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## GENERAL INFORMATION

### SUPPORTED MODELS

This firmware is used on the following Keithley Instruments product models:

Model DAQ6510 Data Acquisition and Multimeter System

### INSTALLATION INSTRUCTIONS

#### Firmware upgrade and downgrade instructions

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## CAUTION

**Do not turn off power or remove the USB flash drive until the upgrade process is complete.**

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#### *From the front panel:*

1. Copy the firmware upgrade file (.upg file) to a USB flash drive.
2. Verify that the upgrade file is in the root subdirectory of the flash drive and that it is the only firmware file in that location.
3. Disconnect any terminals that are attached to the instrument.
4. Turn the instrument power off. Wait a few seconds.
5. Turn the instrument power on.
6. Insert the flash drive into the USB port on the front panel of the instrument.
7. From the instrument front panel, press the **MENU** key.
8. Under System, select **Info/Manage**.
9. Choose an upgrade option:
  - To upgrade to a newer version of firmware: Select **Upgrade to New**.
  - To return to a previous version of firmware: Select **Downgrade to Older**.
10. When the upgrade is complete, reboot the instrument.

A message is displayed while the upgrade is in progress.

For additional firmware installation instructions, refer to the “Upgrading the firmware” topic in the “Maintenance” section of the *Model DAQ6510 Data Acquisition and Multimeter System Reference Manual* (document number DAQ6510-901-01). This manual is available online at [tek.com/keithley](http://tek.com/keithley).

## VERSION 1.7.0 RELEASE

### OVERVIEW

Version 1.7.0 is a significant maintenance firmware release for the DAQ6510 that brings numerous updates along with stability and reliability improvements. See the *Model DAQ6510 Data Acquisition and Multimeter System Reference Manual* (document number DAQ6510-901-01) for more information.

### CRITICAL FIXES

<b>Reference number:</b>	AR55036, AR62150, NS-339
<b>Symptom:</b>	Repeated creation and deletion of user-defined buffers may cause out-of-memory errors. Error messages indicating the maximum size for buffers being created are wrong and provide misleading guidance.
<b>Resolution:</b>	Reading buffer memory management now allows users to easily allocate the largest size available when creating a reading buffer. Documentation has been clarified to explain the creation process. Improved buffer memory management also greatly reduces the possibility of getting out-of-memory errors.
<b>Reference number:</b>	AR56349, AR60259, NS-929
<b>Symptom:</b>	USB communication issues.
<b>Resolution:</b>	To better accommodate the variety of VISA installation options available to users, the STALLing USBTMC is not active as it had been before.
<b>Reference number:</b>	AR61116, AR62660, NS-529, NS-1558
<b>Symptom:</b>	Repeatedly saving a buffer to a file on a USB flash drive using the <code>buffer.saveappend</code> command eventually causes Error 2203, "Cannot open file."
<b>Resolution:</b>	This issue has been corrected.
<b>Reference number:</b>	AR62310
<b>Symptom:</b>	Exercising various combinations of front panel settings for the Event Log may cause the front panel to lock up.
<b>Resolution:</b>	This issue has been corrected.
<b>Reference number:</b>	AR61734, NS-1097
<b>Symptom:</b>	Pressing a shortcut while the swipe screen is moving causes the instrument to become inoperable.
<b>Resolution:</b>	This issue has been resolved.
<b>Reference number:</b>	AR61766, NS-1049
<b>Symptom:</b>	Graph is unresponsive to touch after some screen input sequences.
<b>Workaround:</b>	This issue has been resolved.

<b>Reference number:</b>	AR61773, NS-983
<b>Symptom:</b>	Instrument unable to trigger over digital I/O in 2700 emulation mode.
<b>Resolution:</b>	The instrument now properly triggers from either the accessory card digital I/O pin 6 (Trigger In) or the BNC Trigger In.
<b>Reference number:</b>	AR61925, NS-1108
<b>Symptom:</b>	Manual scaling of histogram display does not work correctly.
<b>Resolution:</b>	This issue has been resolved.
<b>Reference number:</b>	AR62144, NS-879
<b>Symptom:</b>	Touching the swipe screen while maximizing or minimizing the swipe screen may cause the instrument to become inoperable.
<b>Resolution:</b>	This issue has been resolved.
<b>Reference number:</b>	AR62462, NS-1432
<b>Symptom:</b>	Using the instrument with a 7708 card can result in a short circuit condition.
<b>Resolution:</b>	This issue has been resolved.
<b>Reference number:</b>	AR62632, NS-647, NS-682, KS-2983
<b>Symptom:</b>	Fast continuous streaming of data (at rates > 50 kS/s) results in report of buffer overrun condition.
<b>Resolution:</b>	Enhancements have been made in firmware to better support streaming to the computer while using digitizing, however, hardware limitations are still present. The KickStart software provides the framework and code to help the user achieve 50 kS/s runs for up to 5 hours.
<b>Reference number:</b>	AR62869, NS-1771
<b>Symptom:</b>	Instrument may slow down or become inoperable storing data to a USB flash drive in scan mode.
<b>Resolution:</b>	This issue has been resolved.

## KNOWN ISSUES

<b>Reference number:</b>	NS-1386
<b>Symptom:</b>	Errors and mis-aligned information may be displayed if you are using applications designed for earlier versions of firmware
<b>Workaround:</b>	Download updated applications from the <a href="http://tek.com/keithley">tek.com/keithley</a> website and install them on the instrument.
<b>Reference number:</b>	AR62218, NS-1241
<b>Symptom:</b>	Rapidly changing the Quickset performance slider between medium and fast settings can result in the slider becoming unresponsive.
<b>Workaround:</b>	Switch to another screen and back to Quickset.

**ENHANCEMENTS**

<b>Category</b>	<b>Reading buffers</b> <ul style="list-style-type: none"> <li>Reading buffer memory management now allows users to easily allocate the largest size available when creating a reading buffer.</li> <li>Added a method to clear the active buffer by pressing the MENU + EXIT keys.</li> <li>When selecting the active buffer, an option now exists to create a new user buffer.</li> <li>Added the <code>display.activebuffer</code> TSP remote command and <code>DISPlay:BUFFer:ACTive</code> SCPI command to specify the active buffer for the instrument using remote commands.</li> </ul>
<b>Category</b>	<b>Configuration lists</b> <ul style="list-style-type: none"> <li>Added the ability to use remote commands to store inactive measure function settings in a configuration list index.</li> <li>Added the ability to use remote commands to query or configure inactive measure function attributes.</li> </ul>
<b>Category</b>	<b>New commands and options</b> <ul style="list-style-type: none"> <li>Added a method to automatically install any scripts to internal storage memory that reside in an autoinstall directory on the USB drive when inserted into the instrument.</li> <li>Added <code>fs.*</code> TSP commands for accessing and managing file system settings.</li> <li>Added remote commands to set continuous measurement.</li> <li>Added an outside high and low limit option for scan monitor mode.</li> </ul>
<b>Category</b>	<b>Ease of use</b> <ul style="list-style-type: none"> <li>Graph and Histogram settings are now shared for ease of viewing data between the two screens. Also added other graphing enhancements.</li> </ul>
<b>Category</b>	<b>General changes</b> <ul style="list-style-type: none"> <li>The maximum TSP node ID is now 63. The previous maximum was 64.</li> </ul>

## VERSION 1.0.04

### OVERVIEW

Version 1.0.04 is a maintenance release of the DAQ6510 firmware. This release includes one critical fix.

### CRITICAL FIXES

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<b>Reference number:</b>	NS-1094
<b>Symptom:</b>	Input overload protection triggered on one channel caused overflow readings on subsequent channels during high-speed scans.
<b>Resolution:</b>	This issue has been corrected.

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### NONCRITICAL FIXES

There were no noncritical fixes included in this release. See the “Critical fixes” sections for more information about release content.

### ENHANCEMENTS

There were no enhancements included in this release. See the “Critical fixes” sections for more information about release content.

## VERSION 1.0.03

### OVERVIEW

Version 1.0.03 is a maintenance release of the DAQ6510 firmware. This release includes one critical fix and several noncritical fixes.

### CRITICAL FIXES

<b>Reference number:</b>	NS-1122
<b>Symptom:</b>	The instrument potentially performs make-before-break relay connections instead of break-before-make for 7701, 7708, and 7709 cards when scanning certain channels.
<b>Resolution:</b>	This issue has been corrected.

### NONCRITICAL FIXES

<b>Reference number:</b>	NS-867
<b>Symptom:</b>	When the SCPI2700 or SCPI 2700 command set is selected, setting an aperture larger than allowed by SCPI or TSP command set commands causes error -222, "Parameter data out of range," to be generated.
<b>Resolution:</b>	The instrument records and reports the selected aperture, but internally uses the largest supported aperture.
<b>Reference number:</b>	NS-929 NS-1016
<b>Symptom:</b>	The instrument does not respond properly when using Keysight VISA in some applications.
<b>Resolution:</b>	This issue has been corrected.
<b>Reference number:</b>	NS-983
<b>Symptom:</b>	When the SCPI2700 command set is selected, the instrument does not respond to external triggers on pin 6 of the digital I/O connector on the KTTI-GPIB, KTTI-RS232, or KTTI-TSP communication accessory. It does respond to the BNC Trigger input.
<b>Resolution:</b>	The instrument now properly triggers from either the communication accessory digital I/O pin 6 Trigger In or the BNC Trigger In.

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<b>Reference number:</b>	NS-1153
<b>Symptom:</b>	The instrument generates an error when specifying a channel list range that spans more than one card. For example, "@101:240".
<b>Resolution:</b>	This issue has been corrected.
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<b>Reference number:</b>	NS-1162
<b>Symptom:</b>	When writing to the communication accessory digital I/O as an output port the 6 outputs transition at different times rather than simultaneously.
<b>Resolution:</b>	The issue has been corrected.

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## ENHANCEMENTS

There were no enhancements included in this release. See the "Critical fixes" and "Noncritical fixes" sections for more information about release content.



## **VERSION 1.0.02**

### **OVERVIEW**

This Firmware Release is a result of changes to the internal production process. There were no issues or concerns that needed to be addressed in this release.

## VERSION 1.0.01

### OVERVIEW

Version 1.0.01 is a maintenance release of the DAQ6510 firmware. This release includes two critical fixes and several noncritical fixes.

### CRITICAL FIXES

<b>Reference number:</b>	NIHK-6215
<b>Symptom:</b>	In any emulation mode, a 4-wire reading may incorrectly return an overflow.
<b>Resolution:</b>	In all emulation modes, 4-wire readings return the correct reading.
<b>Reference number:</b>	NIHK-6331
<b>Symptom:</b>	Using the Keithley Model 7701, 7706, or 7708 to make measurements may result in overflows and inaccuracies when, without opening all of the channels in between, you make a 2-wire measurement followed by a 4-wire measurement or a 4-wire measurement followed by a 2-wire measurement. A scan with both 2-wire and 4-wire measurements may be inaccurate after the change-in-function has occurred.  A scan with a single function, either 2-wire or 4-wire measurements, would contain accurate measurements. The USB interface may exhibit lockups when used for extended periods.
<b>Resolution:</b>	The 7701, 7706, or 7708 now make accurate measurements for all combinations of 2-wire and 4-wire measurements, whether in a scan, script, or from the display.

### NONCRITICAL FIXES

<b>Reference number:</b>	NIHK-4779
<b>Symptom:</b>	The USB interface may exhibit lockups when used for extended periods.
<b>Resolution:</b>	The USB interface has been changed to improve performance, status byte responsiveness, and long-term reliability. There is no impact to VISA compatibility.
<b>Reference number:</b>	NIHK-6176
<b>Symptom:</b>	Using the infinite count in a trigger model can yield unexpected results.
<b>Resolution:</b>	The use of an infinite count in a trigger model has been improved and functions as expected.
<b>Reference number:</b>	NIHK-6183, NIHK-6204, NIHK-6211
<b>Symptom:</b>	When the KTTI-GPIB card is installed and GPIB communications are used, the SRQ line on the GPIB interface is not functional
<b>Resolution:</b>	The SRQ line is now properly driven on the GPIB interface.

<b>Reference number:</b>	NIHK-6184
<b>Symptom:</b>	Frequent switching using the FRONT/REAR TERMINALS switch may make the instrument inoperable.
<b>Resolution:</b>	The switching between front and rear terminals has been improved.
<b>Reference number:</b>	NIHK-6242
<b>Symptom:</b>	When the instrument is emulating the Keithley Model 2700 the instrument uses a different version of the moving average filter than the actual Keithley Model 2700 or 2701.
<b>Resolution:</b>	<p>Emulation of the Keithley Model 2700 and 2701 now uses the same version of the moving average filter as the original products. This type of filter is also available in non-emulation modes under the name Hybrid Average filter. Channels do not support the hybrid filter type.</p> <p>A hybrid filter combines characteristics of the repeating and moving filter types. A hybrid filter always averages an entire window of readings before returning the requested filtered reading. If the window is empty when the first reading is triggered, multiple readings are made to fill the window, after which the single requested filtered reading is returned. This process may take longer than a single reading. Once the window is filled, subsequent triggers make a single reading, add it to the window, and return the single requested filtered reading. This process will take the duration of a single reading.</p> <p>The TSP and SCPI commands for these filter-type options are  <code>dmm.measure.filter.type = dmm.FILTER_HYBRID_AVG</code> and  <code>[SENSe[1]]:&lt;function&gt;:AVERage:TCONtrol:HYBRid.</code></p>
<b>Reference number:</b>	NIHK-3957
<b>Enhancement:</b>	When the EXIT key is pressed, the previous screen becomes active. Previously, the instrument returned to the menu screen.
<b>Reference number:</b>	NIHK-5778
<b>Resolution:</b>	The scan time for scans with a count greater than one and autoranged functions has been improved. The instrument now retains the range learned from the first scan iteration and uses it as a basis for delays and ranging on subsequent scans. Previously, only worse case values were considered.
<b>Reference number:</b>	NIHK-6156
<b>Resolution:</b>	SCPI commands were added to programmatically control the display's active reading buffer and watch list. Additional documentation can be found in the latest reference manual under the <code>:DISPlay:WATch:CHANnels</code> and <code>:DISPlay:BUFFer:ACTive</code> commands.

<b>Reference Number</b>	NIHK-6158
<b>Enhancement</b>	The Reset Popups button on the Event Log screen and Log Settings tab now clears the error log of any suppressed warning popups. When a warning event occurs, the user interface displays a popup. You can suppress the popup so that subsequent warnings do not generate a popup. Previously, the suppression list could not be cleared.
<b>Reference number:</b>	NIHK-6168
<b>Enhancement:</b>	SCPI now allows the use of the dBm unit in a writable buffer. Additional documentation can be found in the latest reference manual under the :TRACE:WRITE:FORMAT command.
<b>Reference number:</b>	NIHK-6171, NIHK-6172
<b>Enhancement:</b>	A moving average filter is no longer allowed as a filter type on a channel. The moving average filter makes a reading, averages it with a previous set of readings, and returns the result. This can yield unexpected results during a scan because the averaged readings will not be sequential in time. To prevent inadvertent errors, this option has been removed for channels. It is still available for normal DMM usage.
<b>Reference number:</b>	NIHK-6195
<b>Enhancement:</b>	The time taken to switch functions using the front panel has been reduced substantially across all function.
<b>Reference number:</b>	NIHK-6213
<b>Enhancement:</b>	All emulation modes now support a beeper for continuity and limits.
<b>Reference number:</b>	NIHK-6221, NIHK-6236
<b>Enhancement:</b>	The scan screen menu has been changed as follows. The command Create New has been renamed to Create New List. Save has been renamed to Save System. The functionality is the same. There are two additional menu entries. The first is Reset Scan Settings, which clears the scan list and resets all settings associated with a scan, but not DMM settings. The other is Reset System, which redirects you to System Info and Management where the Reset button, which resets the entire instrument to power-on defaults, is located.
<b>Reference number:</b>	NIHK-6258
<b>Enhancement:</b>	TCP/IP communication speeds have been improved for short packets.
<b>Reference number:</b>	NIHK-6277
<b>Enhancement:</b>	All emulation modes now support a beeper for continuity and limits.

<b>Reference number:</b>	NIHK-6303
<b>Enhancement:</b>	In 2701 emulation mode, the following command is now supported as described in the Model 2701 User's Manual :TRACe:POINts:ACTual...
<b>Reference number:</b>	NIHK-6329
<b>Enhancement:</b>	When opening and appending a file on a USB flash drive, if the file does not exist it will be created. If the file exists, it will be appended to as before. This affects the <code>file.open()</code> and <code>io.open()</code> TSP commands.

## ENHANCEMENTS

There were no enhancements included in this release. See the “Critical fixes” and “Noncritical fixes” sections for more information about release content.