displayed is the current VOP value stored in the LVPro for that cable type. If you change the VOP, it erases the factory setting and stores the new number (until it is changed again).

Cable Types Tested (All LVPro models)
Shielded and unshielded twisted pair. All cable categories.
Coax. All types.
Telephone.
Speaker and alarm wire.

Cable Tests (all LVPro models)
Opens, shorts, reversals, split pairs, wiremap,
propagation delay, skew, ohms. Feet and meters selectable.

Advanced Cable Tests (Models 2 and 3)
Length and distance to fault.
Adjustable and standard VOP settings for accurate length of all cables.
RLQ. Return Loss Quality.

Locating cable ends, speaker wires and switch ports (all LVPro models)
Wall jack identifiers (RJ45, coax and mixed kits available).
Speaker identification. Qty 8. Available separately.
Port Blink. LVPro lights the LED on the switch port.

Device tests
Speakers: Audible popper (All LVPro models)
Network Devices (Model 3)
   10/100/1000 advertised speed and cable pairs used.
   PoE Volts and cable pairs used.
CCTV camera video signal: Measure peak to peak volts.
CATV (cable TV) Requires min 30mVpp signal.
Battery test (loaded) (Model 3)
   100ma loaded test (for 12V alarm and other backup batteries)

Printed Reports (Model 3)
Stores 250 cable test reports in flash memory.

Upgradeable (All LVPro models)
Web upgradeable. Software and USB cable included with all models.

Voltage protection (All LVPro models)
DC Volts: 100
AC Volts: 70

Length measurement (Models 2 and 3)
Max (all wire types): 1000' (305 m)
Min split pairs: 6' (2m)
Min RLQ: 20' (7m)
VOP calibration: Min cable sample 150' (50m)

Battery
Type: 9V alkaline
Life: Operating: 24-30 hours
       Standby (1 year)

Timeout (battery saver): 30 mins

LCD viewing angle: 60 degrees

PART NUMBERS/CONTENTS

Common parts standard with all LVP Pro Models (1, 2 or 3):
Cable Tester with built-in Remote, RJ45/Alligator Clip adapters (2),
CAT 6 patch cables (2), zippered, embroidered pouch and 9V battery.
Includes LVPro Manager software and USB cable (6').

LVPro 1 Low Votage Pro Model 1
Includes 6 APPS. Upgradeable to Models 2 and 3 (factory or web).

LVPro 2 Low Voltage Pro Model 2
Adds Length-RLQ Pack to bring total APPs to 7. Upgradeable to Model 3
(factory or web). Includes 3 piece RLQ adapters.

LVPro 3 Low Voltage Pro Model 3
Low Voltage Pro Model 3. Adds 6 more APPS for a total of Length-RLQ
and 12 APPS. USB cable is used to transfer test reports.

LVPro-UPG1-2
Upgrade from LVPro 1 to LVPro 2. Includes the addition of the Length-
RLQ pack.

LVPro-UPG1-3
Upgrade from LVPro 1 to LVPro 3. Includes the addition of 7 LVPro
APPS.

LVPro-UPG2-3
Upgrade from LVPro 2 to LVPro 3. Includes the addition of 6 LVPro
APPS.

LVPro-PROBE LVPro Lighted Probe
Lighted, tone probe with volume control for use with LVPro's tone gen-
eration capability. It is the same popular probe used with our Real World
Certifier and Pro Tone Kits.

LVPro-SPKR(7.1)ID Speaker 7.1 ID Kit
Especially designed to properly map and label A/V speaker wires. Re-
quires remote kit. Color coded and labeled per Dolby 7.1 (and 5.1) speci-
fications. Attach the alligator clips to speaker wires and let the LVPro sort
out the rest. Works with all LVPro models. Order **LVPro-SPKR-POUCH**
Pouch for nylon carrying case.

LVPro Wall Jack ID Kits (3 mixes available)
Also called mappers, these are used for locating and identifying wall
jacks. Available separately for CAT5/6 and coax cables. Works with all
LVPro models. Includes foam holder.
  LVPro-RJ45ID Wall Jack IDs for RJ45 (20pcs)
  LVPro-CoaxID Wall jack IDs for coax (20pcs)
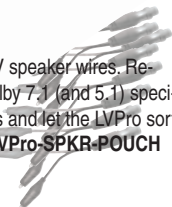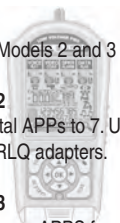 **LVProRJ45-CoaxID** Mixed kit RJ45 (10pcs) coax (10pcs)

LVPro-CLIPS LVPro RJ45/Alligator Clips Adapter
Replacement RJ45/Alligator clip adapter.

LVPro-USB Replacement USB data transfer cable.

LVPro-F.M/BNC.M Coax F male to BNC male adapter.

Appendix A. Ping and TCP/IP debugging tools

Who should read this: If you spend time working with Ethernet and network devices, this section could be of help to you.

Ethernet Software Level (TCP/IP): Once the LVPro has established that your cables and network devices are working at the hardware level, your next step is to checkout the software level of your network. Understanding the basics of TCP/IP and gaining a familiarity with your operating system's built-in network debugging tools helps you diagnose and troubleshoot network problems.

Because Ethernet is so common, Windows and many Linux systems have built-in tools to help you debug network problems.
These debugging programs are executed at the command line prompt of the operating system.

ping

The most popular Ethernet debugging program is called "ping".
Ping sends out a packet to an address that you specify and waits for a reply. Although very simple to use, *ping* is extremely powerful because it works at the IP level and often will respond even when the higher level layer cannot.
USE: Determine if a workstation is connected to the network. Routers, servers and workstations are identified by an "ip" address and possibly a "name". The ip address is a numeric string whose format is referred to as "dotted decimal" (example: 192.168.0.0.). The "name" can be any name given to a computer when it is installed or an internet URL. EXAMPLE OF USE: #1: I have problems connecting to the Byte Brothers website from a workstation. I know the DNS name of the website is "www.bytebrothers.com". At the workstation's Command Prompt, enter **"ping www.bytebrothers.com".** If connected, I will receive back bytebrother.com's IP address (*e.g.* 207.115.64.64) and the roundtrip time of my ping packet. #2) I am having a problem with one of my workstations communicating to a server. I know the server's ip address is 192.168.1.100. I enter **"ping 192.168.1.100"** on the workstation's Command Line. If the server is connected I will receive a response to my ping. Ping notes: If you want to ping another workstation or server and you do not know its DNS name or IP address use **ipconfig** (below). To learn all of the ping command's option, enter **ping /?**.

ipconfig

USE: Determine the IP address and other related information about a workstation.
Enter **ipconfig /?** at the prompt to display the options possible with this command. The two most common entries: ipconfig and ipconfig /all.
EXAMPLES OF USE: I want to ping a remote server but I do not know its ip address. Go to the server and at the command line prompt enter "**ipconfig**". The server's IP address will be displayed. Return to the earlier workstation and perform the ping test to this address.

tracert

USE: Determines how many router hops a packet took to reach its

Appendix B. Color code for Category cable

destination. This can help determine why a network is slow (or not functioning). Enter **tracert /?** at the prompt to display the options possible with this command.

EXAMPLES OF USE: Determine how many routers between my system and the ISO that services Byte Brothers. Enter tracert followed by the name or IP address of the destination (*enter* www .bytebrothers.com).

Netstat

USE: Displays the current status of all listening TCP/IP ports. A TCP/IP port is where applications connect to the server or workstation.
EXAMPLES OF USE: I would like to see how many applications are tied to my system that use TCP/IP.

Executing troubleshooting programs from the command line

All of the programs discussed must be executed from the command line of your operating system. To reach the command line on Windows 95 and 98 systems, click on START>PROGRAMS and Select the MS DOS prompt. *Then enter your command.*

On Windows XP systems, click on START>PROGRAMS> and select ACCESSORIES then COMMAND LINE. *Then enter your command.*
On other systems select **Run** from the main menu and enter "**cmd**". Then *enter your command.*
TO EXIT THE COMMAND LINE: Enter EXIT.

Appendix B. Color code for Category cable

RJ45 Connectors (sockets and plugs): The Base-T Standard uses RJ45 sockets and plugs. The RJ45 socket has 8 pins. The pins are numbered 1 to 8. Looking at the socket with insertion key facing down, pin number 1 is to the left.

SOCKETS   PLUGS

1   8   8   1   8   1 1   8

PIN NUMBERS
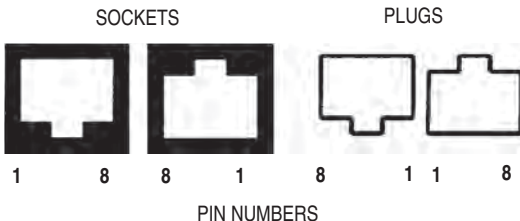
EIA/TIA 568B STRAIGHT THRU

PIN #		PIN#	WIRE COLOR
1		1	Orange/White
2		2	Orange
3		3	Green/White
6		6	Green
4		4	Blue
5		5	Blue/White
7		7	Brown/White
8		8	Brown

Colors: The first color is the base color on the cable. Second color is the stripe color of the cable. *A straight-thru cable has identical ends.*
Note: The above color code is the most popular in use.

WWW.BYTEBROTHERS.COM