MeasureLINK™ Software

to control the Lake Shore Guarded Insert used with the Quantum Design PPMS®

Installation

There are two options for installing MeasureLINK. It can be installed on the same PC with the MultiVu software or on a separate PC that is on the same network as the MultiVu PC. In either case, the standard installation for MeasureLINK can be followed.

A computer running Windows® 7 or higher operating system with a USB port is required to run the M91 FastHall measurement controller with MeasureLINK-MCS software.

Activation

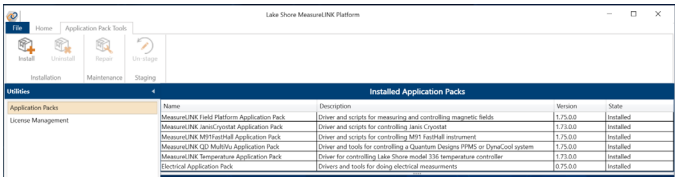
Once MeasureLINK is installed, the software must be activated using the License Management tab on the Utilities window. If the computer is connected to the Internet, then the product can be activated by filling in the required fields in the Activation pane and hitting the Activate button. A one-time 90-day evaluation license can also be activated on the same page.

Application packs

The MeasureLINK installation includes a number of optional application packs that extend the functionality of the base MeasureLINK software. These packs include the drivers needed to communicate with the instruments, prewritten scripts for running all of the Hall measurements and reporting the results of the measurements, measurement examples, and documentation. For this application, the following two application packs should be installed (which can be completed by navigating to the Application Packs tab in the Utilities window):

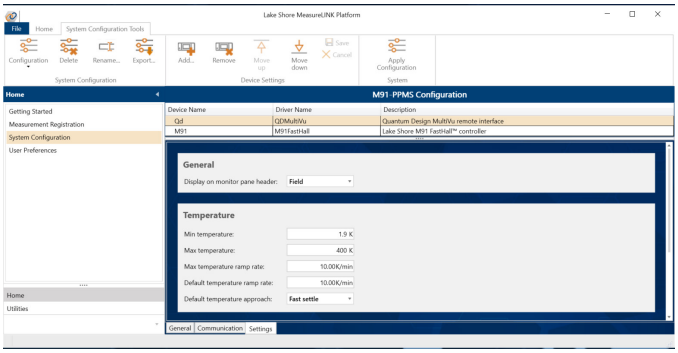
- MeasureLINK QD MultiVu application pack
- MeasureLINK M91 FastHall application pack

Once they are installed, the MeasureLINK software will need to be restarted in order to complete have the application pack installation process.



Configuring the MultiVu driver

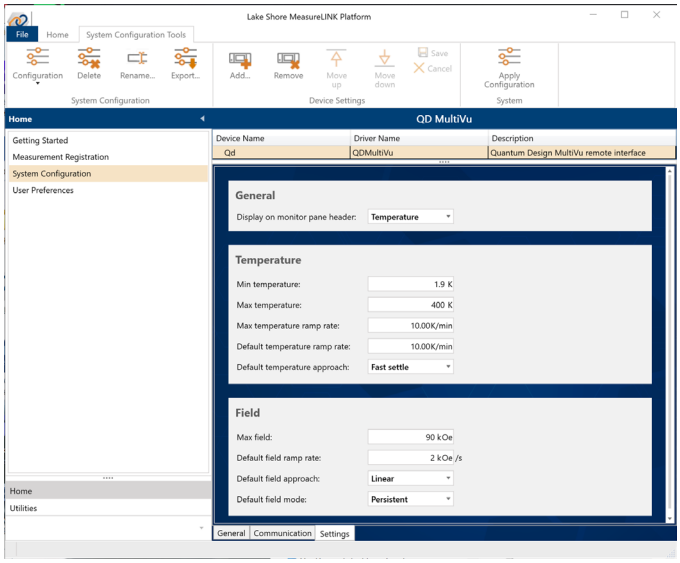
Communication with the Quantum Design MultiVu software can be done locally with MeasureLINK and MultiVu on the same PC or remotely with MeasureLINK MCS and MultiVu on two different networked PCs. This is configured in the Communications tab of the MultiVu driver.

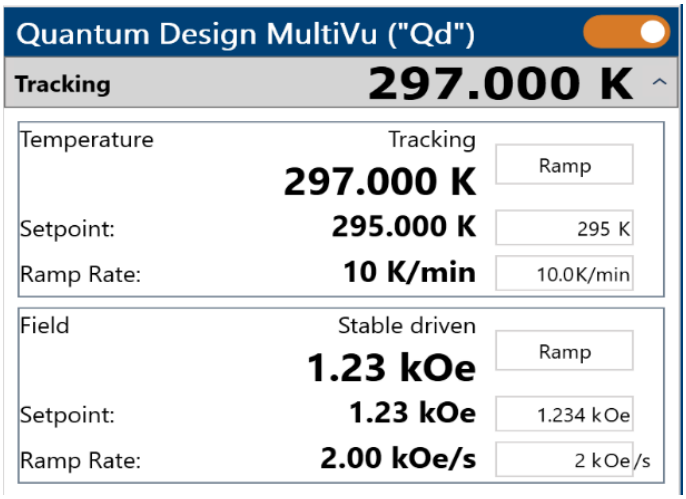


In order to communicate correctly with MultiVu, all three of the fields in the communications tab must be correct. The first is the instrument type. Select your Quantum Design system type from this dropdown list.

The second is the IP address to use for communication. For local installations where MultiVu and MeasureLINK MCS are on the same PC, this will almost always be 127.0.0.1, which is the local loopback IP address. For a remote configuration, this should be the IP address of the computer running MultiVu.

The last setting is the Remote checkbox. Check this box to access MultiVu remotely using the QDInstrument_Server.exe. This should always be checked for remote scenarios. You may want to check it in a local scenario if you are already running QDInstrument_Server.exe for some other reason. QDInstrument_Server.exe is a product of Quantum Design and must be obtained from them.





The Settings tab for the driver allows you to set preferences, defaults, and limits for the MeasureLINK driver. Nothing you set here will change or override the platform settings in MultiVu. For example, setting a maximum field 1000 Oe will not change the maximum field in MultiVu. However, setting a maximum field of 1000 Oe will prevent MeasureLINK from requesting any field higher than that limit. Once the driver settings are configured the way you want, apply the configuration to MeasureLINK MCS to activate the driver.

Driver monitor pane

The status and state of the driver can be monitored and controlled from the monitor pane. When a system configuration containing the QD driver is active, this pane will appear in the Monitor Panel window in MeasureLINK MCS.

The connection button in the upper right of the pane connects the driver to MultiVu. Before you can connect, MultiVu must be running. If you are connecting remotely, QDInstrument_Server.exe must be running on the same PC as MultiVu. If connection fails for any reason, you will be notified.

Once the connection is established, the monitor pane will show the live temperature and field status of the Quantum Design system. You can also trigger ramps to a temperature or field using the controls in the monitor pane. These controls will be disabled if a measurement is running.

Measurements using the MultiVu driver

The driver is both a field controller and a temperature controller. That means all the standard Hall measurements that use those interfaces can use this driver without changing the underlying script. Of course, you can also create custom measurement scripts either using the interfaces or by referencing the driver directly. For documentation of the commands available in the driver, see the manual available in the Help page in MeasureLINK. To learn more about drivers and interfaces, see the MeasureLINK user's guide also in the Help page.

Baud rate	921,600
Data bits	8
Stop bits	1
Parity	None
Handshaking	RTS/CTS

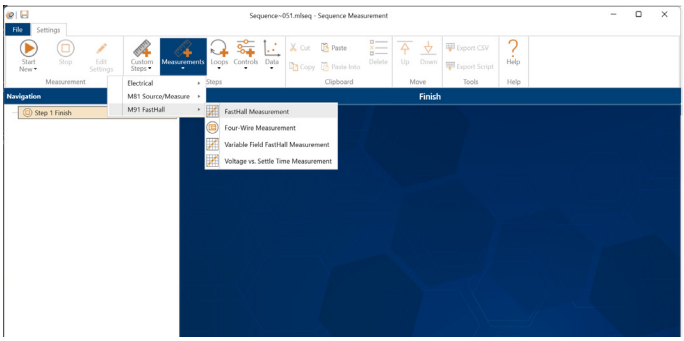
USB connection and driver

The M91 has a B-type USB connector on the rear panel that should be used for communicating with the instrument. This is the standard connector used on USB peripheral devices, and it allows the common USB A-type to B-type cable to be used to connect the M91 to a host PC. The maximum length of a USB cable, as defined by the USB 2.0 standard, is 5 m (16.4 ft). This length can be extended using USB hubs every 5 m (16.4 ft) up to five times, for a maximum total length of 30 m (98.4 ft). The USB interface emulates an RS-232 serial port at a fixed 115,200 baud rate but with the physical connections of a USB. This interface requires the following communication parameters:

Running a Hall measurement

Sequences

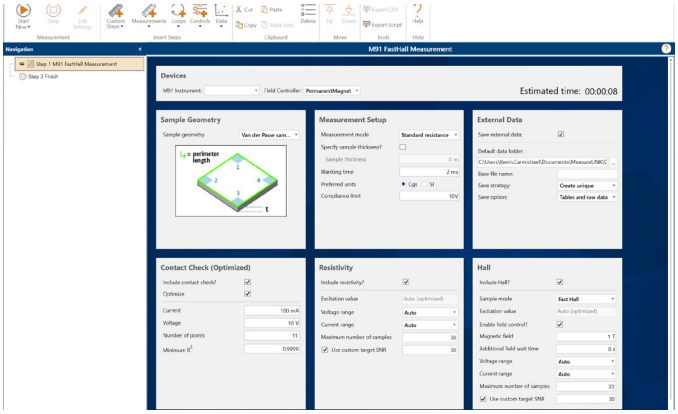
As part of the application pack installation, a set of prewritten scripts are installed and registered to be used in the sequence window shown below. All of the M91 measurement scripts are located under the Measurement ribbon button. Each step selected will appear:



In the left hand pane, when the start button is pressed, a sequence of measurement functions are executed in order. By selecting each step independently, the user can edit the step parameters to control the measurement execution.

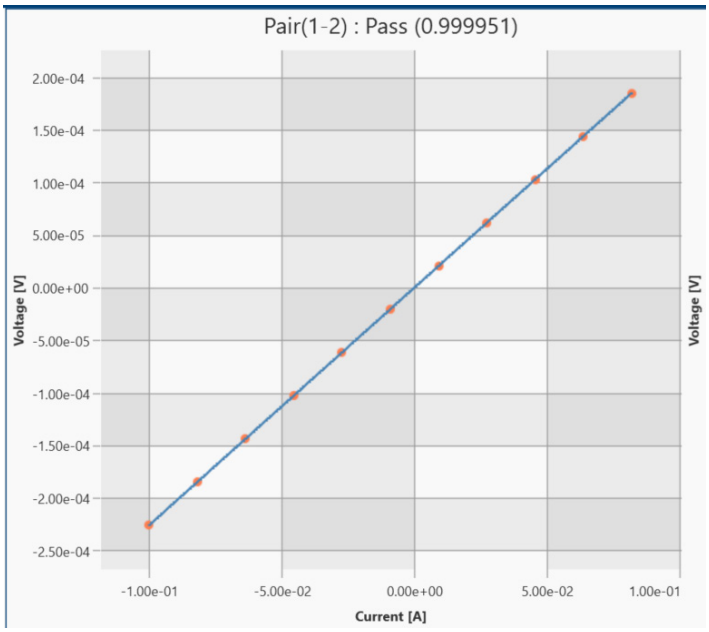
Hall measurement script

Most Hall measurements are covered using the script labeled “Hall measurement” as shown below.



Separate documentation is available that explains all of the settable parameters available in this sequence step. While the script permits users to configure the measurement with manual control of all parameters prescribed, it also provides an “optimization mode” that determines optimized parameters automatically during the Contact Check portion and then uses this information during the Resistivity and Hall voltage step. Using this Optimization routine greatly simplifies the selection of suitable measurement parameters while giving generally very good results. At a minimum, this can be a very useful place to begin with when measuring a new sample, even if additional adjustment is performed afterward.

Pair (1-2)						
Force I	Measure V	Measure I	Fit	V.Over	I.Over	Compliance
-100.000E-3	-226.164E-6	-99.9804E-3	-226.257E-6	False	False	False
-81.8182E-3	-185.043E-6	-81.7934E-3	-185.099E-6	False	False	False
-63.6364E-3	-144.074E-6	-63.6435E-3	-144.024E-6	False	False	False
-45.4545E-3	-102.942E-6	-45.4753E-3	-102.909E-6	False	False	False
-27.2727E-3	-61.6661E-6	-27.2594E-3	-61.6855E-6	False	False	False
-9.09091E-3	-20.5632E-6	-9.08768E-3	-20.5621E-6	False	False	False
9.09091E-3	20.5753E-6	9.09033E-3	20.5757E-6	False	False	False
27.2727E-3	61.6998E-6	27.2613E-3	61.6974E-6	False	False	False
45.4545E-3	102.957E-6	45.4773E-3	102.921E-6	False	False	False
63.6364E-3	144.003E-6	63.6341E-3	144.011E-6	False	False	False
81.8182E-3	185.206E-6	81.8300E-3	185.189E-6	False	False	False



Results

The Hall measurement script provides a complete set of output data from the M91. Notice the multiple tabs across the bottom of the M91 Summary Report window. These contain a measurement summary, charts, and data tables of the results, including a complete listing of each voltage and current measurement used to reach the final calculations.

