Touch1 Ultra
Performance Verification Manual

Version 2010.1.4

August 9, 2010

CIRRIS®

(ISO 9001 Certified)

Touch1 Ultra Performance Verification Manual
Version 2010.1.4
Copyright 2006 by Cirris Systems Corporation
All Rights Reserved

Cirris Systems Corporation
1991 W. Parkway Boulevard
Salt Lake City, Utah 84119
USA

Table of Contents

Introduction

The Touch1 Ultra Performance Verification Kit allows you to verify calibration and proper operation of the Touch1 Ultra tester. The Associated Research Hypot Ultra unit has it's own calibration procedure found in the Associated Research Hypot Ultra Users Manual.

Each Performance Verification Kit has a lifecycle of two years from the time of purchase. At the end of two years, the kit can be recalibrated or replaced. All of the components for this performance verification kit are tested with instruments traceable to the National Institute of Standards and Technology (NIST).

Calibration should be performed on your Touch1 Ultra tester at least once a year. You should also check the calibration whenever you suspect the tester may not be operating properly. If the Touch1 Ultra tester fails any step in the performance verification procedure, it must be sent back for repair. No external adjustments can be made to fix the tester.

For information on setting up a calibration system to meet national calibration standards such as ANSI/NCSL Z540-1, and ISO 10012-1, see the appendix of this manual.

Set Up

Packing List:

You should have received the following items with your *Touch1 Ultra Performance Verification Kit*:

- This manual which includes a copy of a Touch1 Ultra Certificate of Calibration
- 0.1% Resistor Leak Adapter
- T1/H+ Capacitance/4-Wire Adapter
- Zero Ohm Adapter
- HVI Block PCHK Adapter
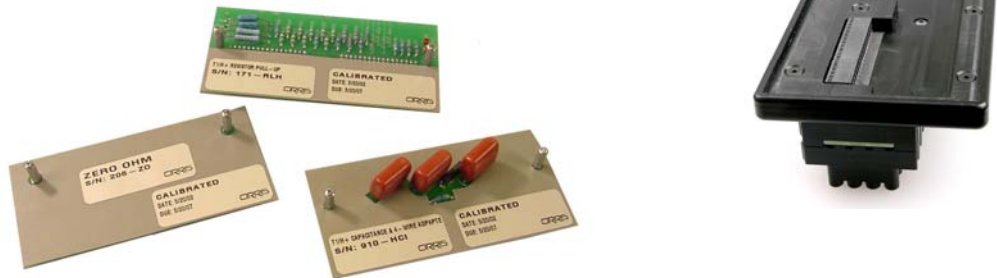
Tester Preparation:

To prepare the tester for calibration, do the following:

- Install any expansion boxes you want to use. For information on how to do this, see your *Touch1 ULtra Users Manual*.

- Connect the power cord to the tester. Plug the tester into a grounded power outlet.

- To print Tester Checkout results, connect a printer to the tester using the parallel port.

- Depending on your calibration system requirements, you may need to prepare a form to record the results of the calibration. At the end of this manual is a *Touch1 Ultra Certificate of Calibration*. If you use this form, make a photocopy so you can maintain the master for the next time you perform the calibration tests.

- Special equipment is required to do the high voltage tests. **To do the high voltage tests, be certain your voltmeter is equipped with a high voltage probe.** For testing above 1000 volts DC, your voltmeter must be equipped with a high voltage probe which has > 50M ohms of input resistance and be able to safely withstand over 1500 volts DC. **Your voltmeter may be damaged if you do not take these precautions.**

Tester Checkout Tests

1. From the Main Menu, press **System Setup**.

2. At the System Setup screen, press **Tester Checkout**.

3. The Tester Checkout Selection screen allows you to decide which tests you want to run for your calibration process. You can select **Full Calibration** to run all of the tests or you can select an individual test to run.
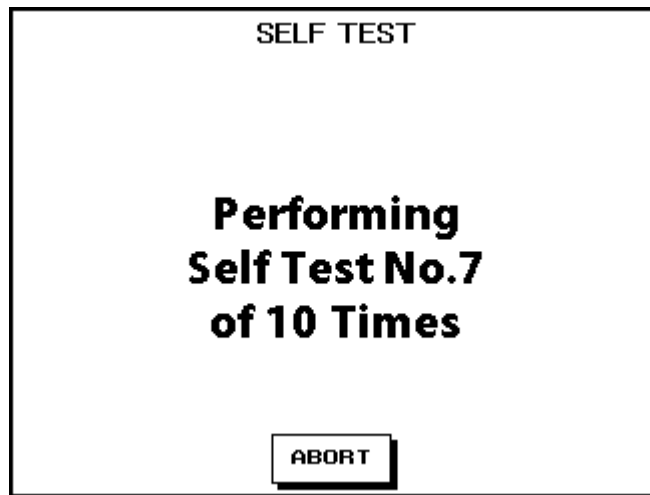

Touch here for full calibration
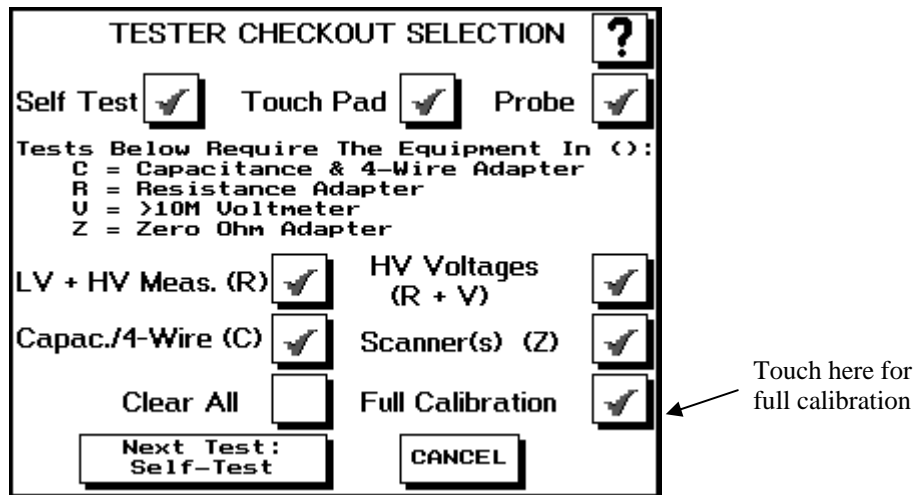
General Procedures for all Tests

- To switch a test option on, touch the button for that test so a checkmark appears inside of the box. If there is no checkmark inside the button, the test is turned off.

- To start a test, press **Next Test X** where X lists the test to be performed. The Touch1 Ultra will perform the test and then show either a Pass or Fail result. You can abort any test except the Touch Screen Test by pressing the **Abort** button. The Touch Screen Test will automatically abort if the screen is not touched for ten seconds.

- To proceed to the next test you have selected, press **Next Test X**. If all the tests have finished, press **Show Summary**.

- If during testing you want to cancel all remaining tests and see a summary of the test results so far, press **Cancel**.

- To print the results on a printer, press **Print**. Some tests have individual summary results you can also print.

Self Test

When this test is selected, the Touch1 Ultra will perform ten passes of a series of major tests. These are the same tests performed automatically on power up. They test the basic functionality of the tester to see if it can perform reasonable measurements within specification. Some of the tests include the voltage measurement gain circuitry, the high voltage circuitry, the high-current source, the negative current clamp, the capacitance measurement hardware, etc.

1. To start the test, press **Next Test: Self-Test**.

2. All ten passes must complete without errors for the tester to pass Self Test.

```
┌────────────────────────────┐
│         SELF TEST          │
│                            │
│                            │
│                            │
│         Performing         │
│      Self Test No.7        │
│        of 10 Times         │
│                            │
│                            │
│         ┌────────┐         │
│         │ ABORT  │         │
│         └────────┘         │
└────────────────────────────┘
```

This screen shows the seventh pass for the group of self tests being done.

Touch Pad Test

The **Touch Pad Test** tests the touch screen to be sure is it working properly.

1. To start the test, press **Next Test: Touchpad**.

2. A screen with a calibration button in the upper lefthand corner will be displayed. Press the center of the picture inside the button.

Touch Center Of Button For Touchscreen Calibration

Touch the center of the button to calibrate.
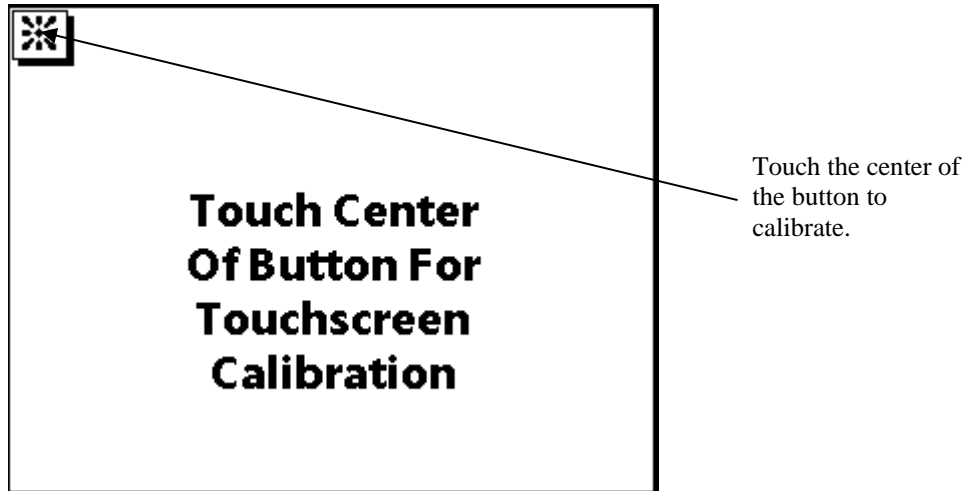
3. A screen with a calibration button in the lower righthand corner will be displayed. Press the center of the picture inside the button.

4. A screen with five buttons will be displayed. Press each button to check the calibration. You must press a button within ten seconds or the test will fail. A star should appear where the screen was touched. If the star is not drawn where the screen was touched, the calibration is not correct. Let the test fail by waiting ten seconds without touching the screen and perform the Touch Pad test again to correctly calibrate the touchscreen.

5. To pass the test, all five buttons must be pressed before the timeout.

Touch Buttons To Check Calibration

To check the calibration, press all five buttons making sure a star is drawn where the screen is touched.
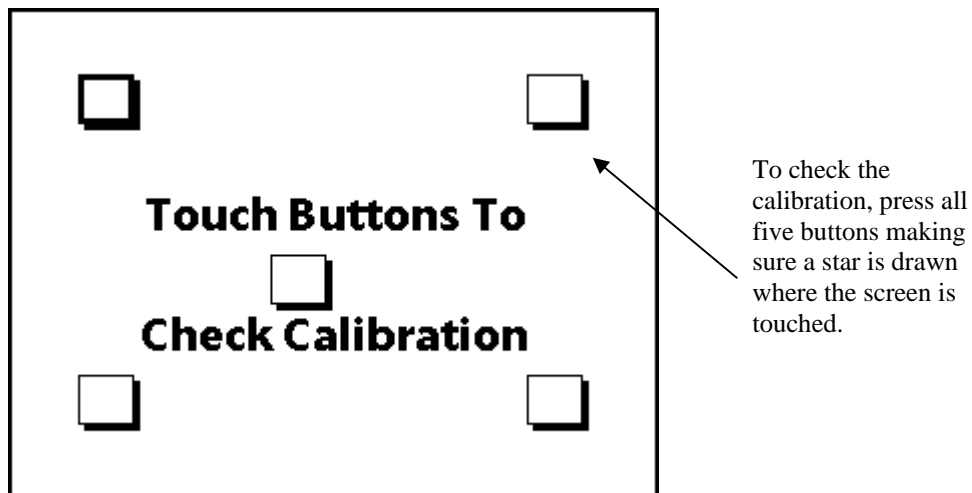
Probe Test

The **Probe Test** tests the ability to correctly identify probed test points. Any one of the adapters included in the Performance Verification Kit are needed to perform this test.

1. To start the test, press **Next Test: Probe**.

2. A screen will prompt you to install any adapter in the J1 position on the scanner. Install the Resistance adapter into the HVI Block Adapter.
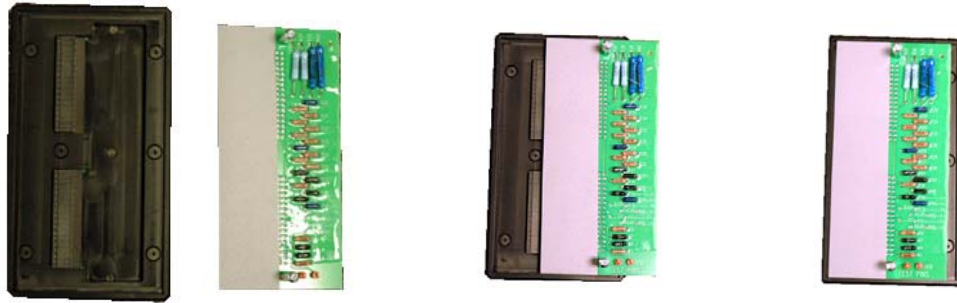
3. Install the HVI Block Adapter into the far left hand position (Pin 1) on the scanner assembly. Once the HVI Block Adapter is in place, press **OK**.

4. Touch the tip of the probe to the HV test point(s) on the adapter. If the probe is working correctly, a pop-up window will display the correct point(s) touched by the probe. If no pop-up window is displayed when the test point(s) are probed, press **No Response.** The test will fail and a Failed Probe Test screen will display.

PROBE:
J1-027 J1-029 J1-030 J1-032

**LIFT PROBE
FROM TEST POINT**

NO RESPONSE
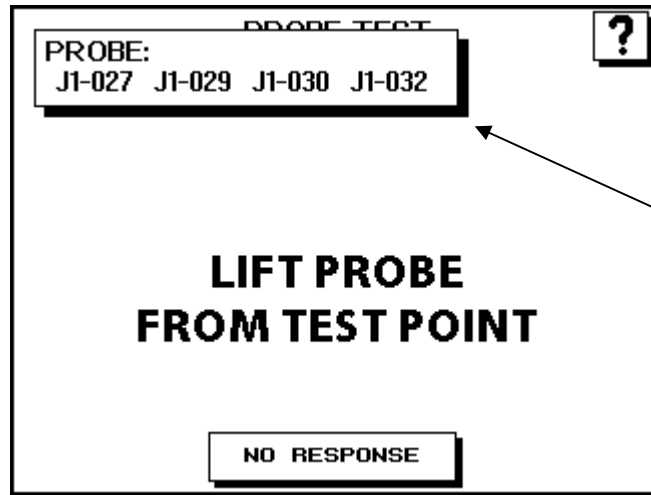
To display the pop-up probe window, touch the probe to any test point(s) on the adapter.

5. Release the probe from the test point(s) and a Passed Probe Test screen will be displayed. If the screen does not change when the probe is released from the test point(s), press **No Response.** The test will fail and a Failed Probe Test screen will be displayed.

LV + HV Meas. (R) Test

The **LV/HV Measurement Test** checks the low voltage and high voltage measurements. To pass the test, the Touch1 Ultra must measure the resistor's value to +- 1% +-0.1 ohm and the high voltage leakage at 5M ohm +- 10%. The Resistance Adapter included in the Performance Verification Kit is needed to perform this test.

1. To start the test, press **Next Test: LV/HV Meas**.

2. A screen will prompt you to install the Resistance Adapter in the J1 position on the scanner. Install the Resistor Adapter into the HVI Block Adapter. Install the HVI Block Adapter into the Pin 1 position as shown and then press **OK**.

3. The Touch1 Ultra will perform the tests and display either a Pass or Fail result for each test.

```
┌─────────────────────────────────────────┐
│  LV & HV MEASUREMENT TESTS  [?]          │
│                                          │
│             PASSED                       │
│ ┌─────────────────────────────────┬───┐ │
│ │LV Measurement Tests             │[▲]│ │
│ │  Expected 10.0 ohm              │   │ │
│ │   Avg  10.1 ohm (0.9%)  PASSED  │[ ]│ │
│ │   Min  10.1 ohm (0.8%)  PASSED  │   │ │
│ │   Max  10.1 ohm (1.0%)  PASSED  │   │ │
│ │                                 │   │ │
│ │  Expected 100 ohm               │   │ │
│ │   Avg   99.9 ohm (-0.1%)  PASSED│   │ │
│ │   Min   99.9 ohm (-0.1%)  PASSED│   │ │
│ │   Max   100 ohm (-0.0%)   PASSED│   │ │
│ │                                 │   │ │
│ │  Expected 1.00 K ohm            │   │ │
│ │   Avg   998 ohm (-0.2%)  PASSED │[▼]│ │
│ │   Min   998 ohm (-0.2%)  PASSED │   │ │
│ │   Max   999 ohm (-0.2%)  PASSED │   │ │
│ ├─────────┬──────────────┬────────┴───┤ │
│ │ PRINT   │ Show Summary │  CANCEL    │ │
│ └─────────┴──────────────┴────────────┘ │
└─────────────────────────────────────────┘
```
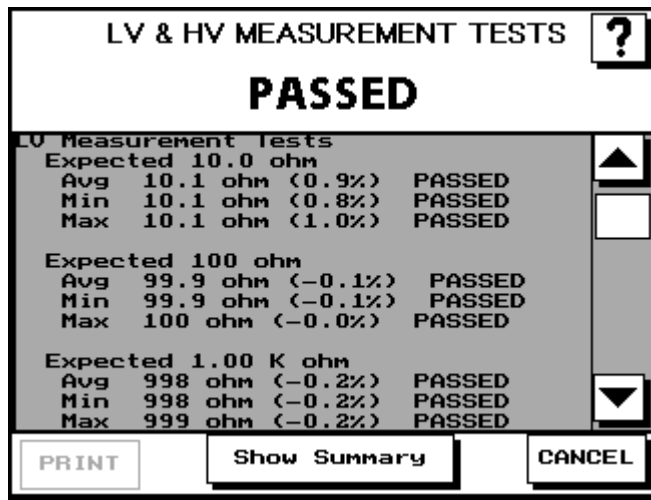
Scroll down to view the results for all the tests.

HV Voltages (R + V) Test

The **High Voltage Test** checks that all the voltages in the high voltage settings of the Touch1 Ultra are within range. The Associated Research Hypot Ultra voltages are calibrated separately using the Hypot Ultra Users Manual.

To pass this test, all the voltages must be within 10% of the high voltage setting. The Resistance Adapter included in the Performance Verification Kit is needed to perform this test. You will also need a voltmeter with a high voltage probe.

In general, the high voltages on the Touch1 Ultra tester are not considered dangerous because the current is limited to a safe level. However, touching cable connections when high voltage is applied causes an unpleasant shock. An operator who has a health condition that could be aggravated by a startle should not do high voltage tests.

Special Equipment is required:

To do the high voltage tests, be certain your voltmeter is equipped with a high voltage probe. This is beyond the range for most ordinary voltmeters. For testing above 1000 volts DC, your voltmeter must be equipped with a high voltage probe which must have > 50M ohms of input resistance and be able to safely withstand over 1500 volts DC. **Your voltmeter may be damaged if you do not take these precautions.**

1. To start the test, press **Next Test: HV Volts**

2. A screen will prompt you to install the Resistance Adapter in the J1 position on the scanner.

A high voltage probe is required to perform the HV Volts test.

3. Install the Resistance adapter into the HVI Block Adapter. Install the HVI Block Adpater into the Pin 1 position and connect your high voltage probe to the HV test pins on the adapter as shown. Then press **OK**.
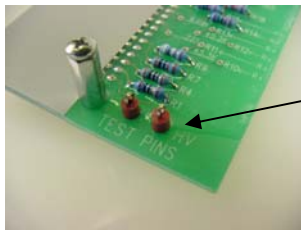
Attach the high voltage probe to the test pins shown here.

4. The Touch1 will apply high voltage during each test so keep your hands clear from all connections during the test. Press **START** to begin the test.
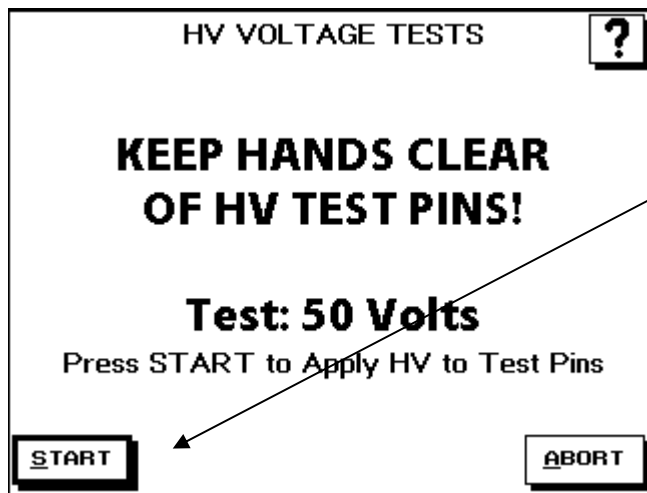
Press START to begin the series of high voltage tests.

5. Read the voltage from your voltmeter and press **RECORD VOLTAGE** to enter the reading from the voltmeter. Press **OK** to continue on to the next voltage or press **RETRY x V** where **x** is the voltage the test will retry. Note: The HV Test will timeout if the Record Voltage button is not pressed.
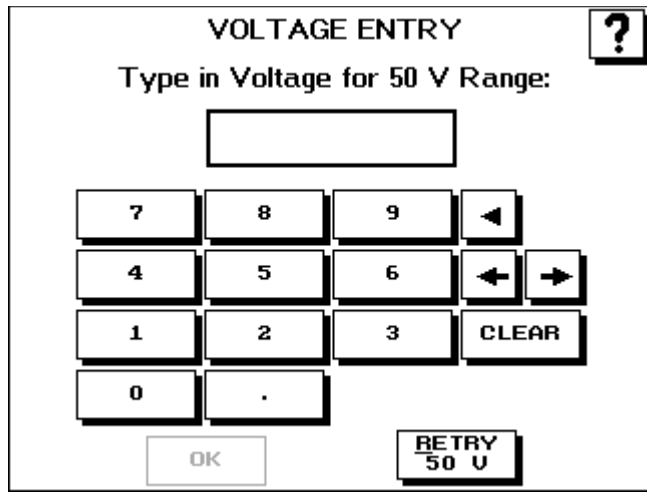
Enter the voltage displayed on the voltmeter here.

6. Repeat steps 4 and 5 until all the voltages have been tested and recorded. After 50 volts, the tests will increment by 100 volts until 1500V. The Touch1 Ultra will perform the tests and display an overall summary with either a Pass or Fail result for each test. If any of the the voltages do not pass, the entire HV Test will fail.

Capacitance/4-Wire (C) Test

The **Capacitance and 4-Wire Test** checks the Touch1 Ultra can accurately measure capacitance and perform a 4-Wire test. To pass the test, the Touch1 Ultra must measure the capacitor's value to ±10% and the 4-Wire resistor to ±1% ±0.001 ohm. The Capacitance/4-Wire Adapter included in the Performance Verification Kit is needed to perform this test.

1. To start the test, press **Next Test: Cap. & 4W**

2. A screen will prompt you to install the Capacitance/4-Wire Adapter in the J1 position on the scanner. Install the Capacitance/4-Wire Adapter into the HVI Block Adapter. Install the HVI Block Adapter into the Pin 1 position as shown and then press **OK**.

Touch1 Ultra Checkout Manual – Page 11

3. The Touch1 Ultra will perform the tests and display either a Pass or Fail result for each test.
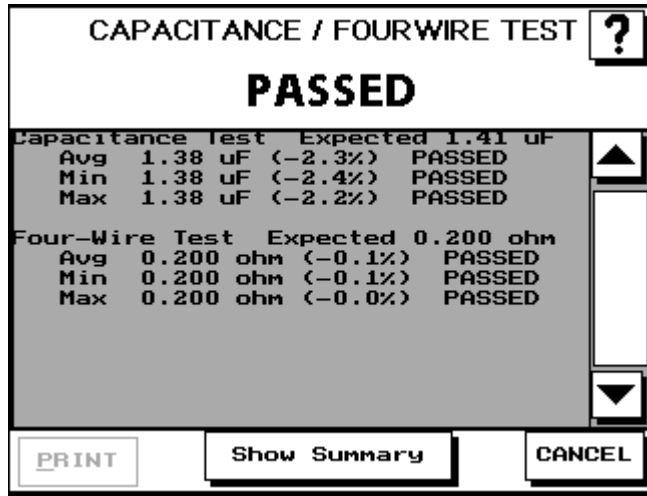
Results will be displayed for both the capacitance and fourwire tests.

Scanner Test

The **Scanner Test** verifies the analog circuitry and relays inside the scanners are working properly all the way to each test point. The test checks for loose scanners making sure the cables are connected properly. Run this test to isolate capacitor measurement errors, high resistance shorts, and leakage errors by eliminating or identifying contamination on scanners as the cause of the problem. The Zero Ohm Adapter included in the Performance Verification Kit is needed to perform this test.

1. To start the test, press **Next Test: Scanners**

2. A screen will prompt you to install the Zero Ohm Adapter in the J1 position on the scanner. Install the Zero Ohm Adapter into the HVI Block Adapter Install the HVI Block Adapter into the Pin 1 position as shown and then press **OK**.

3. The Touch1 Ultra will perform the test and display either a Pass or Fail result for each portion of the test. A screen will then prompt you to remove the adapter and install it in the next "J" position on the scanner. Two tests are done for each scanner. One for each double-high position.

4. The test automatically sequences to the next step if it can detect the removal of the adapter. If it cannot detect the adapter was removed, you must press the **NO RESPONSE** button.

Remove the adapter to automatically proceed to the next test.
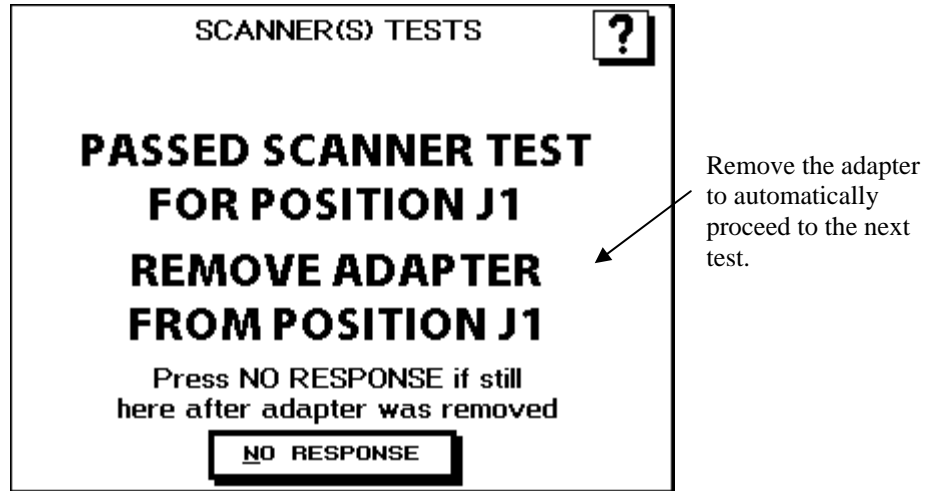
5. Remove the HVI Block Adapter and place it into the next Pin 1 position as shown.
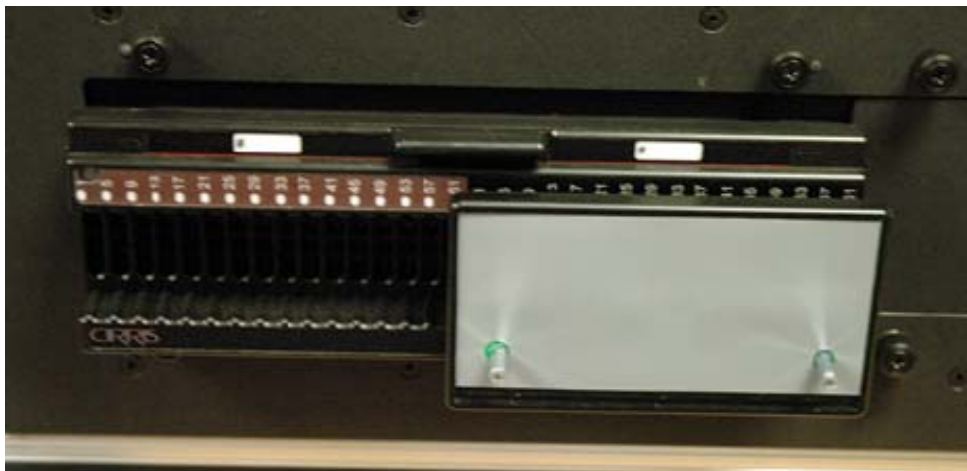
6. If the tester has any expansion boxes installed, continue testing the other scanners by moving the HVI Block Adapter to each of the "Pin 1" positions and running the test.

7. At the end of all the tests, a scanner summary screen will be displayed listing the results for each test section. If any of the the individual scanner tests do not pass, the entire ScannerTest will fail.
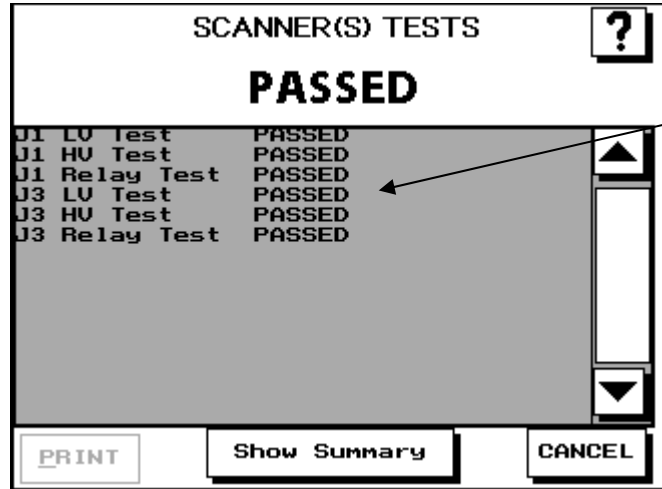
Results for six separate tests will be displayed for each scanner attached.

Tester Checkout Summary

1. To see the TESTER CHECKOUT SUMMARY screen for all the Tester Checkout Tests, press **Show Summary**. Use the arrow or scroll buttons to view all the results.

   - The summary will display ABORTED for any aborted tests.

   - The summary will display SKIPPED for any skipped tests.

   - The summary will display FAILED for any failed tests.

2. To save the Test Summary results, you must either print them or copy them to paper by hand. If you have a printer connected to your Touch1 Ultra, you can print the Test Summary by pressing **PRINT**.

```
+--------------------------------------------------+
|   TESTER CHECKOUT SUMMARY          [ ? ]         |
|                                                  |
|      Scroll For Test Results & Values            |
|  +-----------------------------------------+----+|
|  |Self Test            PASSED              |[▲] ||
|  |Touchpad             PASSED              |    ||
|  |Probe                PASSED              |[  ]||
|  |LV/HV Measurements   PASSED              |    ||
|  |HV Voltages          PASSED              |    ||
|  |Capacitance & 4-Wire PASSED              |    ||
|  |Scanners             PASSED              |    ||
|  |                                         |    ||
|  |DETAILS FOR TESTS:                       |    ||
|  |Self Test            PASSED              |    ||
|  |  Hardware Version: 2.0                  |    ||
|  |  Software Version: 4.2e                 |    ||
|  |  Point Count: 128                       |[▼] ||
|  |  Scanner Type: 1500V                    |    ||
|  |  Hardware Voltage Limit:                |    ||
|  +-----------------------------------------+----+|
|      [ PRINT ]          [ CANCEL ]               |
+--------------------------------------------------+
```
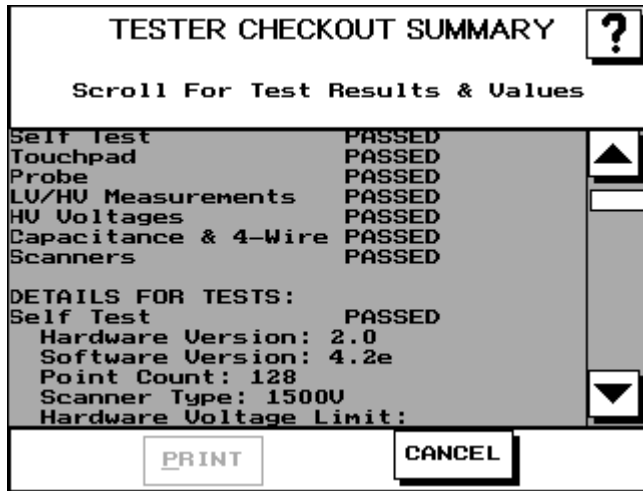
An overall summary is given for each test along with the individual test results.

```
+--------------------------------------------------+
|   TESTER CHECKOUT SUMMARY          [ ? ]         |
|                                                  |
|      Scroll For Test Results & Values            |
|  +-----------------------------------------+----+|
|  |  Hardware Voltage Limit:                |[▲] ||
|  |    1500VDC/1000VAC                      |    ||
|  |  Touchpad Type: Analog                  |    ||
|  |  Enabled Features:                      |[  ]||
|  |    SPC Data Collection                  |    ||
|  |    Scripting                            |    ||
|  |    AC                                   |    ||
|  |                                         |    ||
|  |Touchpad             PASSED              |    ||
|  |                                         |    ||
|  |Probe                PASSED              |    ||
|  |  Probe Touch Test   PASSED              |    ||
|  |  Probe Lift Test    PASSED              |[▼] ||
|  |                                         |    ||
|  |LV/HV Measurements   PASSED              |    ||
|  +-----------------------------------------+----+|
|      [ PRINT ]          [ CANCEL ]               |
+--------------------------------------------------+
```
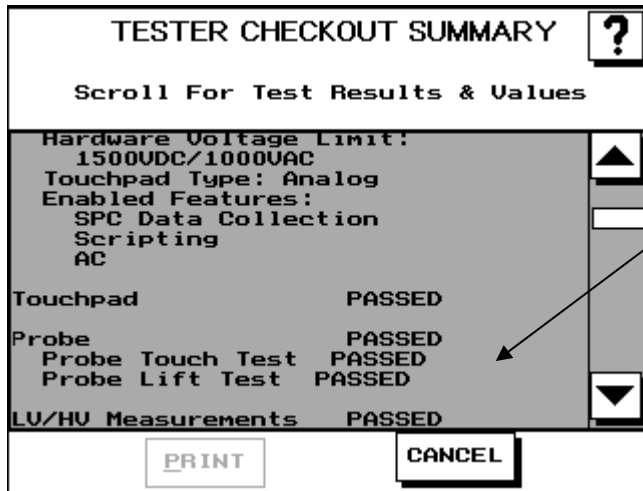
Scroll down to view the individual results for all the tests.

Appendix

The following information can be used a guide for setting up a formal calibration system in your organization.

Calibration Standards
Calibration standards refer to written quality system requirements for organizations that perform calibations and use calibrated equipment. Establishing a quality system according to calibration standards helps insure calibrations are done competently and lends credibility to the calibration organization. In the United States, common calibration standards include ANSI/NCSL Z540-1, ISO/IEC Guide 25, ISO 10012-1, and the former MIL-STD 45662A.

The ANSI/NCSL Z540 standard refered to above, as well as other helpful metrology information, can be obtained from the National Conference of Standards Laboratories International (NCSL) at 1-303-440-3339 or www.ncslinternational.org. You can obtain the ISO standards from the International Standards Organization (ISO) at their web site www.iso.net/.

The word "standards" is often used in another way in the metrology industry to refer to a centralized, most accurate unit of measurement regulated by countries. The National Institute of Standards and Technology (NIST) maintains the *national standards* for measurements in the United States.

Good Calibration Practices
The calibration standards, such as ANSI/NCSL Z540-1 and ISO 10012-1, require several good practices for the calibration industry including the following areas:

> *Recall System*
> How do you ensure your company does not forget to send an instrument in for calibration? Use a recall system which can be a card file or a computerized database, This system includes calibration dates, due dates, calibration sources, and other instrument records. The recall system ensures calibrated instruments are recalibrated in a timely manner.

> *Calibration Labels*
> How does someone know if an instrument has been calibrated without looking for the paperwork in a filing cabinet drawer? When an instrument is calibrated, the calibration standards require the instrument to be labeled as such. The calibration labels, which are applied to instruments, have fields for the instrument serial number, calibration date, calibration due date, and by whom. A good source of inexpensive calibration labels is United Ad Label at 1-800-992-5755.

> *Accuracy Ratios*
> Can you use a ruler to calibrate your digital calipers? Of course not! Wherever possible calibration standards require an accuracy ratio of at least four to one. In other words, the insturment being used to measure the calibrated instrument must be at least four times as accurate as the calibrated instrument.

Certificate of Calibration
How does everyone *know* you had an instrument calibrated*?* The calibration certificate is the record of who, when, and by what equipment the instrument was calibrated. A Touch1 Ultra Certificate of Calibration, which you can photocopy for your calibration, is provided following this section.

Calibration Data Report
So just how accurate is the calibrated test instrument in relation to its published specifications? Some organizations require the measured values of a calibrated instrument are written down when an instrument is calibrated. Calibration laboratories typically charge extra to create a calibration data report. However, when a calibrated instrument is found to be out-of-tolerance, the calibration standards require the out-of-tolerance data be recorded in relation to the instruments specifications. A calibration data report can fill this requirement. The Tester Checkout Summary from the Touch1 Ultra tester can be used as a calibration data report. This report can be printed or copied to paper by hand.

Traceability
Did qualified personnel perform the calibration procedure under controlled conditions, using correctly calibrated instruments with the correct test accuracy ratios? To maintain *traceability,* the answer to all these questions must be *yes.* Traceability refers to each unbroken link of valid calibrations going back to national standards such as those maintained by the NIST in the United States.

Several years ago NIST numbers (ie. reference numbers issued on NIST reports) were commonly copied on successive calibration certificates as a means of showing traceability. This practice has been discontinued. Therefore, if you are writing a calibration procedure, do not require NIST numbers be copied on reports to show traceability. NIST numbers are sometimes confused with other numbers that calibration laboratories create for reference such as "asset numbers", "NIST trace numbers", "ID numbers", and report numbers. For more information regarding the discontinued use of NIST numbers, contact Cirris for a copy of the position paper from the National Conference of Standards Laboratories.

Touch1 Ultra Certificate of Calibration

<table>
<tr><td colspan="4">Name and Address of Organization Performing the Calibration:</td></tr>
<tr><td colspan="2">Certificate Number:</td><td colspan="2">Calibrated by:</td></tr>
<tr><td colspan="2">Calibration Date:</td><td colspan="2">Due Date:</td></tr>
<tr><td colspan="2">Applicable Calibration Standard(s):</td><td colspan="2">Procedure:
Touch1 Ultra PCHK Version 1.3</td></tr>
<tr><td colspan="2">Temperature:</td><td colspan="2">Relative Humidity:</td></tr>
<tr><td colspan="4">Tester Serial Number:</td></tr>
<tr><td>Instruments used:</td><td>Serial Number</td><td>Cal. Date</td><td>Due Date</td></tr>
<tr><td>Zero Ohm Adapter</td><td></td><td></td><td></td></tr>
<tr><td>Resistor Leak Adapter</td><td></td><td></td><td></td></tr>
<tr><td>Capacitance/Fourwire Adapter</td><td></td><td></td><td></td></tr>
<tr><td>HV Block PCHK Adapter</td><td></td><td></td><td></td></tr>
<tr><td>Voltmeter</td><td></td><td></td><td></td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="4">Statement of Traceablility:

Certified by:</td></tr>
</table>