

CableTest Systems Inc.  
**HORIZON SERIES TESTER**

H1500 Operator's Manual

v 4.5.xx

Distributed by:



<http://www.quadtech.com>

1-800-253-1230

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Printed on 08/03/2004

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# 1 INTRODUCTION

# INTRODUCTION

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## 1.1 WELCOME

**Thank You.** Congratulations and thank you for purchasing your Horizon Series Tester. CableTest Systems Inc. is proud of its Horizon line of testers and warranty's them for one (1) full year parts and labour (please see our complete Warranty at the beginning of this manual).

### Where to get more help:

Check out our web site:	<a href="http://www.CableTest.com">www.CableTest.com</a>
Email our Support Team:	<a href="mailto:service@CableTest.com">service@CableTest.com</a>
Call Toll Free in the US and Canada:	800.495.1998
International:	905.475.2607
Fax:	905.475.2609

## 1.2 ABBREVIATIONS AND SYMBOLS



**Important: Additional User Information**



**Caution: Indicates how to avoid potential damage to parts/components or loss of data.**



**Warning: Indicates how to avoid potential bodily harm.**

EPO	<b>Emergency Power Off</b>
EXP	<b>Expansion</b>
FER	<b>Faulty End Recognition</b>
HCS	<b>High Current Source</b>
HiPot	<b>High Potential Test</b>
HV	<b>High Voltage</b>
LV	<b>Low Voltage</b>
MSR	<b>Measurement Board</b>
PUT	<b>Product Under Test</b>
TCL	<b>Tool Command Language</b>

## INTRODUCTION

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### 1.3 SAFETY



#### **Warning!**

This product generates high potential as a test stimulus when programmed to do so.

To avoid the risk of shock do not attempt to service the supply beyond the described steps in the User's Manual.

To avoid the risk of shock or personal injury, do not remove the product covers while the unit is operating or connected the AC mains.

Use only a power cord rated greater than the input current rating of the external power supplies. Use only a cord in good condition.

If liquid is spilled on the unit, shut it off immediately and disconnect it from the AC mains.

Ensure the unit is properly grounded using a reliably grounded AC mains input at the external power supplies.

Do not touch any exposed wiring on your product under test (PUT) while the High Voltage lamp is illuminated.

For additional safety it is recommended to use an approved EPO (Emergency Power Off) switch during High Voltage testing.



## 1.4 BUILT-IN SAFETY

The Horizon Series Tester has built-in safety systems:

### **Interlock:**

EPO (Emergency Power Off) switch connected to the Horizon's I/O can be used as emergency high voltage shut off.

### **Software Safety:**

The H1500 will not perform a High Voltage test on a product that has failed either continuity or isolation.

By default, the software pauses before running a High Voltage test. The operator is prompted to continue.



The operator prompt before High Voltage tests can be disabled – enabling it allows an immediate High Voltage test to follow a passed Low Voltage test. CableTest Systems Inc. does not take responsibility for injury caused by the 'Autohipot' option.



## 2 SYSTEM INSTALLATION

# SYSTEM INSTALLATION

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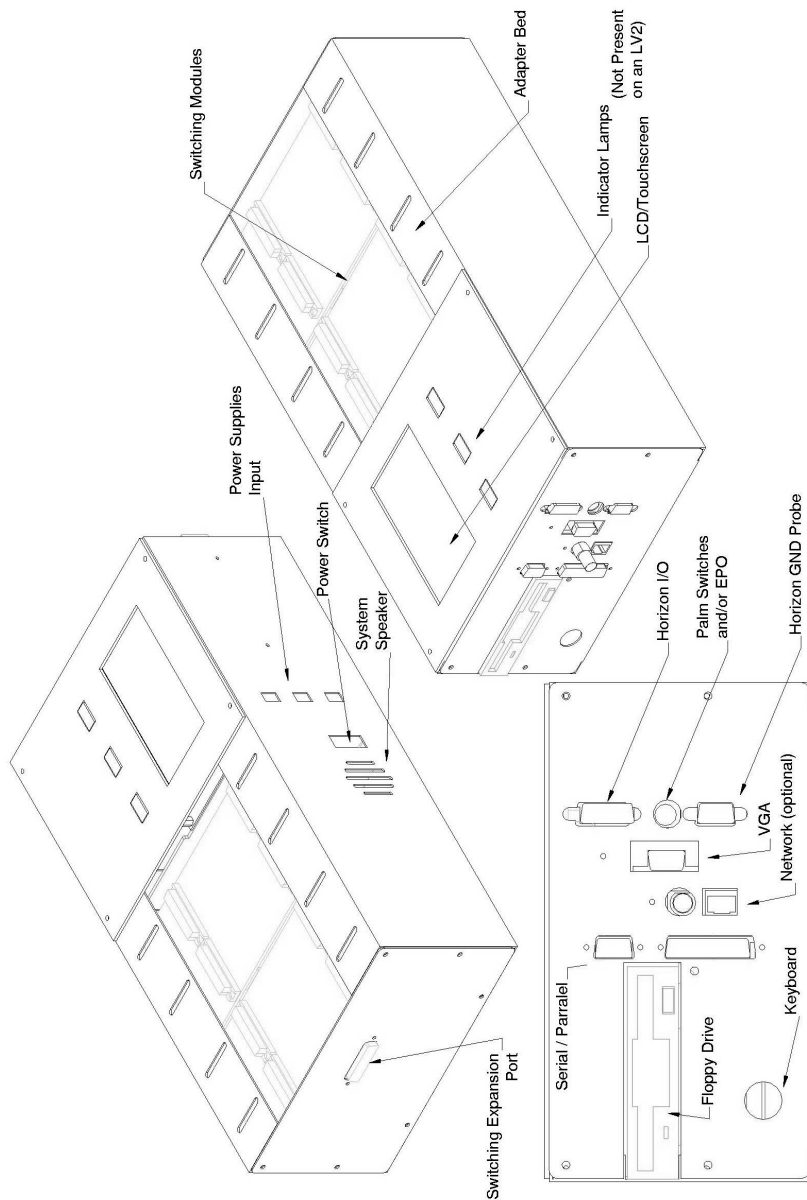


Figure 2-1: Horizon Series Tester

## SYSTEM INSTALLATION

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### 2.1 REQUIRED TOOLS

No special tools or equipment are required to install the Horizon 1500 Series Tester.

### 2.2 UNPACKING THE HORIZON 1500 SERIES TESTER

As you unpack your system, you will find one or more of the following items (please refer to your Packing Slip to ensure all ordered items are in the box(es)).

#### **Standard:**

H1500 Series Tester

External 12V Power Supplies (min. 1, max. 3 – See Table 1 for details)

Includes 1 local plug terminated cord set for each supply

Ground Probe

Documentation

    Operator/Programmer's Manual

    Warranty Certificate

    Calibration Certificate

Purchased Adapters (if you purchased Horizon Adapters they will be included with your shipment).

#### **Options:**

Safety devices such as palm switches, EPOs, safety shields, etc.

Calibration Verification Tool

Digital Hand Held Probe

Expansion Boxes (for systems with more than 128 test points)

Expansion Umbilical Cables

TCL Scripting Guide



Carefully inspect the shipping containers for mishandling or damage due to transit. If visible damage is found, CableTest suggests that the carrier's representative be present when opening the container. Carefully inspect all items as they are removed from the shipping containers and immediately report any lost or damaged parts to CableTest or an authorized CableTest representative.

## 2.3 ENVIRONMENTAL REQUIREMENTS

### 2.3.1 PHYSICAL SPECIFICATIONS

**Dimensions:**

17" (432mm) W x 9" (229mm) D x 5" (127mm) H

**Weight:**

Less than 15lbs (6.8kg)

### 2.3.2 ENVIRONMENTAL SPECIFICATIONS

**Ambient Temperature:**

Operating 0°C - 55°C

Non-Operating 0°C - 45°C

**Temperature Gradient:**

Operating/Non-Operating

30°C/hr max, without condensation

**Relative Humidity:**

Operating/Non-Operating

8% - 80% non-condensing

**Vibration:**

Operating 2.45 m/s<sup>2</sup> (0.25G)

Non-Operating 11.76 m/s<sup>2</sup> (1.2G)

**Shock:**

Operating 29.4m/s<sup>2</sup> (3G)

Non-Operating 490 m/s<sup>2</sup> (50G)

**Corrosion Gas:**

No Corrosion Gas

## 2.4 SITE REQUIREMENTS

The installation site must provide a properly wired and grounded power outlet.

Circuits connected to air conditioners and devices that generate significant transient

## SYSTEM INSTALLATION

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electrical noise should be avoided.

Electrostatic discharge in the vicinity should be minimized by avoiding high resistant floor material and carpeting that does not have anti-static properties. The unit should be located away from areas that generate electromagnetic interference (for example, transformers, power distribution panels, and motors). The unit should not be installed where the atmosphere contains corrosive elements that may damage the unit.

The Horizon should be installed on a flat sturdy surface at a comfortable height for operators to work at.

It is not recommended to install the unit on any angle other than horizontal (with all four chassis rubber feet touching the surface) or on a 90 degree angle from that reference.



## 2.5 HORIZON LITE (H1500-LV2) INSTALLATION

This is for the "Horizon Lite", H1500-LV2 model only.

The installation of an H1500 LV2 requires the connection of an external VGA Monitor to the VGA port (Figure 2-1) of the H1500 and a Keyboard attached to the AT Keyboard port of the unit.

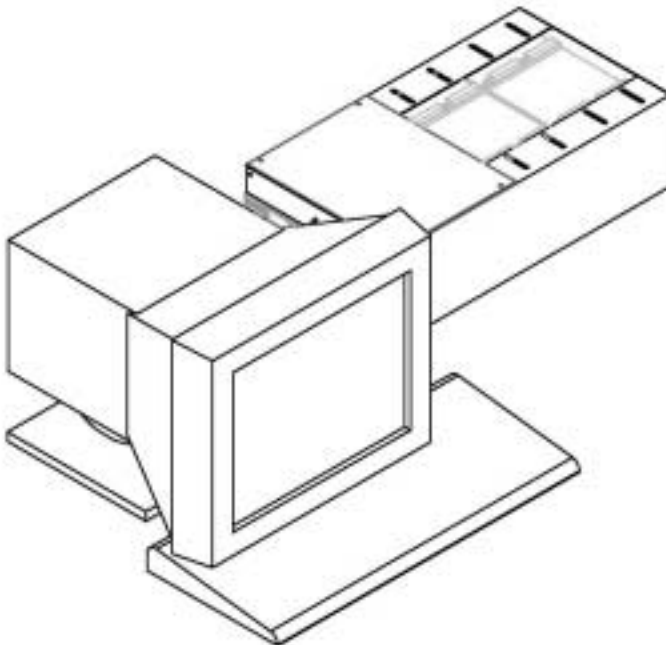


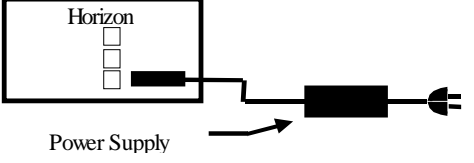
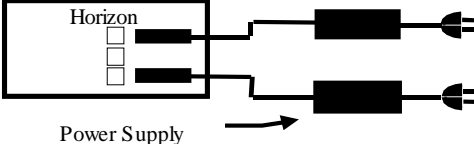
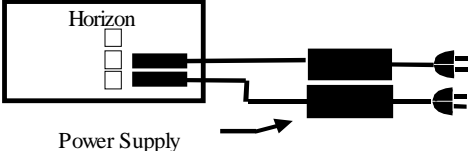
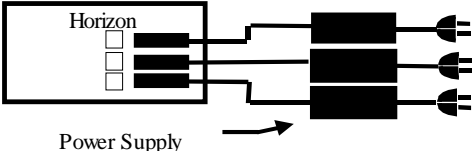
Figure 2-2: Horizon 1500-LV2 final set-up

# SYSTEM INSTALLATION

## 2.6 CONNECT POWER SUPPLY(IES)

Connect the external power supply as per the table below (see Figure 2-1 for location).

Table 1: Power Supply Configuration

Type of System (Model #)	Power supplies needed and configuration
H1500P-128/LV1, LV2  No Expansion Boxes  Input #1	 <p>The diagram shows a box labeled 'Horizon' with three vertical slots. The top slot is connected to a power supply. An arrow labeled 'Power Supply' points to the power supply unit, which is connected to a wall outlet.</p>
H1500P-128/LV1, LV2  With Expansion Box(es)  Input #1 and #3	 <p>The diagram shows a box labeled 'Horizon' with three vertical slots. The top and bottom slots are connected to two separate power supply units. An arrow labeled 'Power Supply' points to the top power supply unit, which is connected to a wall outlet.</p>
H1500P-128/HV1, HV2, HV3, HV4, HV5, HV6, SCSI-1, SCSI-2  No Expansion Boxes  Input #1 and #2	 <p>The diagram shows a box labeled 'Horizon' with three vertical slots. The top and bottom slots are connected to two separate power supply units. An arrow labeled 'Power Supply' points to the top power supply unit, which is connected to a wall outlet.</p>
H1500P-128/HV1, HV2, HV3, HV4, HV5, HV6, SCSI-1, SCSI-2  With Expansion Box(es)  Input #1, #2, and #3	 <p>The diagram shows a box labeled 'Horizon' with three vertical slots. The top, middle, and bottom slots are connected to three separate power supply units. An arrow labeled 'Power Supply' points to the top power supply unit, which is connected to a wall outlet.</p>

## 2.7 CONNECTING EXPANSION BOXES:

If your unit was shipped with expansion boxes, then it was preconfigured to use them. Before turning on the unit for the first time, connect all expansion boxes to the unit.

- ⓘ Expansion boxes are numbered and it is important to connect them in a chronological order.

Expansion boxes are connected either directly to the box previous (or main unit) or using a CableTest supplied umbilical cable.

## 2.8 CONNECTING ACCESSORIES

### 2.8.1 HORIZON GROUND PROBE

If needed, connect the Horizon Ground Probe to the DB9 (**I/O#2**) connection on the left hand side plate (Figure 2-1).

### 2.8.2 MOUSE AND PRINTER

If you wish to use a mouse with your Horizon, connect it to the DB9 COM Port (**Mouse & Serial**) located on the left hand side of the unit (Figure 2-1).

If the Horizon was not preconfigured to use a mouse, the Autoexec.bat file on the unit will need to be modified to run the supplied generic Mouse.com driver application.

- ⓘ The mouse pointer will only appear on an attached monitor.

If you will be using a printer with your Horizon, connect the unit to the Parallel port located on the side of the unit (Figure 2-1).

- ⓘ Only printers that support pure DOS commands (not DOS under Windows) will work on your Horizon.

### 2.8.3 EPO AND/OR PALM SWITCHES (OPTIONAL)

EPO and Palm Switches are connected to the Mini-Din (**Palm Switch & EPO**) connection on the left hand side plate (Figure 2-1).

## SYSTEM INSTALLATION

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- i** Systems shipped with an EPO are pre-configured to use it. You will not be able to perform High Voltage tests if it is not connected.

### 2.8.4 DIGITAL HAND HELD PROBE (OPTIONAL)

If you have purchased a Digital Hand Held Probe for your Horizon, connect the unit to the supplied communication cable and DB9 connector. Connect the assembly to the DB9 COM Port (**Mouse & Serial**) located on the left hand side of the unit (Figure 2-1).

## 2.9 POWERING ON / POWERING OFF

### 2.9.1 POWER ON

Once installation is complete. Turn on the Horizon using the Power Switch located at the rear of the unit (Figure 2-1).

- i** If you are using an H1500-LV2, do not forget to turn on the attached VGA Monitor prior to powering on the Horizon.

Successful Power On and Initialization will display the Horizon *Main Menu*.



Figure 2-3: Horizon *Main Menu*.

### 2.9.2 POWER OFF

From the *Main Menu* of the Horizon (Figure 2-3), select **Shut Down <Alt-D>**.

Once prompted it is safe to Shut Down, power off using the Power Switch located at the rear of the unit (Figure 2-1).

# 3 LOADING AND TESTING

LOADING/TESTING

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### 3.1 INTRODUCTION

Test programs that have been created using the Horizon 1500 can be loaded and run right from the *Main Menu*.

### 3.2 NAVIGATING THE HORIZON

All models of the Horizon except the LV2 have an LCD and touch screen. Selecting buttons on the screen opens and selects each labelled option.

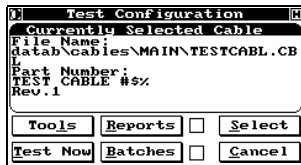
- K** For LV2 users and Horizon operators using a monitor and keyboard you can navigate using the underlined character displayed on the screen.

**Example:** For "Test" select **<Alt-T>**.

- i** By default all affirmative buttons (**Ok** and **Yes**) can be selected by pressing **<Enter ↵>** and all **Cancel** or **No** buttons can be selected by pressing **<Esc>**.

### 3.3 LOADING A SAVED TEST PROGRAM

On the *Main Menu*, select **Test <Alt-T>**. The *Test Configuration* dialog appears.



The display shows the Directory and the Part Number of the last tested or learned product.

If you do not see the correct information you will have to press **Select <Alt-S>** to select your cable. The *Select Part Number* dialog appears.



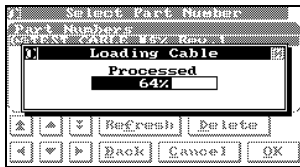
Select the part number for your cable, using the arrow keys if necessary, and press **Ok <Enter ↵>**. The *Test Configuration* dialog reappears with your cable as the *Currently Selected Cable*.

Only one product is available, since only one product has been learned.

- i** This selection process is only necessary if you want to test a cable other than that shown as the *Currently Selected Cable*.

## LOADING/TESTING

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The Horizon loads the selected product.

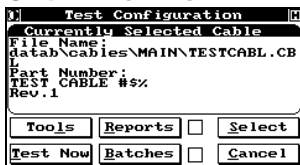
i

**Fast Load:** To alleviate searching through long lists of files for your test program, simply touch the center of the screen and type the name of the file to load it quickly. You can also type in partial names to get a list of matching files.

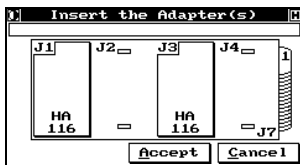
K

You can also use the Space Bar on a keyboard to use the **Fast Load** feature.

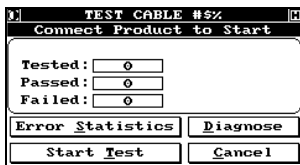
### 3.4 TESTING THE PRODUCT



To start testing your cable, select **Test Now <Alt-T or Enter ↵>**. The *Insert the Adapter(s)* dialog appears.



Insert the adapters required to test your cable. Note that the system will prompt you for any missing, mis-positioned, or incorrect adapters by flashing an outline in the appropriate position and by flashing the part number. As soon as all of the proper adapters are mounted, the *Connect Product to Start* dialog appears.



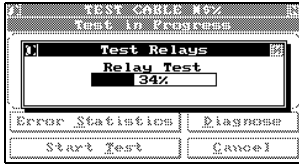
Mount your cable on the adapters.

#### 3.4.1 STARTING THE TEST

The default system setup starts the test as soon as 60% product is inserted.

Alternately, the system may be setup to begin testing using the optional palm switches or if the product is open ended you may need to select **Start Test** to begin testing.

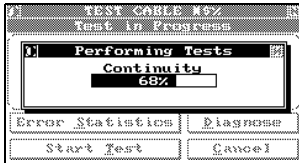




The relays are tested and cleaned.



LV1 & LV2 systems are not equipped with relays. This step is bypassed.



The system will indicate testing progress by displaying a horizontal bar graph that visually tracks the continuity and isolation tests as they are performed.

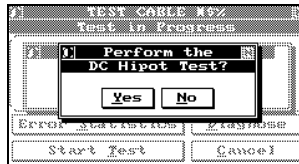


This feature can be disabled, and may not appear.

### 3.4.2 HIGH VOLTAGE TESTING

High voltage tests will only begin if the low voltage test prior has passed.

#### 3.4.2.1 SAFETY



If the test program you are using has a High Voltage test cycle (DC or AC), the system will pause prior to energizing and prompt the user to acknowledge the test.

Select **Yes (Alt-Y or Enter ↵)** to continue or **No (Alt-N or Esc.)** to abort.



**Caution:** This option can be disabled. Keep hands clear of the product under test and the Horizon during the entire test cycle.

Alternately, if Palm Switches are being used with the Horizon, you may be required to depress one or both switches to begin the HV cycle

If you are using an EPO with the Horizon, this can be used to immediately disable the High Voltage output.

Likewise, touching the display during a High Voltage cycle will abort the test.

#### 3.4.2.2 HIGH VOLTAGE INDICATORS

While high Voltage is being applied to the PUT, the High Voltage lamp is illuminated

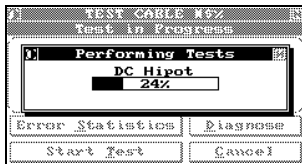
## LOADING / TESTING

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(Figure 2-1) and a progress bar is displayed.



LV2 users, the 'LAMP' indicator is located on the attached monitor.



The display shows the progress of High Voltage test.



This feature can be disabled, and may not appear.

Once the High Voltage indicator is off, it is safe to touch the PUT.

### 3.4.3 VIEWING RESULTS

At the end of a test, the product has either **PASSED**, **FAILED**, or **ABORTED**.

The indicator lamps on the Horizon (Figure 2-1) display passed or failed by illuminating green (passed) or red (failed).



LV2 users, the 'LAMP' indicator is located on the attached monitor.

To view the results, select **Diagnose (Alt-D)** at the end of the test.

The *Test Report* window is displayed.

Altering the results displayed in the *Test Report* windows during the test cycle can be done by touching the center of the display.

There are five options available for diagnostic display.

None: No results are displayed.

Fail: Only failed results are displayed.

Pass: Only pass results are displayed.

Pass/Fail: For on-screen diagnostics this behaves the same as Fail.

All: All results are displayed.



LV2 users and operators using a keyboard with their Horizon can toggle between result options by using the **Spacebar**.





## TROUBLE SHOOTING

## TROUBLESHOOTING

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## TROUBLESHOOTING

<b>Problem</b>	<b>Possible Cause</b>	<b>Possible Solution</b>
High Voltage or High Current module error during startup.	Noted module not detected during initialization.	Replace unit.
Adapters aren't auto-detected	Capacitance Signature Adapter Switch Card Failure MSR Card Failure	Perform System Capacitance Tare Replace Switch Cards Replace MSR Card
System Will not Boot Up	BIOS settings incorrect Interface Card Not Seated Properly General Hard Drive Failure	Perform HDD Auto-detect Re-seat Interface Card Replace Hard Drive
LCD Too Dark	Contrast Set Low Back Light Failure	Increase Contrast Replace LCD
Can't Select Buttons on LCD	Touch Screen Failure	Replace Touch Screen
Error Message: "Error initializing switching cards"	Power Supply #3 not present  General Switching Card Failure	Ensure all required power supplies are present Service Switching Cards
Lost Password		Contact Horizon Service
Product always fails Hipot – Arcs	DC or AC Hipot Failure	Service High Voltage Module(s)

## TROUBLESHOOTING

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## GLOSSARY OF TERMS

## GLOSSARY

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<b>Build Aid</b>	A special test parameter that allows the Horizon to aid in the building of a product. Assists in avoiding mis-wiring during product assembly.
<b>Calibration Verification</b>	Verifying your Horizon is maintaining measurement within CableTest engineering specifications.
<b>CapTare</b>	Measurement of capacitance up to a specific location for increased measurement accuracy.
<b>Conventions</b>	The numbering / lettering of connector pins using a specific sequence.
<b>Digital Hand Held Probe</b>	Digital Hand Held Probe - An optional product available for the Horizon. The DHHP currently works in conjunction with the Build Aid feature and with the Net List Editor.
<b>EPO</b>	Emergency Power Off
<b>FER</b>	Faulty End Recognition – a unique feature of the Horizon that enables the operator to quickly and easily locate low voltage shorts anywhere along the length of a product.
<b>Flex Test</b>	A special test parameter that allows the operator to manipulate the cable while the Horizon searches for opens, mis-wiring, and shorts. In many cases, faults only occur intermittently depending on the cable position.
<b>Flying Leads</b>	Any product that is terminated at one end with accessible contacts at another location.
<b>Ground Probe</b>	Included tool with the Horizon to use with the Build Aid feature of the Horizon.
<b>Hipot testing</b>	The application of high voltage (either DC or AC) to a product.
<b>Kelvin “four-wire” testing</b>	Accurate, low resistance measurement of a conductor or resistor. The method uses four wires instead of two (simplex).
<b>Netlist</b>	Groups of test points, sorted by their connections.
<b>Palm Switch</b>	An optional safety feature available for the Horizon.
<b>PUT</b>	Product Under Test
<b>Quickscan</b>	The default setting for low voltage tests of a product. The scan performs a standard isolation and continuity test on your product.
<b>ResTare</b>	Measurement of resistance up to a specific location for increased measurement accuracy.



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