Lab Device Toolkit

Installation and Use for LCMS Diagnostics

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1. Introduction

Lab Device Toolkit (LDT) is an Agilent developed utility designed to communicate with instruments and run customized test instructions. This document describes how to install LDT and load the drivers necessary to run diagnostic tests for LCMS instruments. The diagnostic test sets are instrument specific. This tool is intended for use by qualified Agilent employees, and is not intended for use by Agilent customers.

2. Installation

a. Lab Device Toolkit

NOTE: **If you are already have LDT installed, and only need to update your test sets, you can skip the first three steps and continue with step 4 below.**

The installation of LDT involves running a minimum of three setup files. The first will install LDT 1.0 on your computer. This is the utility used to connect to an instrument and run tests. The second will install LDT 2.0 on your computer. This utility allows you to review your previous test results and to print them. The third installs the necessary drivers and test sets specific to a family of LCMS Instruments. You can install the test sets for more than one instrument class without conflict.

The installation files are available on SubscribeNet under LC/MS Diagnostic Software and at: \\Wscsfs01\lsca\apgsup\LCMS\Diagnostics

1. Download the compressed directory Lab Device Toolkit.zip and extract on your local notebook drive. It should contain a folder of install files, a folder of demo videos, and a user guide. In the

install folder are two files: "Lab Device Toolkit 1.0.msi" and "Lab Device Toolkit 2.0 Setup.exe" that must be installed.

2. Double click or Alt-Click -> Install "Lab Device Toolkit 1.0.msi". Do not change the installation directory location from the default.
3. Double click or Alt-Click -> Open "Lab Device Toolkit 2.0 Setup.exe". Do not change the installation directory location from the default. This program is installed to add the functionality of printing test logs to a local printer or to PDF format.
4. NOTE: If you already have LDT installed, you need to delete the following directories before updating your test sets:

   C:\Program Files\Agilent\Lab Device Toolkit\bin

   C:\Program Files\Agilent\Lab Device Toolkit\tests
5. There are additional install files that are specific to an instrument class and contain the test sets and drivers needed for the instrument class. At least one of these must be installed. They are named in the format *"QQQ_Drivers_and_Test_Sets.exe",* with the prefix noting which instrument files they contain. Double click or Alt-Click -> Open the instrument packages you are interested in. Both TOF and QTOF files are contained in one installation executable.

A shortcut for LDT 1.0 and LDT 2.0 will be installed on your desktop. Delete the shortcut Lab Device Toolkit 2.0 from your desktop, as it is not used to execute any tests. Log files will automatically open with LDT 2.0 if it is installed correctly.

b. Agilent IO Libraries **SINGLE QUAD ONLY**

Communication with the Single Quad family of instruments requires the installation of the Agilent IO Libraries, including the Agilent Connection Expert. If you do not already have it installed, you must do so using the included installation file. To install this utility, run the file "IOLibSuite_15_5_13009_1.exe" and follow the default prompts to install.

3. Configuring your Notebook PC

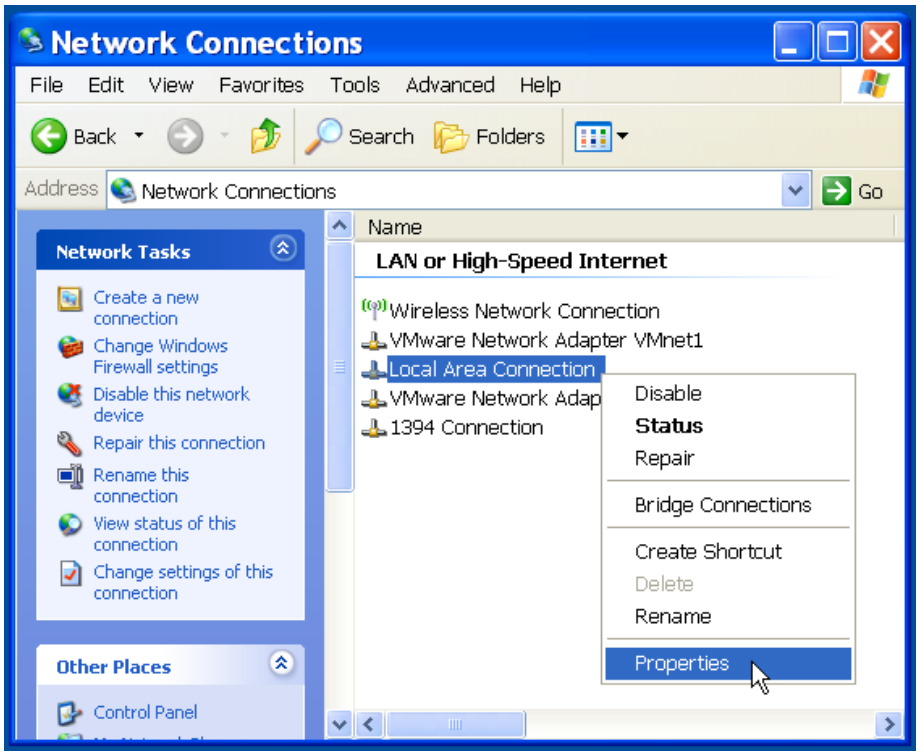
a. Static IP Setup

It is recommended that you use LDT on your notebook, connected to the LCMS either directly or through the network switch via LAN cable. This will prevent having to uninstall the utility from a customer PC after using it. Additionally, all log files will be saved on your hard drive for future review.

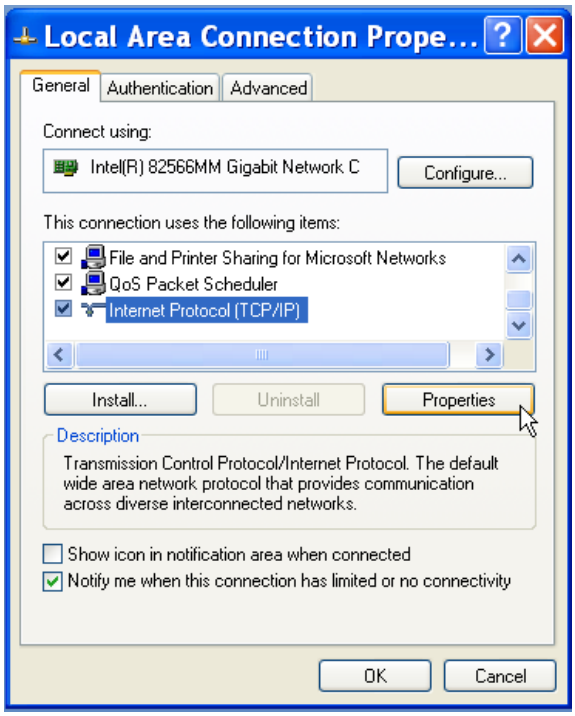
You must configure the network connection to a static IP address in order to communicate with the LCMS, just as you would when running acquisition or connecting via Telnet

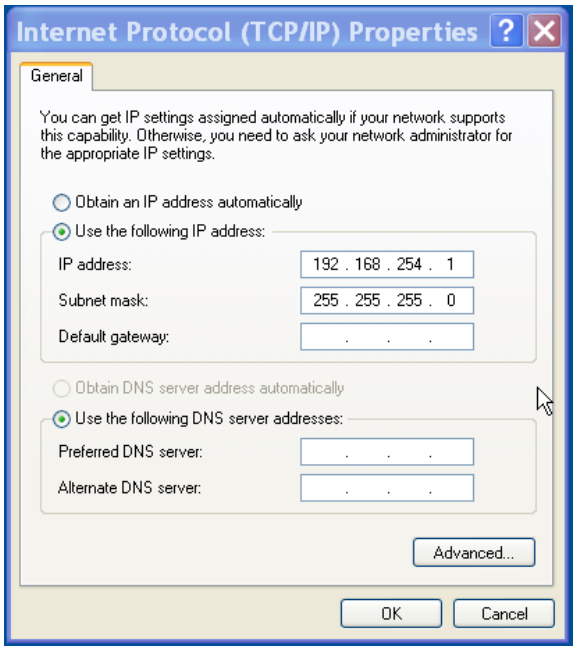
1. Open Control Panel -> Network Connections

2. Alt-Click the Local Area Connection and select Properties.



3. Select Internet Protocol (TCI/IP) and click the Properties Button





4. Select “Use the following IP address:” and enter 192.168.254.1 for the IP address and 255.255.255.0 for the Subnet mask.

Connection to the LCMS instrument is now possible. You can test this by pressing the start button, selecting Run…, and typing ping 192.168.254.12. If the instrument does not respond you have configured the connection incorrectly or there is a communication problem with the instrument.

NOTE: Never change the network domain on your notebook, or you will be locked out of your PC!

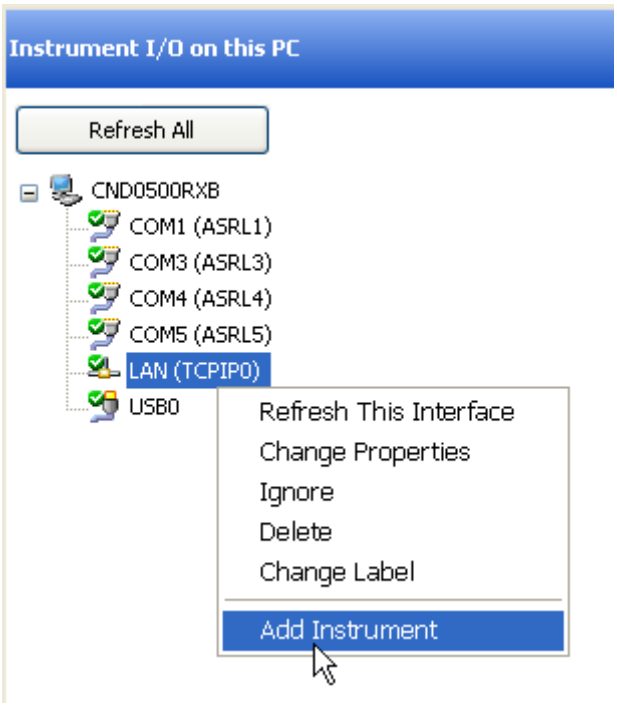
b. Single Quad IO Control

The Single Quad family of instruments utilizes drivers contained in the Agilent IO Libraries. In addition, LDT uses a particular connection string with these instruments in order to execute the diagnostic tests. It is required to have Agilent IO Libraries installed on your PC to run LDT on a Single Quad. Refer

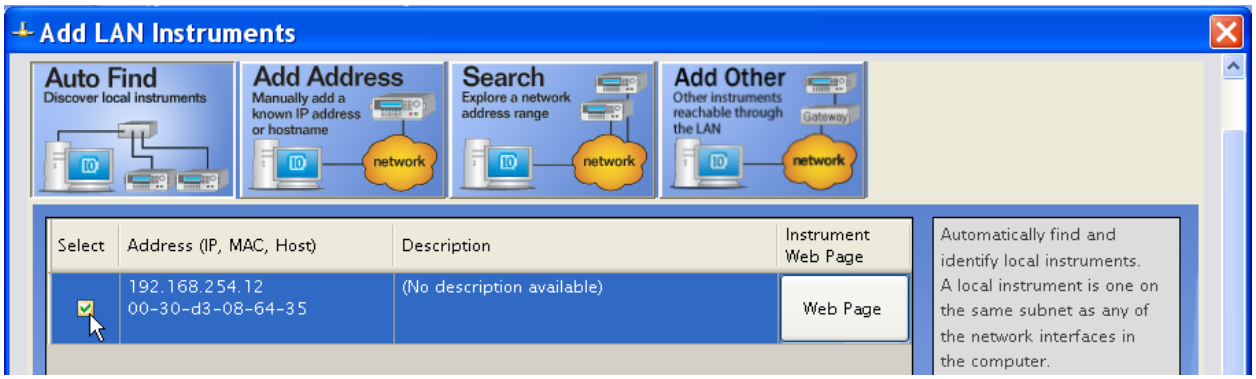
Once you have installed Agilent IO Libraries, there will be a program group in your Start Menu called Agilent IO Libraries Suite. From that group, select Agilent Connection Expert. You may also find the IO Libraries icon in the toolbar on your desktop. You can double-click or Alt Click -> Open the toolbar icon and select Agilent Connection Expert this way as well.

You will need to configure the LAN connection to the instrument with a new connection string. First make sure that your computer is connected to the LCMS or the network switch . Make sure you have already configured your LAN connection to use a static IP address, as described in the previous section.

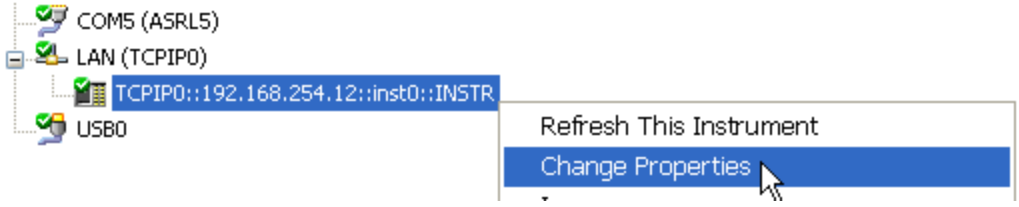
If the MS system is not already configured in the Connection Expert, Alt-Click the LAN (TCPIP0) option, and choose Add Instrument.



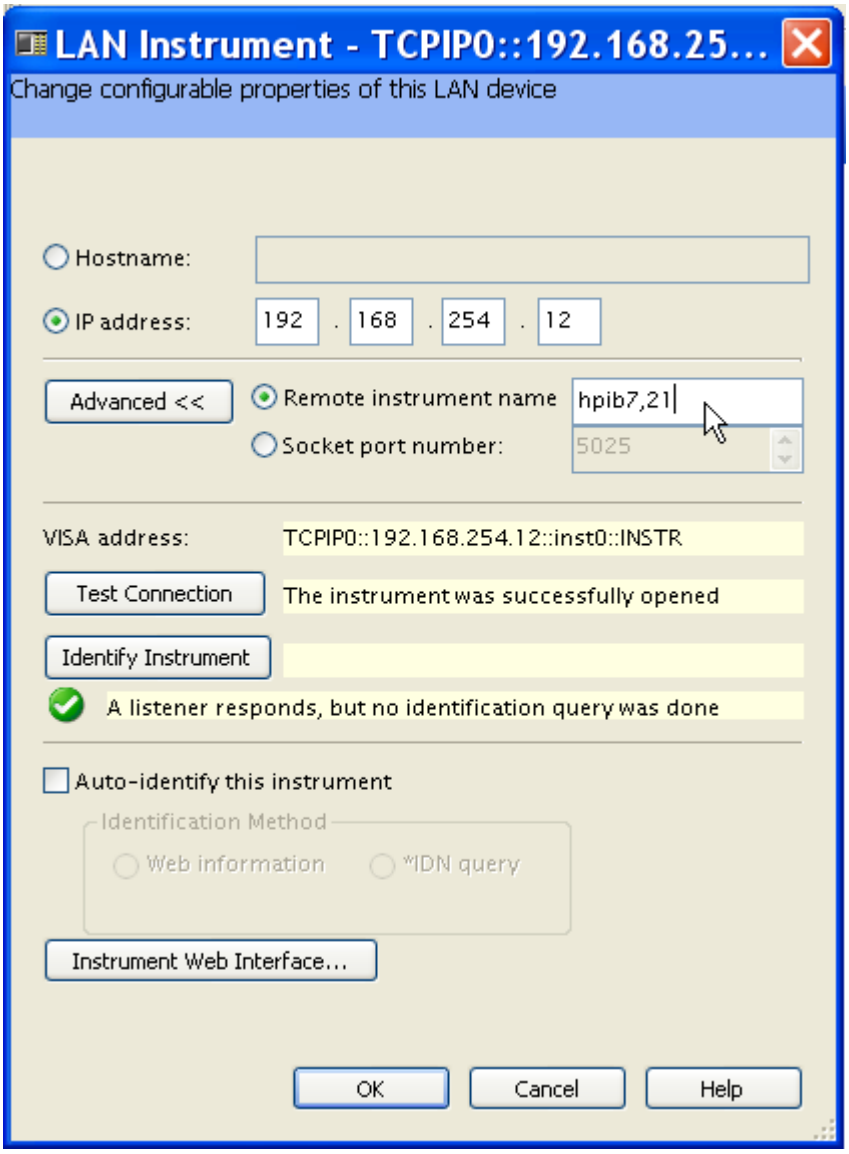
A new window will open up, and a brief scan will take place looking for connected instruments. If you are not connected to the LCMS with a static IP, no instruments will show up. If you are, the LCMS will appear as a selection. Click the checkbox for the row describing the LCMS, and select OK in the bottom right corner.



The instrument connection string will show up in the connections list under LAN (TCPIP0). Alt-Click the instrument connection string 192.168.254.12::inst0::INSTR, and select Change Properties.



In the Advanced section of the properties menu, the instrument name needs to be changed to "hpib7,21". Once you have changed the instrument name, click OK at the bottom of the menu.



Once you have changed the instrument name, you can now use LDT for Single Quad Diagnostics. Once reconfigured, you do not need to modify the connection string again. In addition, this change will not conflict with use of ChemStation.

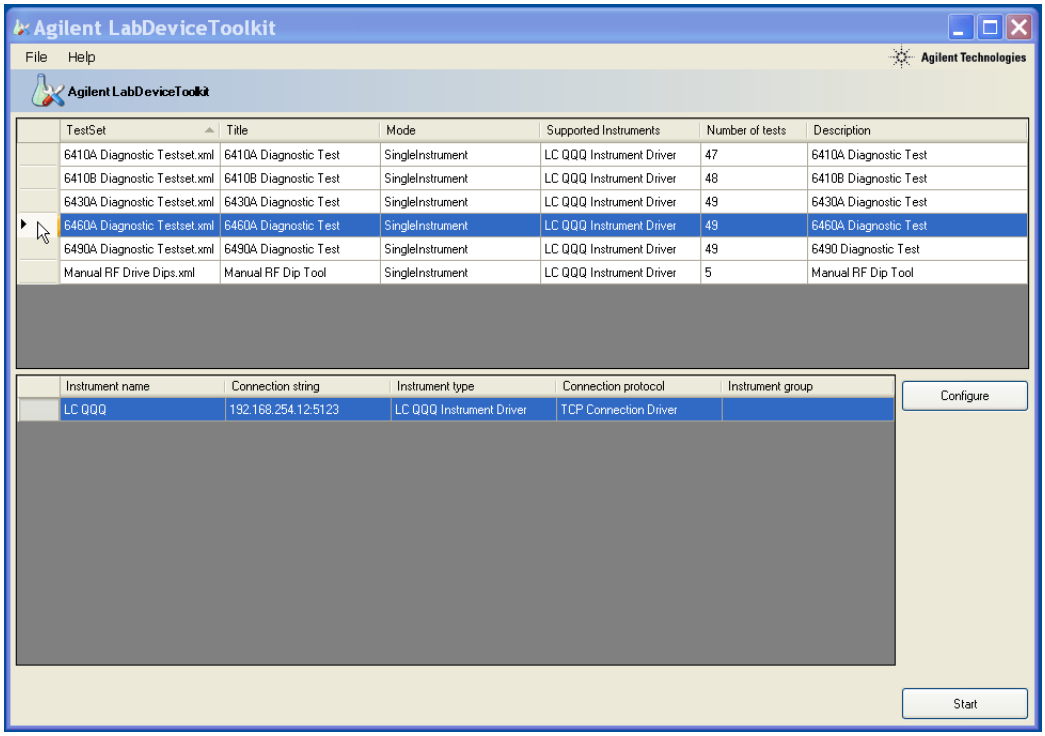
4. Use

a. Choosing a Test Set

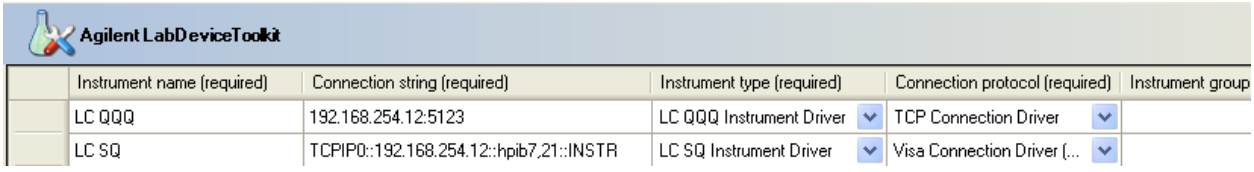
Before connecting to the instrument with LDT, close all other applications which communicate with the instrument. Normally this would be MassHunter Acquisition, Chemstation Online, or a Telnet

session. You need to close all these connections on any computer connected to the instrument. **Do not forget to close the Acquisition Engine using the Acq System Launcher!**

Open the application with the shortcut for Lab Device Toolkit on the desktop, in the Start Menu, or at C:\Program Files\Agilent\Lab Device Toolkit\bin\LabDeviceToolkit.exe. This will launch a window where you can select which test you wish to run from the installed test sets. The test sets are instrument model specific; make sure you choose the correct one. For example, the quad driver calibration test targets different frequencies for different models depending on their expected values.



The default connection settings for the instrument should already be applied. If they are missing you can set them up manually by clicking the Configure button. The settings shown below are the correct setting for the SQ and QQQ instruments. Once you have selected your test set click Start to launch. The program will connect to the instrument via the backdoor port.

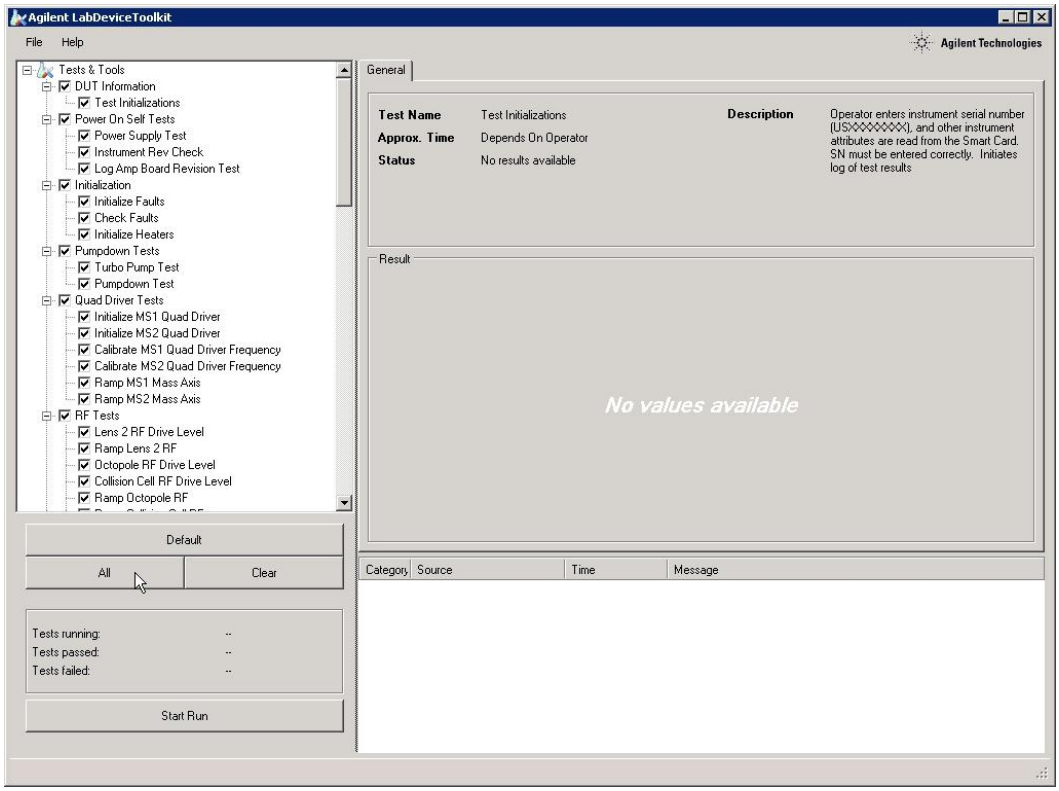


NOTE: The Manual RF Drive Dip testset is a tool intended as an alternative to manually configuring peak voltage setpoints and connecting a digital multimeter to instrument test points. It provides a real-time

graphical display to assist you in dipping Lens2 RF, Octopole RF, and in the QQQ test set, Collision Cell RF.

b. Running Tests

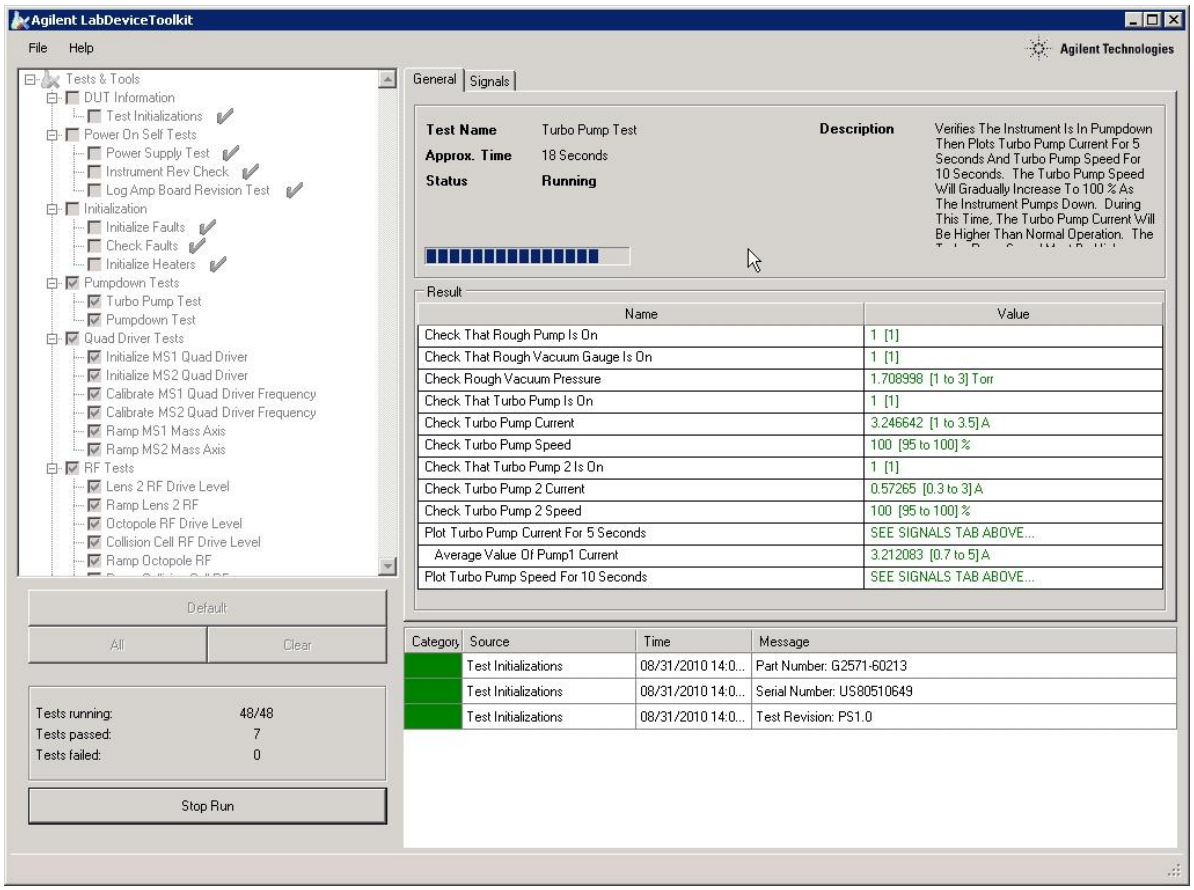
Available tests from the selected set will be displayed in a column on the left side. Clicking the All button to select all tests then Start Run will initialize running the entire test set. It is also possible to select individual tests to run, but certain tests must be selected in order for others to proceed. The first test is required, and when you initiate the run, will prompt you for the instrument serial number.



Tests will be executed in series. Each test listed in the left column is made up of individual test instructions which display in the center window. Items which pass will have results shown in green, with failing tests displaying results in red. The value reported for each test instruction is the actual read or calculated value, followed by the passing range in brackets.

If all parts of a test pass, there will be a green check mark next to the test in the left column. If any part of the test fails, a red "X" will flag the test. While the test is running the tests will be grey until completion.

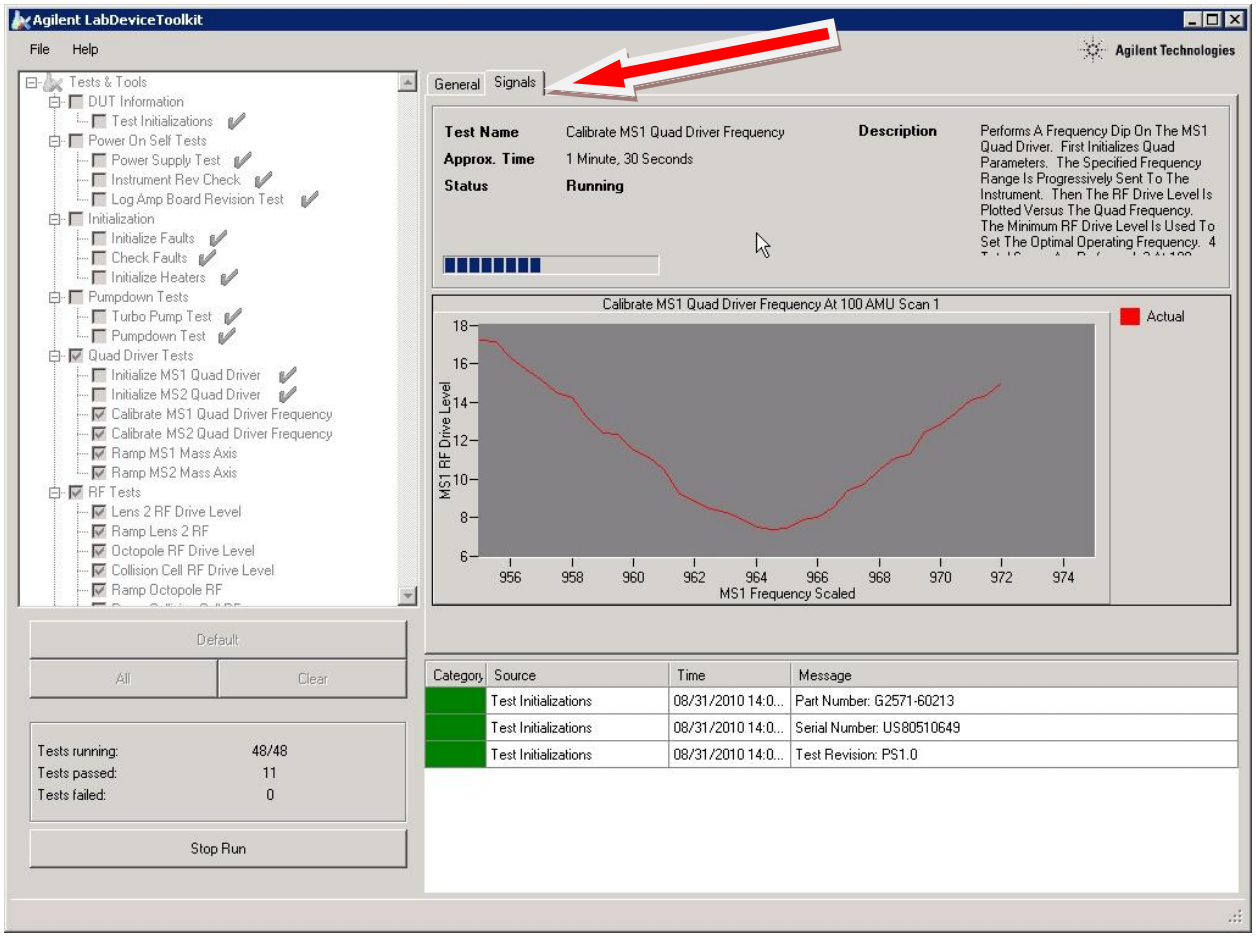
NOTE: The functionality of the Stop Run button is very minimal. Most tests will continue to run if you click stop. It is advised to let the tests run until completion. If for some reason it is necessary to stop the tests, wait until the currently running test completes and close the entire program.



In addition to the results from each item in a test being displayed, a graphical view of signals plotted is available on the Signals tab. You can click on this tab while the test is running to see the real time plot being recorded. After a plot is finished, a generated curve will be fit to the data in order for evaluation.

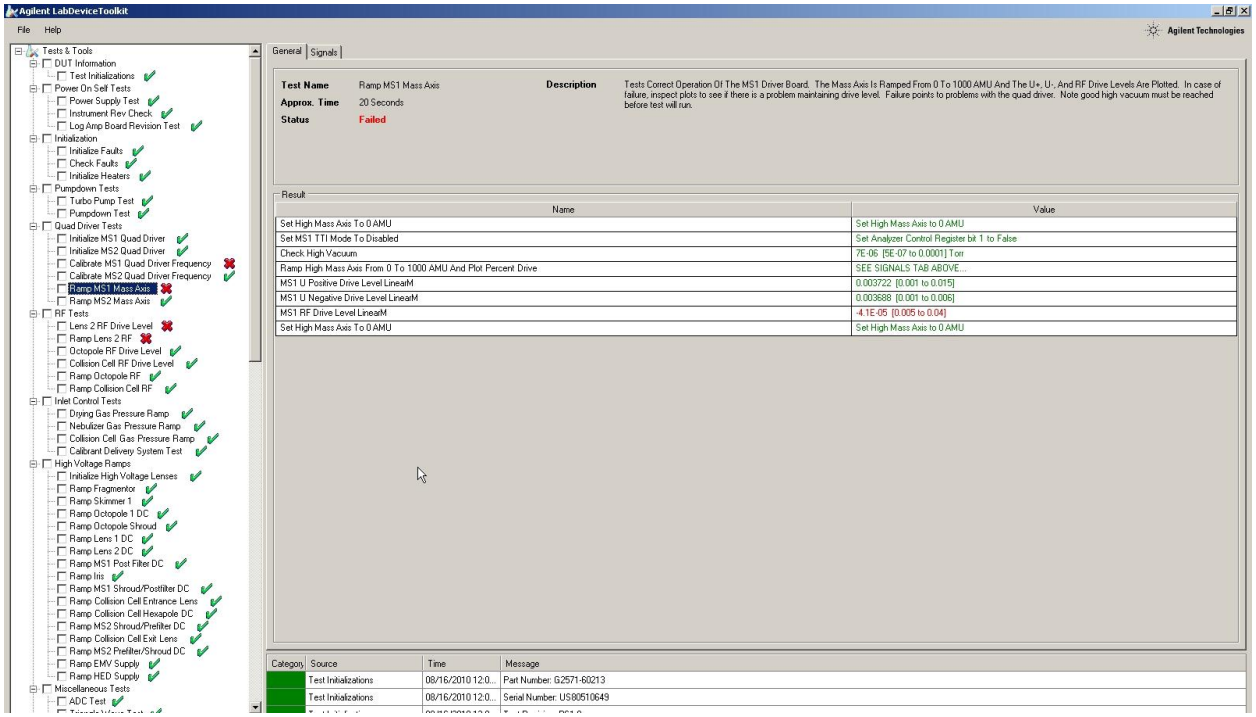
NOTE: While these signal plots are available in your current LDT session, they are not stored for review in the log file. If you wish to save the visual recording of these ramps, take a screenshot and save.

NOTE: LDT changes many settings on the instrument temporarily. After running LDT, you may see a loss of ion abundance in Acquisition. Reloading the tune file alone does not remedy this issue. A power cycle is required if you experience this temporary loss of ion abundance. This issue mainly affects the TOF and QTOF instruments.



Below is an example of how a set of tests may look after they have completed. Passing tests have green arrows, and failing ones have a red “X” next to them. You can click on an individual test to review the results from each item in the test.

NOTE: Each test has a description in the upper right which gives information on the test. In addition, there are suggestions on what to do if a test fails. Many recommend repeating the test for confirmation. Some will suggest specific actions to take, or which component(s) have possible issues which need troubleshooting.



c. Reviewing Log Files

Each session of LDT you run will create a log file which stores results and can be viewed at a later date. These log files have the file extension .lrs. They are recorded in the program directory C:\Program Files\Agilent\Lab Device Toolkit\log. They are stored in the format LDT_Diagnosis_mm-dd-yyyy_hh-mm-ss.lrs, corresponding to when the first test was initialized.

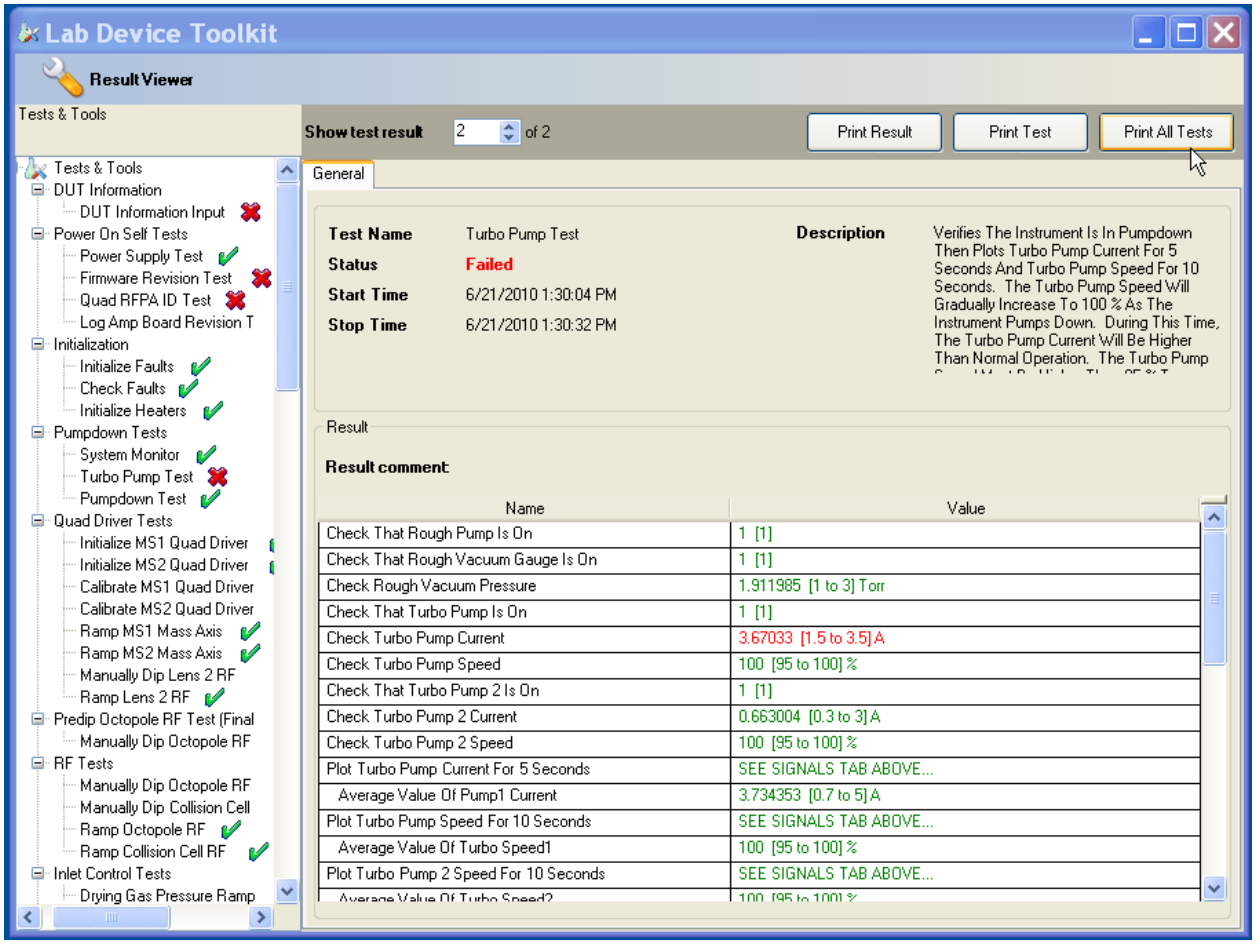
NOTE: Lab Device Toolkit 2.0 is only required to print .lrs log files. Even though the tests are run in LDT 1.0, version 2.0 is a stronger tool for reviewing the files. Please refer to the installation instructions if you have not installed LDT 2.0.

When you open an .lrs file with LDT 2.0, you can browse through the results just as you would when you run the tests. The exception is the signal plots are not stored in the log file, so there is no Signals tab.

Since tests can be run multiple times in a session, there is the option at the top to toggle which test result to review. Higher numbers correspond to test duplicates run later.

An advantage of opening the log file in LDT 2.0 is the ability to print tests. Print Results creates a report for the currently viewed result for a single test. Print Test creates a report for all results for that test since the test may have been run multiple times in a session. Print All Tests creates a report for all the results of all the tests run in that session.

NOTE: There is a known software defect which causes the first Initialization test to show up as failed when reviewing the .lrs log file for both SQ and QQQ logs.



5. Notes

a. For All Instruments

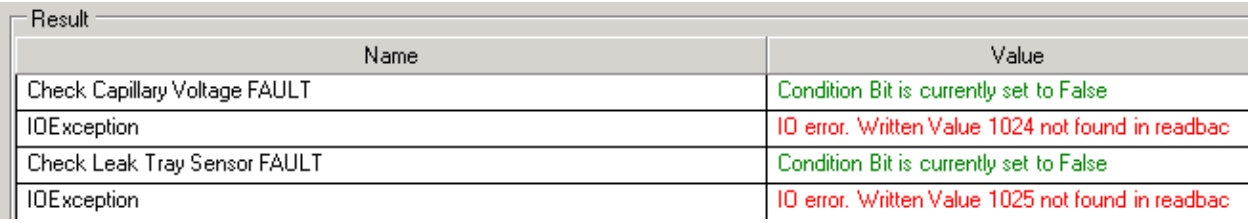
1. Mainboard voltage note

Many of the tests require mainboard lens voltages to reach a certain value before they proceed. Mainboard voltages can be deactivated for a variety of fault states the instrument can encounter. Thus, a fault with one component can make it incorrectly appear that there is a problem with a mainboard, which will then prevent other tests from passing.

2. Loss of Abundance after LDT run

It has been seen that after using LDT on a system that is functioning properly, abundances are negatively affected directly after running a test set. This problem is fixed by simply performing an instrument power cycle before starting acquisition. Reloading the latest tune file is not enough to fix the problem.

3. **IOException error readback**


Result

Name	Value
Check Capillary Voltage FAULT	Condition Bit is currently set to False
IOException	IO error. Written Value 1024 not found in readbac
Check Leak Tray Sensor FAULT	Condition Bit is currently set to False
IOException	IO error. Written Value 1025 not found in readbac

This is a common error message encountered when running LDT concurrently with other software that is trying to communicate with the instrument. This is especially apparent on TOF class instruments. Be sure to close all other software, including the Acquisition Engines, before running LDT.

b. 6100 Series SQ

Below is a list of the available tests for the 6100 Series instruments, with some notes to clarify their function.

1. Instrument Serial Number
   a. **SN Input** – Required test where the operator enters the serial number of the LCMS being tested.
2. Power On Self Tests
   a. **Power Supply Test –** Checks +15V, +24v, +48V DC Power Voltages, AC Level, and Turbo Current
   b. **SQ Model Check –** Reads back the instrument model number. This test will never fail, but will provide a record if you have run the wrong test set for the instrument being diagnosed
   c. **Log Amp Board Revision Test**
3. Initialization
   a. **Initialize Faults –** Clears all fault states, then reads back if any faults are raised immediately.
   b. **Check Faults –** Checks individual fault bits, useful to identify disconnected or damaged connectors.
   c. **Initialize Heaters –** Sets heater temperatures for heater ramps which occur later in the test set.

4. Vacuum System
    a. **Turbo Pump Test –** Checks the turbo pump current and speed
    b. **Vacuum Pressure Test –**Checks the instrument rough and high vacuum levels
5. Quad Driver Tests
    a. **Quad ID Test –**Verifies the correct Quad driver is installed in the instrument model.
    b. **Initialize Quad Driver –** A required test which energizes the mass filter electronics so they can be calibrated in the next test.
    c. **Calibrate Quad Driver –** Performs a quad frequency dip to identify ideal operating frequency
6. RF Tests
    a. **Ramp Octopole RF –** Checks drive level of the Octopole RF
    b. **Ramp Lens 2 RF –** Checks drive level of the Lens2 RF for systems which have this feature.
7. Inlet Control Tests
    a. **Drying Gas Pressure Ramp**
    b. **Nebulizer Gas Pressure Ramp**
    c. **Calibrant Delivery System Valve Test –** Switches the valve control electronic state to open and closed, and verifies the electronic readback is correct. Note, this does not check the actual valve function, nor if calibrant is flowing to the nebulizer.
8. High Voltage Ramps
    a. The ramps in this section are described essentially by their name. Note these tests will not execute if the first test, Initialize High Voltage Lenses, does not run. This initialization will not occur if there is a system fault preventing the main board from maintaining rail voltages.
9. Miscellaneous Tests
    a. **ADC Test**
    b. **Triangle Wave Test –** Reads back the response when the wave form is off, then with the wave form on, to ensure the Log Amp is functioning properly. Note, the plot of the signal on does not show sharp triangles due to the sampling rate.
10. Heater Ramps
    a. **Ramp APCI/AJS Gas Heater –** Checks the vaporizer heater is responsive to temperature setpoints. Temperature does not actually reach high set point of ramp, but slope is evaluated. Will fail if no AJS or APCI is installed

b. **Ramp Drying Gas Heater -** Checks the drying gas heater is responsive to temperature setpoints. Temperature does not actually reach high set point of ramp, but slope is evaluated.
c. **Ramp Quad Driver Heater** - Checks the quad driver heater is responsive to temperature setpoints. Temperature does not actually reach high set point of ramp, but slope is evaluated. Sets temperature back to 100C at end of ramp.

c. 6200 Series TOF

Only the 6224 and 6230 model TOF instruments are supported by LDT. The older architecture TOF models are not supported.

Temporary changes in instrument setpoints by LDT can cause temporary loss of ion abundance to the instrument. Power cycling the instrument after running LDT fixes this issue.

Below is a list of tests in the TOF test sets.

1. Power On Self Tests
   a. **Power Supply Test** – Checks +15V, +24V, the +48V supply implicitly, and checks the AC Level.
   b. **Show Electronics Revisions** – reads back the "showrevs" backdoor command to log the firmware, logic, and instrument serial number. This test will always pass, but the individual lines will appear in red.
   c. **ADC Check**
2. Initialization
   a. **Turn Fault Check On** –
   b. **Check Faults** – Checks individual fault bits. Useful to identify disconnected or damaged connections.
   c. **Heater Initializations**– Turns on heaters to be tested at end of tests
3. Vacuum System Test
   a. **Vacuum Pumpdown Verification** – Checks pump currents, speeds, and vacuum levels.
4. Octopole RF Tests
   a. **Octopole RF Ramp** – Checks drive level over range
5. Inlet Control Tests
   a. **Drying Gas Pressure Ramp**
   b. **Nebulizer Gas Pressure Ramp**
   c. **Reference Nebulizer Gas Pressure Ramp**

d. **Dual Bottle CDS Test –** Checks to see if the control of the CDS valves is working, by changing the state back and forth, and monitoring the readback on the electronic board to confirm this control bit is changing. Does not verify calibrant delivery or pressurization in system.

6. Ion Optics Lens Ramps
   a. Tests self-explanatory in nature, require main board lens voltages to be initialized. Initialization must pass for other tests to start. Failures in this section should be run again, especially if the failure symptom is the main board lens voltages not initializing.
7. Heater Ramps
   a. **Ramp Drying Gas Heater –** actual temperature does not increase as fast as the setpoint, but test is looking for steady temperature increase over range.
   b. **APCI/AJS Source Heater Ramp** – Will fail if no APCI or AJS source is installed.

d. 6400 Series QQQ

Mainboard voltage note**:** Many of the tests require mainboard lens voltages to reach a certain value before they proceed. Mainboard voltages can be deactivated for a variety of fault states the instrument can encounter. Thus, a fault with one component can make it incorrectly appear that there is a problem with a mainboard.

For example, a defective ion gauge will cause a system fault which will periodically cause main board voltages to drop. This is not a problem with a mainboard, and if you review tests which involve initializing this voltage and see them both reach the expected voltage occasionally, they are likely not the cause of the problem. This distinction becomes important when you have an actual problem on a main board. A problem with one mainboard maintaining voltage can bring down the voltage on the other mainboard. Thus, if you consistently see one board failing voltage initialization, but the other board passes some of the time; it is likely a problem with the board which is always failing, not both.

Below is a list of the tests in the test sets with clarification notes on some:

1. Instrument Initialization
   a. **Test Initializations** – Asks for serial number, starts log of results
2. Power On Self Tests
   a. **Power Supply Test** – Checks +15V, +24V, +48V DC Power Supply Voltages, AC Level, and Turbo Current

b. **Instrument Model Check** – Checks I-Button
c. **Log Amp Board Revision Test**

3. Initialization
   a. **Initialize Faults** – Clears fault status and then checks fault status to see if any are raised. Run with Check Faults.
   b. **Check Faults** – Checks individual fault bits. Useful to identify disconnected or damaged connections.
   c. **Initialize Heaters** – Turns on heaters to be tested at end of tests
4. Pumpdown Tests
   a. **Pump Status** – Checks pump currents, speeds, and rough pump vacuum
   b. **Vacuum Pressure Test** – Checks high vacuum
5. Quad Driver Tests
   a. **Initialize MS1 Quad Driver**
   b. **Initialize MS2 Quad Driver**
   c. **Calibrate MS1 Quad Driver Frequency** – Performs a frequency dip
   d. **Calibrate MS2 Quad Driver Frequency** – Performs a frequency dip
   e. **Ramp MS1 Mass Axis** – Checks U+/- and RF drive levels over mass range
   f. **Ramp MS2 Mass Axis** – Checks U+/- and RF drive levels over mass range
6. RF Tests
   a. **Lens 2 RF Drive Level** – Checks drive level at 2 voltages. MS1 problems will cause this test to fail.
   b. **Ramp Lens 2 RF** – Checks slope of drive level over voltage range. . MS1 problems will cause this test to fail.
   c. **Octopole RF Drive Level** – Checks drive level at 2 voltages
   d. **Collision Cell RF Drive Level** – Checks drive level at 2 voltages.
   e. **Ramp Octopole RF** – Checks drive level ramp over voltage range.
   f. **Ramp Collision Cell RF** – Checks drive level ramp over voltage range.
7. Inlet Control Tests
   a. **Drying Gas Pressure Ramp**
   b. **Nebulizer Gas Pressure Ramp**
   c. **Collision cell Gas Pressure Ramp**
   d. **CDS Valve Control Test –** Checks to see if the control of the CDS valves is working, by changing the state back and forth, and monitoring the readback on the electronic board to confirm this control bit is changing.
   e. **Ramp Vcap Power Supply –** This test will fail if you have power supply G1946-80059 installed.
8. High Voltage Ramps
   a. Tests self-explanatory in nature, require main board lens voltages to be initialized. Initialization must pass for other tests to start. Failures in this

section should be run again, especially if the failure symptom is the main board lens voltages not initializing.

9. Miscellaneous Tests
    a. **ADC Test**
    b. **Triangle Wave Test –** Checks average signal with the test turned off and on. This test occasionally fails to initialize. Often, re-running the test will allow it to pass.
10. Heater Ramps
    a. **Ramp Drying Gas Heater –** actual temperature does not increase as fast as the setpoint, but test is looking for steady temperature increase over range.
    b. **Check MS1 Heater -** actual temperature does not increase as fast as the setpoint, but test is looking for steady temperature increase over range.
    c. **Check MS2 Heater -** actual temperature does not increase as fast as the setpoint, but test is looking for steady temperature increase over range.
    d. **Ramp APCI/AJS Source Heater** – Will fail if no APCI or AJS source is installed

e. 6500 Series QTOF

Temporary changes in instrument setpoints by LDT can cause temporary loss of ion abundance to the instrument. Power cycling the instrument after running LDT fixes this issue.

Below is a list of tests in the QTOF test sets.

1. Power On Self Tests
    a. **Power Supply Test** – Checks +15V, +24V, the +48V supply implicitly, and checks the AC Level.
    b. **Show Electronics Revisions** – reads back the "showrevs" backdoor command to log the firmware, logic, and instrument serial number. This test will always pass, but the individual lines will appear in red.
    c. **ADC Check**
2. Initialization
    a. **Clear Faults and Initialize**
    b. **Check Faults** – Checks individual fault bits. Useful to identify disconnected or damaged connections.
    c. **Initialize Heaters**– Turns on heaters to be tested at end of tests
3. Vacuum System Test
    a. **Pumpdown Verification** – Checks pump currents, speeds, and vacuum levels.

4. Quad Driver Tests
    a. **High Voltage Initialization**
    b. **MS1 Quad Driver Initialization**
    c. **MS1 Quad Driver Frequency Calibration**– Performs a quad frequency dip
    d. **MS1 Quad Driver U+/- Amplifier Ramp** – Checks U+/- drive levels
    e. **MS1 Quad Driver Mass Axis, Peak Width DC Ramp** – Checks RF drive levels over mass range.
5. RF Voltage Ramp
    a. **Octopole RF Ramp** – Checks RF drive level over operating range
    b. **Lens2 RF Ramp** – Checks RF drive level over operating range
    c. **Collision Cell RF Ramp** – Checks RF drive level over operating range
    d. **Hex2 RF Ramp** – Checks RF drive level over operating range
6. Inlet Control Tests
    a. **Dual Bottle CDS Test –** Checks to see if the control of the CDS valves is working, by changing the state back and forth, and monitoring the readback on the electronic board to confirm this control bit is changing. Does not verify calibrant delivery or pressurization in system.
    b. **Drying Gas Pressure Ramp**
    c. **Nebulizer Gas Pressure Ramp**
    d. **Reference Nebulizer Gas Pressure Ramp**
    e. **Collision Cell Gas Pressure Ramp**
7. Ion Optics Lens Ramps
    a. Tests self-explanatory in nature, require main board lens voltages to be initialized. Initialization must pass for other tests to start. Failures in this section should be run again, especially if the failure symptom is the main board lens voltages not initializing.
8. Heater Ramps
    a. **MS1 Heater Ramp–** actual temperature does not increase as fast as the setpoint, but test is looking for steady temperature increase over range.
    b. **Ramp Drying Gas Heater –** actual temperature does not increase as fast as the setpoint, but test is looking for steady temperature increase over range.
    c. **APCI/AJS Source Heater Ramp** – Will fail if no APCI or AJS source is installed.

6. Support

If you need assistance interpreting the diagnostic results, you can send the .lrs log file directly to LCMS Service Channel Assist, or print to PDF format to share. If you have a PDF printer installed on your laptop, you can choose to print to a local drive in that format.

a. Videos

There are videos recorded in Webex format which demonstrate how to use Lab Device Toolkit. Once you have installed LDT, the videos are found at:

C:\Program Files\Agilent\Lab Device Toolkit\help\videos

b. Example Log files and Test Result Matrix

Example .lrs log files are available to help evaluate test results. These example log files were generated on systems with a faulty component installed. There are individual log files, screenshots, and written descriptions for a variety of cases. After installation, these log files can be found at:

C:\Program Files\Agilent\Lab Device Toolkit\help\example logs



Group	Test	Problem	Good Instrument	Bad Collision Cell	Ion Optics Assembly	MB1	MB2
Power on Self Tests							
	Power Supply Check		✓	✓	✓	✓	✓
	Instrument Model Check		✓	✓	✓	✓	✓
	Log Amp Board Rev Test		✓	✓	✓	✓	✓
Initializations							
	Initialize Faults		✓	✓	✓	✓	✓
	Check Faults		✓	✓	✓	✓	✓
	Initialize Heaters		✓	✓	✓	✓	✓
Vacuum Tests							
	Turbo Pump Test		✓	✓	✓	✓	✓
	Vacuum Pumpdown		✓	✓	✓	✗	✗
Quad Driver Tests							
	Initialize MS1 Quad Driver		✓	✓	✓	✓	✓
	Initialize MS2 Quad Driver		✓	✓	✓	✓	✓
	Calibrate MS1 Quad Driver		✓	✓	✓	✗	✗
	Calibrate MS2 Quad Driver		✓	✓	✓	✗	✗
	Ramp MS1 Mass Axis		✓	✓	✓	✗	✗
	Ramp MS2 Mass Axis		✓	✓	✓	✗	✗
RF Tests							
	Lens 2 RF Drive Level		✓	✓	✓	✗	✗
	Ramp Lens 2 RF		✓	✓	✓	✗	✗
	Octopole RF Drive Level		✓	✓	✗	✗	✗
	Collision Cell RF Drive Level		✓	✗	✓	✗	✗
	Ramp Oct RF		✓	✓	✗	✗	✗
	Ramp Collision Cell RF		✓	✗	✓	✗	✗

To aid in navigating these test sets and to allow for quick reference of these logs, there is a spreadsheet matrix of results, with active links to the log files. Clicking on the problem description in the table header will link to the log file of interest. Thus, you can drill down past this quick reference, and find actual failing values for tests. Each tab in the spreadsheet represents a different instrument class.

C:\Program Files\Agilent\Lab Device Toolkit\help

7. Uninstalling

All versions of Lab Device Tookit, can be uninstalled from the Add/Remove Programs utility in Windows. To remove the test sets installed, they can be found at C:\Program Files\Agilent\Lab Device Toolkit\tests.