

# Labgear

76611PI

## 5-in-1 Diagnostic Cable Tester





### 3. Safety Rules and Warnings

Don't store or leave the unit in direct sunlight, especially under glass.

Don't store in damp or excessively dusty environments or temperatures over 40°C.

Use only 9V alkaline battery of good quality.

Remove the battery if the meter is not to be used for an extended period.

Do not disassemble, there are no user serviceable parts inside.

Do not use on mains voltage cables this will damage the meter.

### 4. Product Features

- Test 5 types of cable
- Simple one button test
- Ergonomic portable handheld design
- Tests installed wiring or network/communication cables
- Remote unit stores in main unit
- 600ft test distance (RJ45/RJ11/BNC)
- Convenient battery access
- Built in battery test
- LED's indicate connections and faults
- Beep provides audible confirmation of test results

### 5. Specifications

#### Cables Tester

UTP and STP/FTP LAN cables, terminated in RJ45 male connectors (EIA/TIA 568)

RJ11 cables with male connectors, 2 to 6 conductors installed

IEEE1394 cables with Type 1 plugs on both ends (6pin to 6pin FireWire)

USB cables with type A plug to Type B plug (printer cables, peripheral cables)

BNC cables with male connectors

#### Faults Indicated

No Connection

Shorts

Opens

Crosses

#### Low Battery Indicator

LED lights indicate low battery

#### Battery

Requires 1x 9V PP3 battery (not included)

## 6. Operation

### 6.1. General Information

The Labgear 5-in-1 Diagnostic Cable Tester performs tests when the single button on its front panel is pressed and released. 6 status LEDs indicate the condition of the cable being tested, as well as informing the user that power is turned on, and that the battery is good (or bad). 8 additional connection LEDs light to indicate that specific wires in a cable are connected. A chart beneath the 8 LEDs show the LEDs that should light up for a good cable connection.

### 6.2. The MAIN and REMOTE Unit

The Labgear 5-in-1 Diagnostic Cable Tester consists of a main unit and a remote unit. The remote unit stores conveniently on the bottom of the main unit. It can be removed or replaced by sliding it from left to right. Use care when removing or replacing the remote unit as some of the plastic parts can be quite sharp.

The remote is often attached to the main unit when being stored, when being transported or when patch cables are being tested. The remote is removed from the main unit when an installed (in a wall, ceiling etc.) cable is being tested.

### 6.3. Testing Patch Cables

Patch cables have both ends accessible and can quickly and efficiently be tested using the Labgear 5-in-1 Diagnostic Cable Tester without having to remove the remote unit from its docked position.

### 6.4. Testing Installed Cables

To test cables installed in ceilings or walls or in applications that prevent the ends from being in the same location, the remote can be detached from the main unit. Once detached, the remote can be attached to one end of the cable run, and the main unit attached to the other end. These ends are often in different rooms and on different floors of a building.

### 6.5. Performing the Test

Once the remote and main unit are attached to the ends of the subject cable testing may begin. Simply press and release the Test button on the main unit, observe the LED indicators and note the beeping sound that comes from the main unit.

### 6.6. Interpreting the Results

#### Power LED

The power LED should light whenever the Test button is pressed and released. It will stay on for a minimum of 5 seconds, or for however long the Test button is pressed. If the power LED does not light, replace the battery.

<b>Low Battery LED</b>	Should the Low Battery LED light up, replace the battery.
<b>No Connection LED/ Single Beep</b>	If the remote is not connected to the main unit with a cable or the cable has no intact conductors, the No Connection LED will light up and the audible beep will sound once.
<b>Connected LED/Lo-Hi Beep/Numbered LEDs</b>	If the Connected LED lights up and there is a Lo-Hi Beep, this confirms the connection to the remote unit and the user can examine the numbered LEDs (i.e., numbered 1-8, and the S/G LED).
<b>Connected LED/3 Beepers/Short LED/ Numbered LED</b>	If the connected LED lights, the beeper emit 3 beeps and the short LED lights, the cable has a fault. The Numbered LEDs indicate the location of the short.
<b>Connected LED/2 Beepers/Cross LED/ Numbered LED</b>	If the Connected LED lights, the beeper emit 2 beeps and the Cross LED lights, the cable has a fault.

The numbered LEDs corresponding to the type of cable being tested must light up. Examine the table below the Numbered LEDs, noting the LEDs that should light. If all of these LEDs do not light up, the cable has an OPEN fault. If all of the appropriate Numbered LEDs light, the cable is OK.

#### **Note:**

- When testing an RJ45 UTP Cables the S/G LED must not light up.
- When testing an RJ45 FTP/STP Cable the S/G LED must light up.
- The Labgear 5-in-1 Diagnostic Cable Tester is intended to test complete cable. It may not find faults in cables that are intentionally incomplete. For example, the standard EIA/TIA 568 RJ45 terminated Ethernet cable is expected to contain 8 conductors. If only 4 conductors are used between the RJ45 connectors the Labgear 5-in-1 Diagnostic Cable Tester may not properly identify any faults.
- RJ11 cables may have 2 connections, 4 connections or as many as 6 connections.
  - For 2 connection cables LED 3, 4 must light.
  - For 4 connection cables LED 2, 3, 4 and 5 must light.
  - For 6 connection cables LED 1, 2, 3, 4, 5 and 6 must light.
- The numbered LEDs DO NOT indicate that a GOOD connection exists, only that a connection exists. If the Short or Cross LEDs are lit, there is a fault in the cable.
- In the Short mode, the Numbered LEDs only indicate the location of the shorts. The other connections in the cable are not indicated. If more than 3 numbered LEDs light, there may be multiple shorts in the cable.

- In the Cross-mode, the Numbered LEDs indicate connections but do not indicate the location of the cross.
- RJ11 cables used for telephone connections are often crossed. Even new cables are often crossed. This seldom affects the performance of standard analogue telephone lines (POTS). Digital telephone lines and old touch-tone phones may be polarity sensitive, so a crossed cable may prevent them from working properly.

## **7. Cable Repair**

### **7.1. General Information**

The following section provides information to the user about common cable types, common failures, and repairs. It is not meant to be an exhaustive study of the topic, just some basic information that the uninitiated may find helpful.

### **7.2. Cable Damage**

When a cable tests badly, either the wire or the connectors or both may be at fault. If the cable has been installed and working then it's likely that the wire or connectors have been abused in some way. The wire portion of the cable can be damaged by being crushed (stepped on, left under a desk etc.) stretched (pulled sharply around a corner or yanked when moving equipment) overloaded (hit by lightning). Similar abuses will damage the connectors on the ends of the cable. The connector can also be damaged by excessive insertion and removal or flexing of the cable close to the connector body.

While the Labgear 5-in-1 Diagnostic Cable Tester can identify a bad cable, it cannot determine if the wire or the connectors are at fault. The user must examine the different parts of the cable to determine the cause of the failure and take the appropriate action to correct the problem.

### **7.3. Which End is Bad?**

The Labgear 5-in-1 Diagnostic Cable Tester like many cable testers, cannot find the location of the fault, or even determine which end or connector is bad. It simply knows that a fault exists. The user must locate the fault and take the appropriate action.

### **7.4. Cables with Moulded on Ends**

Many cables have moulded on ends that cannot be opened up for repair. The entire cable in this case must be replaced, or the moulded on end removed and replaced with a user serviceable connector. These types of cables usually fail from Opens or Shorts; they seldom fail from Crossed connections.

### **7.5. Cables with Crimped on RJ Connectors**

Crimped on RJ connectors cannot be reused or repaired. New connectors must be installed on the cable. If the cable being

tested has just been made up or put in service, and it tests as Open or Crossed, the RJ connectors have been installed incorrectly. Shorts very seldom occur as the result of a badly crimped RJ connector, so the user should suspect a problem with the wire (possibly a staple or nail has gone through the wire, or a crushed or pinched wire) if the Labgear 5-in-1 Diagnostic Cable Tester indicates a short.

A visual examination of the RJ connectors may reveal the fault but keep in mind that whatever the cause of a connector problem (i.e., bad wiring, improper stripping of the wire, bad crimp etc.) The only solution is to replace the connector. Consequently, it is not necessary for the user to know the exact cause of the problem, simply to make sure that they install a new connector correctly.

## 7.6. Conflicting Results

Sometimes, the test results of the Labgear 5-in-1 Diagnostic Cable Tester seem to conflict with the performance of the cable i.e., the cable tests badly but works OK, or vice-versa. The following items list some of the reasons why:

### **The Labgear 5-in-1 Diagnostic Cable Tester indicates the cable is not working, but my LAN works OK**

Installed LAN cables with RJ45 connectors that have been in service and working OK may test as Open, Shorted or Cross – here's why:

The EIA/TIA 568B standard for LAN cables only uses 4 of the wires in the eight wire cable. The other 4 wires in the cable may have faults but these will not affect the operation of the LAN. The Labgear Diagnostic Cable Tester tests all of the wires in the LAN cable and identifies the faults, even though these wires may be redundant in the LAN system.

Not all LAN cables are wired straight through. Crossover cables used on LANs are purposely miswired, with their Receive and Transmit wires cross over. The Labgear 5-in-1 Diagnostic Cable Tester will test this as a bad cable, but it may work fine as a crossover cable.

### **The Labgear 5-in-1 Diagnostic Cable Tester indicates the cable is good, but it's not working on my LAN**

Many cable testers like the Labgear 5-in-1 Diagnostic Cable Tester only perform continuity style tests (Opens, Shorts, Crossed etc.) Ethernet LAN cables are constructed in a special way. The 8 wires inside are grouped into 4 pairs of 2 wires each. Not only must the 8 wires connect from end to end of the cable, the pairs of the cable must connect to specific pins of the RJ45 plugs on the ends of the cable, ignoring the pairing (as described in EIA/TIA 568), and the cable will test ok. But when the cable is tried on the LAN it will not work. This is because of the incorrect pairing which causes excessive crosstalk in the cable preventing the LAN from working. This type of cable fault is sometimes called a split pair or double split pair.

**The Labgear 5-in-1 Diagnostic Cable Tester indicates the cable is good, but it's not working on my LAN**

**Note:**

Cross talk increases with the length of the cable. A LAN system will tolerate a certain amount of cross talk. A short cable (10ft or less) that is improperly paired may work just fine. However, longer cables paired in exactly the same way may not work. This explains why an installer can make short jumper cables that work (although they are improperly paired) but when they install RJ45 in exactly the same way on a long run of cable, the cable no longer works.

**The Labgear 5-in-1 Diagnostic Cable Tester says my phone cable is bad, but my phone works OK**

Most single line telephones only use 2 wires in a modular cable, the modular cable, which terminates in RJ11 connectors, could have as many as 6 wires in it. The unused wires may have faults, which the Labgear 5-in-1 Diagnostic Cable Tester identifies, but these faults have no effect on the working 2-wire telephone circuit.

Many telephone cables with RJ11 plugs/jacks are wired in reverse. The Labgear 5-in-1 Diagnostic cable Tester will show that a cable like this is crossed. A cable like this reverses the polarity of the telephone line. Most regular telephones made in the last 20 years are not polarity sensitive. So, even though the cable is wired in reverse (Crossed) it may work OK.

Early touch-tone telephones and answering machines were polarity sensitive. If connected in reverse polarity, the touch-tone phone may not dial out (no touch) and the answering machine may not answer when the phone rings.

**The Labgear 5-in-1 Diagnostic Cable Tester says my RJ11 phone cable is good, but my phone doesn't work**

Analogue telephones will usually work, regardless of line polarity. Digital phones are polarity sensitive, and may not work with reversed line polarity.

## 8. Maintenance

Your Labgear 5-in-1 Diagnostic Cable Tester is a precision test instrument and when used as described in this manual, should not require maintenance.

There are no internal adjustments or calibrations required.

To clean the outside of the tester, use a cloth dampened with a mild cleaning agent solution. Do not use any abrasive cleansers or chemical solvents that may damage the case of the tester.



## **9. Accessories**

Your Labgear 5-in-1 Diagnostic Cable Tester includes the following items:

- Main Unit
- Remote Unit
- Female BNC Terminator
- Male/Male BNC Jumper Cable
- Male/Male RJ11 Jumper Cable, 4-wire
- Male/Male RJ45 FTP/STP Jumper Cable EIA/TIA 568
- Instruction Manual
- Carry Case







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