QP-ICT-4 (Single ICT)

A9-ICT (Dual ICT)

User Manual

Document Number: **90-000416**
Version: **December 12, 2022**

To receive product literature, visit us at http://www.astekcorp.com.

Astek Corporation reserves the right to make changes to any products herein at any time without notice. Astek does not assume any responsibility or liability arising out of the application or use of any product described herein, except as expressly agreed to in writing by Astek; nor does the purchase or use of a product from Astek convey a license under any patent rights, copyrights, trademark rights, or any other of the intellectual property rights of Astek or third parties.

Astek products are not intended for use in life-support appliances, devices, or systems. Use of any Astek product in such applications without written consent of the appropriate Astek officer is prohibited.

TRADEMARK ACKNOWLEDGMENT

1 Introduction / Overview

This document outlines the features and use of Astek's Interconnect Tester (ICT). Interconnect Testers provide the ability to test one (1) to five (5) interconnect in an odd even ping pong fashion. An interconnect could be a cable, cable with slip-ring, or a series of devices that include their own PHY devices. Each ICT connection provides outputs with amplitude control. Depending on the usage calibration of each output maybe required. Each unit is calibrated by the factory at IEEE-1394b defined test point two (TP2) which is at the connector of the ICT. Once calibration is complete the user may select a voltage that will be used when running the test. Each port transmits packets to the 1394 bus and receives data from the 1394 bus. Each packet is verified by the receiver of the packet. Currently the A9-ICT comes in an S400 (A9-ICT4) and S800 (A9-ICT8) versions. The S400 and S800 indicate the maximum data rate supported. The default configuration for the ICT is capacitive coupled for both the A9-ICT4 and A9-ICT8.

Interconnect Tester Components

Interconnect Tester

The Interconnect Tester (ICT) provides hardware capabilities to test transmit and receive signal compatibility.

ICT Application Software

The ICT application software controls the testing process and logs the test results.

DC Adaptor

A 12V DC power supply is included to power the ICT.

Other Required Equipment

Host Computer

The ICT application runs on a PC running Microsoft Windows 7 or Window 10. Minimal hard disk space and memory is required.

1394 Interface

The ICT application communicates with the ICT instrument via IEEE-1394 (the Backchannel). The host computer must provide a 1394 open host controller interface (OHCI). PCI, PCMCIA, and integrated OHCI are acceptable. The ICT has one bilingual ("to PC") and two beta only ports ("daisy chain"). The Backchannel uses VersaPHY™[1] technology for communication between the PC and the ICT. While VersaPHY is supported by most OHCI implementations, Astek has found the TI TSB82AA2B OHCI IEEE-1394b controller does not support VersaPHY packets.

[1] VersaPHY™ is a trademark of Quantum Parametrics LLC (Astek Corporation), all rights reserved.

The ICT application installation will install custom 1394 drivers. These drivers should allow applications currently using 1394 to continue to use the 1394. However, it is STRONGLY RECOMMENDED that the PC and ICT connection remain point-to-point while testing.

2 Interconnect Tester Tour

Front Panel

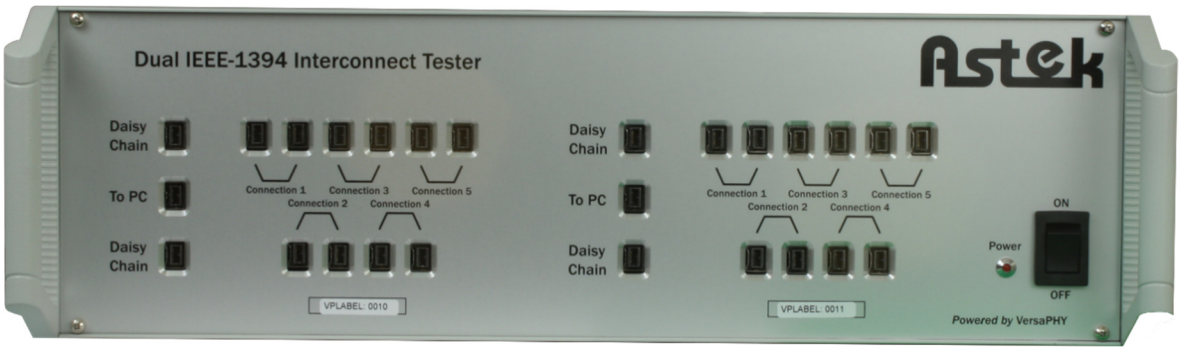

Figure 1 - Dual ICT Front Panel

ON – OFF Switch

The ON – OFF switch connects and disconnects the 12 volt power supply of the ICT internal circuitry.

Power Light

If the Interconnect Tester (ICT) is powered through the 12V jack and the on/off switch is in the *on* position, the Power LED should be illuminated.

Backchannel Connectors

The Backchannel connectors provide the IEEE-1394 connection between the ICT and the PC running the ICT application. The ports labeled “Daisy Chain” are beta only connections and port labeled “To PC” is a bilingual connection. All ports support a maximum data rate of S400.

Connection 1 to n

The ICT supports one (1) to five (5) connections to the units under test (UUT). Each connection is labeled with Connection n, where n represents the connection number (1 to 5). To daisy chain multiple units together, make the following connections with a single cable.

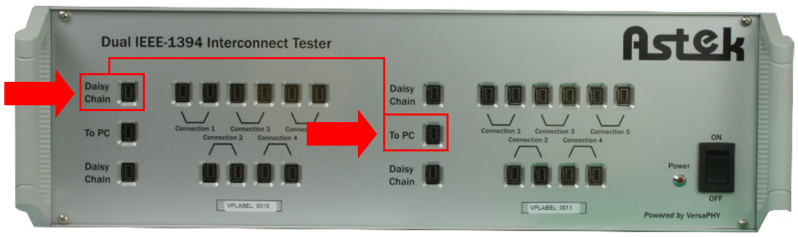

Figure 2 – Dual ICT Daisy Chain Connections

Back Panel

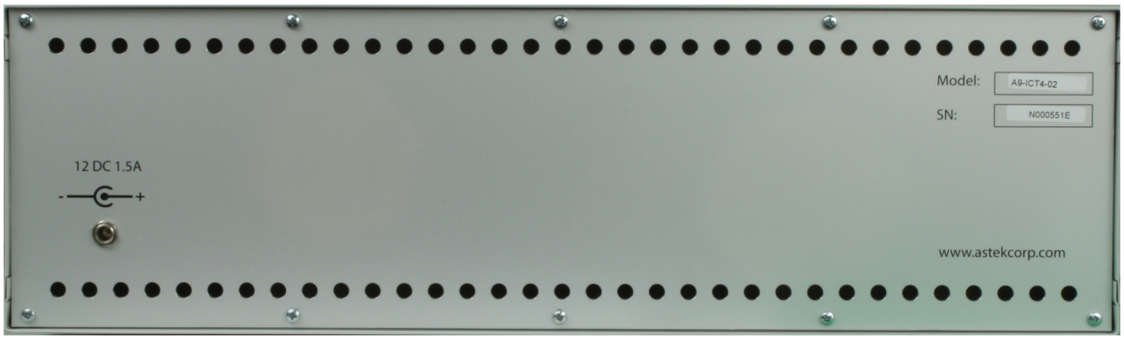

Figure 2 - Dual ICT Back Panel

Tester Power

The ICT may be powered by the included 12 volt power supply connected to the front of the tester.

3 ICT User Interface

Start Application

Execute the ICT.exe file. This can be through the Windows START menu or a Desktop Item.

Initial Screen

If the ICT is not connected to the PC when ICT.exe is executed the user will be instructed to make the connection. In most cases when the ICT is connected the following screen will be presented. If not, please exit the ICT application using the “X” button.

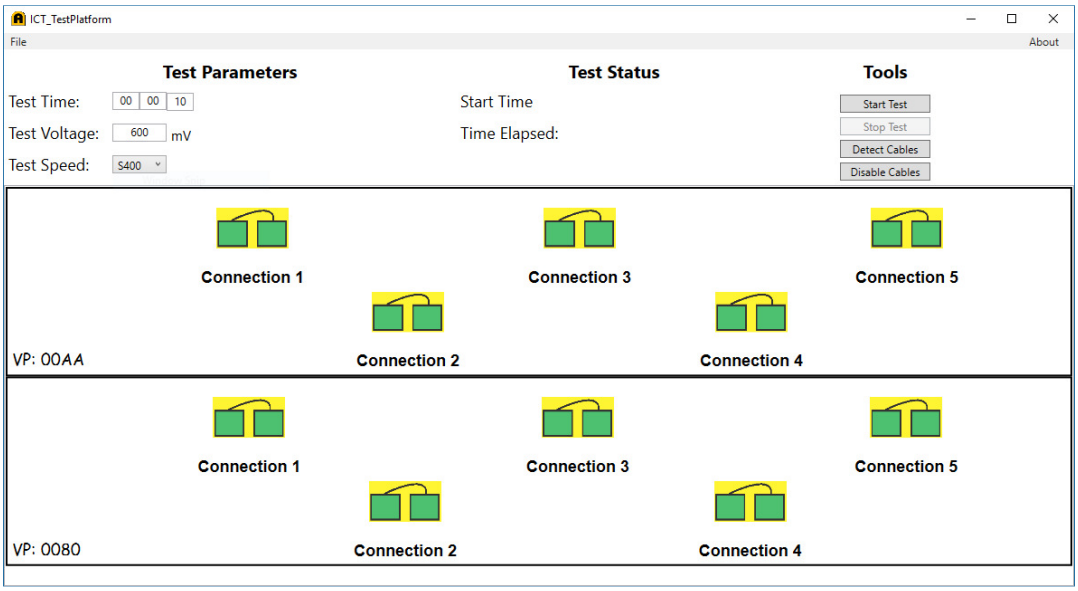

Figure 4 – Initial view after ICT application starts and Dual ICT connected.

Test Control and Test Status

The user is given instructions and status through the Parameters and Status areas in the UI.

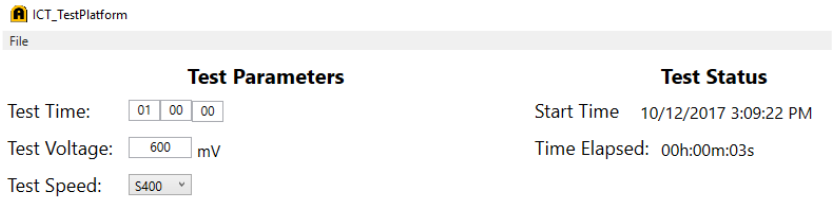

Figure 3 - Parameters and Status areas.

Configuration

Each ICT is pre-configured and has a respective configuration file <Serial Number>.cfg named after its Serial Number. The configurations installed in your system can be found by clicking on the GUI through (file -> Calibration Files). If a configuration file is not present for a respective unit in your system, a message box will appear to alert you when the unit is first connected, until a proper configuration file is created the unit will always run tests at its maximum voltage level. To create or alter the test configuration for a connection in your system right click on the desired connection and click “Calibrate”. Detail about the ICT configuration is provided later in this manual.

Connect State

Each ICT connection is represented in its respective Unit labeled with its VPLabel in the lower left corner of each unit. The test status for each connection is updated continuously during a test and the real-time information can be seen by hovering over the connection with the mouse. Only properly connected cables can be enabled for testing. At first, a connection is disabled and will be grayed out. You may enable the connection for testing after connecting a cable and clicking on the connection you wish to enable or clicking on the “Detect All” button in the Tools section which will enable all connections that have a properly connected cable.

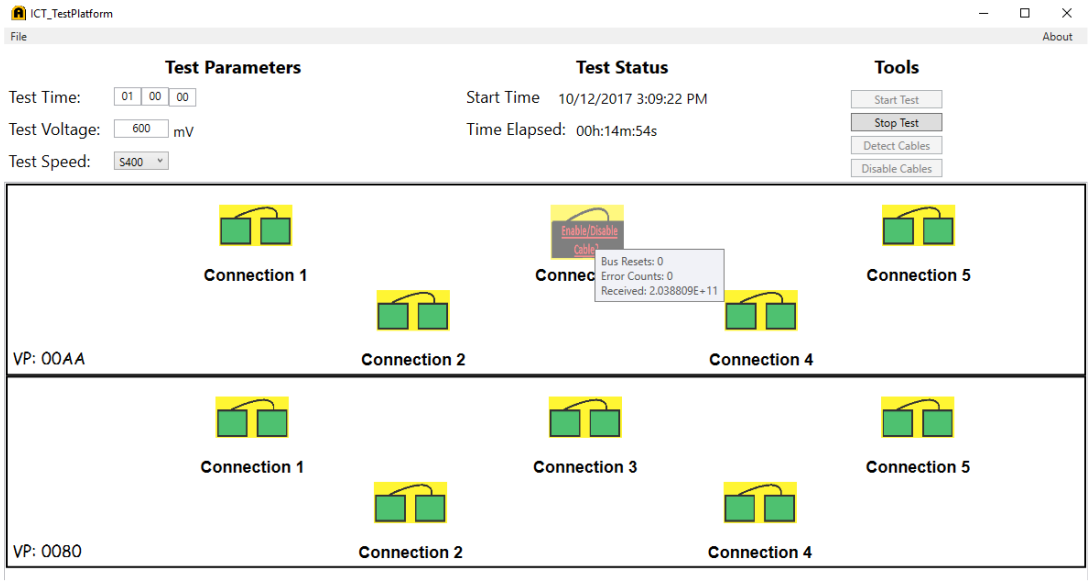

Figure 4 - Cable test parameters

Test Speed

The ICT option 4 (A9-ICT4) supports S100, S200 and S400 speeds and option 8 (A9-ICT8) supports S400 and S800 operation. The test speed for a given test run can be specified in the “Test Parameters” section and will be applicable to all connections during the test run.

Test Time

The Test Time field allows the user to enter how long the test will be run. The duration is entered in terms of hours, minutes and seconds respectively from left to right in their appropriate boxes. The minimum test time is 10 seconds.

The test time for each cable will be ½ of the test time shown in this field. Testing of cables is performed using a ping-pong method where the even cables are tested and then the odd cables are tested. This is required by the IEEE-1394 specification and architecture of the ICT. Therefore, to provide a test time of 5 minutes for each cable, 10 minutes should be put in the Test time field.

Test Voltage Level

The Test Voltage and Calibration and the ICT amplitude are directly related. The voltage setting will only work properly and in calibrated unit. The calibration of ICTs will be discussed in later section.

NOTE: If no Configuration File exists the ICT unit will run with max voltage every time and selecting a voltage level will have no impact on that unit.

4 Log File

Each time the ICT application completes a test it creates a log file which can be found by clicking (file -> log). The file name is uniquely named using the following format:

ResultsYYYY-MM-DD_HH-MM-SS.log

Along with the text .log file, a pdf is also created and placed in the PDF folder.

Each log file details the results of the corresponding test, detailing each ICT Unit by its VPLabel and each connection tested during that run.

```
Start time: 2022-12-12 15:31:36
Total test time: 30 seconds
Test Speed: S400
Test voltage: 600mV

ICT : 00AA
Connection 1 Results: PASS
      Error count: 0
      Bus Reset: 0
      Receive count: 1.12495E+09

ICT : 0080
Connection 1 Results: PASS
      Error count: 0
      Bus Reset: 0
      Receive count: 1.12495E+09

Connection 4 Results: PASS
      Error count: 0
      Bus Reset: 0
      Receive count: 1.16439E+09

Connection 5 Results: PASS
      Error count: 0
      Bus Reset: 0
      Receive count: 9.86911E+08
```


5 Calibration

The GUI allows each connection to be calibrated independently in order to achieve higher accuracy. To calibrate a connection right-click on the Connection in the main test window and selected “Calibrate” to open the connection’s calibration window.

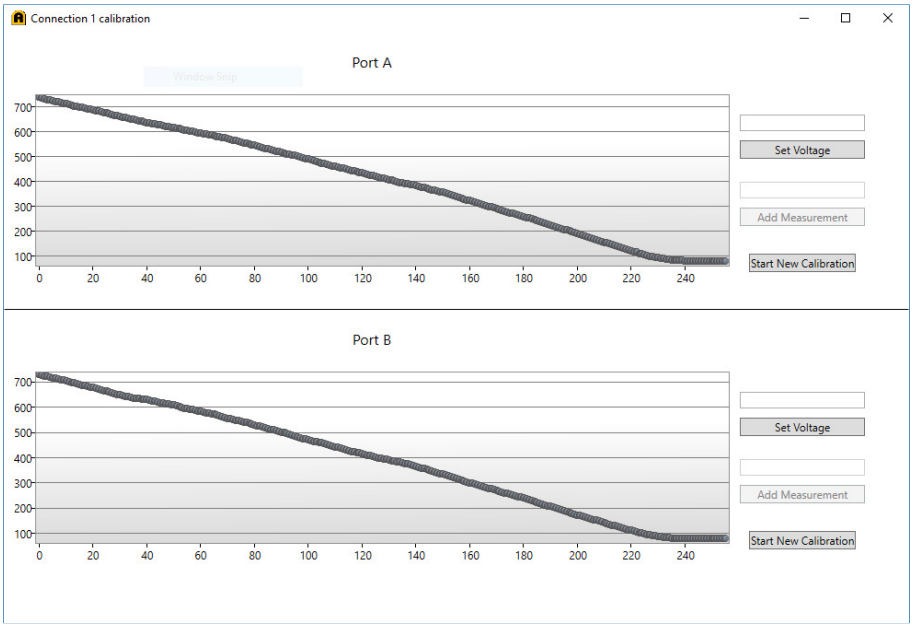

Figure 5 - Calibration Window of properly calibrated connection

The calibration window displays a plot to make it easier to see the calibration data being computed. Each point in the plot shows the output in millivolts for a given input. The calibration is automated in many ways and the user only needs to type in the voltage measured in an oscilloscope to perform the calibration. As more data points are entered, the software computed the curve fit and updates the plot accordingly.

Calibrate Process

You will read the value on the oscilloscope and enter half of the value read into the GUI. After each entry, the GUI will change the output signal amplitude for a new measurement. After five measurements are taken the background will turn white again to indicate initial calibration has completed and the user should proceed to verifying the calibration. During calibration manually set the vertical scale on the oscilloscope so the waveform fills the screen to get more accurate measurements.

1) In the calibration window, click the Port A “Start New Calibration” button.
2) Verify the Port A background color changes to tan, indicating the calibration is in progress.
3) Observe a low voltage square wave is displayed on the oscilloscope.
4) Adjust the channel 1 voltage scale to 100mV. There must not be a “?” displayed with the oscilloscope mean measurement.
5) Press the “Clear Display” button on the scope, and read the “Mean” measurement.
6) Enter half the value into the Port A “Add Measurement” box in the GUI, and Click “Add Measurement”.
7) The GUI will change the signal amplitude, displaying a new voltage level on the scope.
8) Manually change the voltage scale for channel 1 to .3, press “Clear Display” again and enter the mean measurement into the spreadsheet.
9) Enter the divided value into the “Add Measurement” box and click “Add Measurement.
10) Verify the dark line in the Port A section changes to a ramp from top-left to bottom right.
11) Continue this routine for a total of five measurements, setting the voltage scale of the oscilloscope properly for each measurement.
12) Verify the GUI resets the Port A background to white after the fifth measurement has been entered.
13) Move the test fixture to the left-side connector of the “Connection 1”, this is Port B.
14) Repeat steps 1 – 12.
15) Once the “Connection 1” Port A and Port B calibration has been completed, close the Connection Calibration window, hover over and right click the next connection and repeat steps 1-14.
16) Repeat steps 1-15 for all connections.
17) Once all sections have been calibrated a new calibration file will have been created by the GUI with the appropriate name corresponding to the Unit’s VPLabel.

Verify Calibration Process

This section verifies the output voltage level can be accurately set to five distinct levels, these steps should be performed after the calibration sequence is performed for each connection. At any point during verification, if a value is not within spec the user may input the value read into add measurement to further calibrate the unit and should then re-start the verification process.

1) Insert the near end test fixture into the left-side connector of the “Connection 1”. The oscilloscope should display and active signal.
2) At the GUI, hover over the “Connection 1” symbol and right-click to display the calibrate box ---click it.
3) In the displayed window, locate the Port A “Set Voltage” box.
4) Enter 650 into the box and click the “Set Voltage: button.
5) Set the oscilloscope vertical scale to .3V/div and observe a square wave is displayed.
6) Press the “Clear Display” button on the scope, and read the “Mean” measurement.
7) Divide the value by 2 and verify the difference between measured and read values is no greater than +/-15.
8) Repeat this process four more times for voltage settings of 500, 400, 300 and 200.
9) Set the vertical scale of the oscilloscope to 200mV/div for the 500 and 400 measurements, and set to 100mV/div for the 300 and 200 measurements.
10) Verify no measurement results in a difference greater thank +/-15. If a measurement is greater than +/-15 mv the user may type in half the value read into the “Add Measurement” edit box and click the button to record the measurement and adjust calibration, at that point re-start the verification section.
11) In the GUI, move the mouse to Port B, and repeat this procedure.
12) Once the calibration of these two ports is complete, close the calibration window and continue with the calibration for the next four connections in like manner.

6 System Requirements and Installation

1) This installation requires any version of Windows 7 or Windows 10 to be installed on the target PC.
2) If previous version of “ICT” is present on the target system first perform an un-install of the “ICT” using the “Add or Remove Programs” application from the Control Panel. See note below.
3) To enter Control Panel, select start | Control Panel | Add or Remove Programs. If the start menu is in the classic setting then select start | settings | Control Panel | Add or Remove Programs.
4) Insert the “ICT” CD. If target computer is configured for Autorun from CD media then the setup and installation will begin automatically.
5) If Autorun is not enabled on your computer you can start setup by going to Windows Explorer and right clicking on the installation CD drive icon and selecting ‘autoplay’ from the drop-down menu. This will automatically run the installation.
6) Follow all prompts.
7) You are now ready to start using the “ICT”

7 How to Contact Astek Corporation

Astek Corporation may be contacted by phone at:

(719) 260-1625 (USA)

or by email at:

support@astekcorp.com or visit our web site at:

www.astekcorp.com