KEITHLEY
A Tektronix Company

DMM7512 7½ Digit Graphical Multimeter

Version 1.7.2 Firmware Release Notes

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CONTENTS

GENERAL INFORMATION

SUPPORTED MODELS

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

Model DMM7512 7½ Digit Graphical Multimeter

INSTALLATION INSTRUCTIONS

Firmware upgrade and downgrade instructions

CAUTION

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

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 instrument.

You can now access the virtual front panel to upgrade or downgrade the firmware. Refer to "Accessing the virtual front panel" in *Model DMM7512 7½ Digit Sampling Multimeter Instrument Information* (document number 0713576xx). This manual is available online at tek.com/keithley.

When you have connected to the instrument, continue with the installation process.

To upgrade or downgrade the firmware:

1. From the instrument virtual front panel, press the **MENU** key.
2. Under System, select **Info/Manage**.
3. Choose an upgrade option.
4. To upgrade to a newer version of firmware: Select **Upgrade to New**.
5. To return to a previous version of firmware: Select **Downgrade to Older**.
6. When the upgrade is complete, reboot the instrument.

You must perform this procedure for both modules of the DMM7512.

A message is displayed while the upgrade is in progress.

For additional firmware installation instructions, refer to the *Model DMM7512 7½ Digit Sampling Multimeter Instrument Information* (document number 0713576xx). This manual is available online at tek.com/keithley.

VERSION 1.7.2 RELEASE

OVERVIEW

Version 1.7.2 provides fixes and required support.

CRITICAL FIXES

Reference number:	NS-1910
Symptom:	Additional user-defined instrument configurations may be configured incorrectly following a reset command, resulting in incorrect or corrupted customer readings.
Resolution:	This issue has been corrected.

NONCRITICAL FIXES

Reference number:	NS-1915
Symptom:	When running a Test Script Processor® (TSP) script application with a custom user interface that has an End App button, the custom user interface may not close properly when “End App” is selected.
Resolution:	This issue has been corrected. This fix also introduces a behavior change from previous firmware versions. If you are running a nested script (scripts running within a script), the user interface only displays the first running script. Previously, the user interface displayed name changes between nested scripts.

VERSION 1.7.0 RELEASE

OVERVIEW

Version 1.7.0 is a significant maintenance firmware release for the DMM7512 that brings numerous updates along with stability and reliability improvements. See the *Model DMM7512 7½ Digit Sampling Multimeter Instrument Information* (document number 0713576xx) for additional details.

References to the front panel of the instrument in this section refer to the virtual front panel. Refer to "Accessing the virtual front panel" in Model DMM7512 7½ Digit Sampling Multimeter Instrument Information (document number 0713576xx). This manual is available online at tek.com/keithley.

CRITICAL FIXES

Reference number:	AR55036, AR62150, NS-339
Symptom:	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.
Resolution:	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.
Reference number:	AR56349, AR60259, NS-929
Symptom:	USB communication issues.
Resolution:	To better accommodate the variety of VISA installation options available to users, the STALLing USBTMC is not active as it had been before.
Reference number:	AR61116, AR62660, NS-529, NS-1558
Symptom:	Repeatedly saving a buffer to a file on a USB flash drive using the `buffer.saveappend` command eventually causes Error 2203, "Cannot open file."
Resolution:	This issue has been corrected.
Reference number:	AR62310
Symptom:	Exercising various combinations of virtual front panel settings for the Event Log may cause the virtual front panel to lock up.
Resolution:	This issue has been corrected.
Reference number:	AR61734, NS-1097
Symptom:	Pressing shortcut while swipe screen is moving causes the instrument to become inoperable.
Resolution:	This issue has been resolved.

Reference number:	AR61925, NS-1108
Symptom:	Manual scaling of histogram display does not work correctly.
Resolution:	This issue has been resolved.
Reference number:	AR62632, NS-647, NS-682, KS-2983
Symptom:	Fast continuous streaming of data (at rates > 50 kS/s) results in report of buffer overrun condition.
Resolution:	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.
Reference number:	AR62431, NS-1636
Symptom:	A/D timeout error occurring, error code 5701.
Resolution:	This issue has been resolved.

ENHANCEMENTS

Category	**Reading buffers** • Reading buffer memory management now allows users to easily allocate the largest size available when creating a reading buffer. • Additional options are now available when saving data to a USB flash drive. • Buffer statistics and options for accessing data from reading buffers have been added. • Added reading buffer math and unit support. • Added formatting options for writable buffers. • Added a method to clear the active buffer by pressing the MENU + EXIT keys. • When selecting the active buffer, an option now exists to create a new user buffer. • Added the `display.activebuffer` TSP remote command and `DISPlay:BUFFer:ACTive` SCPI command to specify the active buffer for the instrument using remote commands.

Category	**Configuration lists** • Enhanced user interface screen for accessing configuration list settings. • Added the ability to use remote commands to store inactive measure function settings in a configuration list index. • Added the ability to use remote commands to query or configure inactive measure function attributes.

Category	**Trigger model**
	• The Measure and Digitize trigger blocks have been combined into a single Measure and Digitize block. The new trigger block either measures or digitizes based on the active function. When used with a Measure Configuration list, this trigger block lets you make sequential measurements with the analog-to-digital converter and the digitizer (when available) in the same trigger model.
	  • The SCPI command is `:TRIGger:BLOCk:MDIGitize`. The TSP command is `trigger.BLOCK_MEASURE_DIGITIZE`.
	  • The remote commands for the original Measure and Digitize trigger blocks are still accepted to provide compatibility with existing test programs and scripts. However, the trigger models generated with the original commands automatically use the new, combined Measure and Digitize block.

Category	**LXI** • The instrument is now compliant with LXI version 1.5. • An LXI/LAN ID indicator has been added to the System Communications screen. • To discover the instrument, use the LXI Discovery Tool.
Category	**Apps** • When applications are available, the Application APPS Manager screen displays the applications for the instrument.
Category	**New commands and options** • 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. • Added `fs.*` TSP commands for accessing and managing file system settings. • Added an option to show a Processing screen in the user interface to increase test execution speeds when screen updates are not required. • Added remote commands to set continuous measurement.
Category	**Ease of use** • Numerical entries on the virtual front panel user interface now support Minimum, Maximum, and Infinite options when applicable to the setting. • A high-resolution option has been added to the virtual front panel. • Graph and Histogram settings are now shared for ease of viewing data between the two screens. Also added other graphing enhancements.

Category	General changes
	• The maximum TSP node ID is now 63. The previous maximum was 64. • The Access Mode option on the virtual front panel has been changed to Interface Access. • The user swipe screen is only displayed if user text is defined.

VERSION V1.6.7D RELEASE

Overview

Version 1.6.7d is an audited minor release which fixes several different bugs all listed below.
RELEASED 12-NOV-2018

Critical Fixes

NIHK6042 Trigger models hangs with fast NPLC setting.

Models affected:

All DMM7512 models

Symptom:

Setting up a Trigger Flow model using the TSP-Link® trigger lines for synchronization with a fast measurement in a loop can hang waiting for the trigger.

Resolution:

This issue has been corrected.

NIHK4274 TSP-Link performance improvements.

Models affected:

All DMM7512 models

Symptom:

TSP-Link connection can generate errors if the unit is performing high sample rate or low NPLC measurements.

Resolution:

This issue has been corrected.

NIHK6106 NIHK6239 TSP-Link initialization memory leak.

Models affected:

All DMM7512 models

Symptom:

Performing a `tsplink.initialize()` command would reduce the amount of available memory slightly each time it executed. This occurred because the firmware was not correctly clearing the group leaders, which led to extra memory allocation. Eventually this problem can result in an out of memory condition.

Resolution:

This issue has been corrected.

NIHK6320 NIHK6306 TSP-Link node number 64 is no longer selectable.

Models affected:

All DMM7512 models

Symptom:

Using TSP-Link node number 64 could cause compatibility issues with older TSP-Link products.

Resolution:

The maximum TSP-Link node number has been limited to 63.

SYS42 Creating a script on a remote TSP-Link node causes a “Node inaccessible” error.

Models affected:

All DMM7512 models

Symptom:

Steps to reproduce:

1. Use `tsplink.initialize()` to create the TSP-Link network.
2. Send the script source to the remote node via the dataqueue:
   `node[remoteNode].dataqueue.add(`*`myScript`*`.source)`
3. Create the script on the remote node
   `node[remoteNode].execute(`*`myScript`*`.name ..`
   `"= script.new(dataqueue.next(), [[" .. `*`myScript`*`.name .."]])")`
4. The remote node becomes unresponsive and a node inaccessible error is generated.

Resolution:

This issue has been corrected.

SYS535 Using a 2600S, 2600AS, 2600BS, 3706, or a 3706A product as the TSP-Link master results in errors for some commands.

Models affected:

All DMM7512 models

Symptom:

Using a 2600S, 2600AS, 2600BS, 3706, or a 3706A product as the TSP-Link master will generate errors when attempting to use functions or attributes that accept enumeration types

Resolution:

This issue has been corrected.

NS1131 Sending data to TCP/IP socket is too slow.

Models affected:

All DMM7512 models

Symptom:

The TCP/IP socket interface can experience long delays before the acknowledge packet is sent from the instrument for large data packets.

Resolution:

This issue has been corrected.

NS1115 Trigger timer does not generate the event at the correct time for long delay settings.

Models affected:

All DMM7512 models

Symptom:

Steps to reproduce:

```
trigger.timer[1].reset()
trigger.timer[1].delay = delay_time
trigger.timer[1].start.generate = trigger.ON
```

The event should be generated immediately but will not be generated if `delay_time` is greater than 65.5 ms.

Resolution:

This issue has been corrected.

VERSION V1.6.6F RELEASE

Overview

Version 1.6.6f is the initial firmware release for the Model DMM712. No fixes are listed since this is the very first firmware release. Known Issues, Usage Notes, and Upcoming Enhancements are listed below in this document.

Compatibility concerns

N/A

Critical fixes

N/A

Enhancements

N/A

Noncritical fixes

N/A

Known issues

PR55094 Compact buffers do not support negative measurements

Models affected:

All DMM7512 models

Symptom:

If you create a buffer with a “Compact” style, the negative sign will not be reported. All negative measurements will appear to be positive (the absolute value of the measurement). This does not affect default buffers (defbuffer1 and defbuffer2) since they are fixed at “Standard” style.

Workaround:

When creating a custom buffer, use the “Standard” or “Full” style. Avoid “Compact” buffers until this is resolved.

PR54918 Loading a configuration list from the trigger model turns off autoranging

Models affected:

All DMM7512 models

Symptom:

If you create a trigger model that uses a “Config List” block to recall or load a previous or next set of settings, autoranging is turned off. By default, this leaves the instrument on the 1000V range. This occurs even if the configuration list index attempts to turn autoranging on.

Workaround:

If possible, use a trigger model that does not depend on Configuration Lists.

If possible, apply settings using Configuration Lists outside of the trigger model.

PR54333 SCPI problems with MIN/MAX for the Threshold Level unique to Frequency or Period functions

Models affected:

All DMM7512 models

Symptom:

Use the [SENSe[1]]:<function>:THReshold:LEVel command where <function> is FREQuency or PERiod to attempt to set the level to MINimum or MAXimum. It will incorrectly attempt to set it to 700V, independent of range. On lower ranges, this generates an error.

Workaround:

Specify the actual value instead of using the MINimum or MAXimum parameter.

PR54737, PR54700 A saved setup (SCPI) or configuration script (TSP) may generate errors when recalling or running it

Models affected:

All DMM7512 models

Symptom:

A saved setup or configuration script saves and restores the state of the instrument. When the instrument saves the settings into a configuration script, it generates incorrect TSP syntax for some settings in the script. As a result, errors are generated when the script is run to recall the setup. This aborts the execution of the configuration script and halts the process to restore settings. For detailed information on the errors, refer to the Event Log. Warnings do not halt script execution.

This problem only applies to a subset of TSP command sequence with examples shown in the table below. Most configurations are not affected.

Workaround:

Transfer the setup or configuration script to a computer. Edit it with a text editor and correct the command that generated the error so that it uses the proper syntax.

Possible Errors:

Invalid Command Sequence:	Correct Command Sequence
`dmm.measure.func = dmm.FUNC_CONTINUITY` `dmm.measure.range = <a number>`	`dmm.measure.func = dmm.FUNC_CONTINUITY`
`dmm.measure.func = dmm.FUNC_DIODE` `dmm.measure.range = <a number>`	`dmm.measure.func = dmm.FUNC_DIODE`
`trigger.model.* commands appear before settings for "--set up DMM" (look for comment in script)`	`Move the trigger.model.* commands to appear after the settings for "—set up ACAL" (look for comment in script)`

PR54656 Cannot set the aperture to 0 for the digitizer using SCPI

Models affected:

All DMM7512 models

Symptom:

You cannot set the aperture to 0 using the SCPI language as documented in the manual. Either of these commands will generate an error:

:SENSE:DIG:CURR:APER **0**	**ERROR!**
:SENSE:DIG:VOLT:APER **0**	**ERROR!**

Workaround:

Use “AUTO” instead of 0 if you wish to select an Automatic aperture.

:SENSE:DIG:CURR:APER **AUTO**	**CORRECT!**
:SENSE:DIG:VOLT:APER **AUTO**	**CORRECT!**

PR54688 Cannot always abort scripts that use the trigger model with Frequency or Period functions

Models affected:

All DMM7512 models

Symptom:

Configure the trigger model to take Frequency or Period measurements using a script. Attempt to abort the script while it is running. The instrument may not always halt execution of the script.

Workaround:

Allow the trigger model in the script to run to completion.

PR54377 Trigger model hangs if a config list attempts to switch between Digitize and Measure

Models affected:

All DMM7512 models

Symptom:

Create a trigger model using a Measure block that also loads a point from a config list with the function set to take digitizer measurements. The conflict between the DMM Measure and Digitize will cause the trigger model to run indefinitely once started. It is not possible to stop it. This also applies if you create a trigger model with a Digitizer block with a config list that sets up a DMM Measure function.

Workaround:

Avoid mismatches between Digitizer and DMM Measure that can be introduced when using config lists with the trigger model. Consider configuring and loading separate trigger models or writing a TSP script to achieve the desired behavior.

PR55118 Trigger model doesn't update to follow active buffer

Models affected:

All DMM7512 models

Symptom:

Use the Graph's Trigger tab to configure a trigger model. After the trigger model is generated, change the active buffer from the home screen. The trigger model will not get updated and will still put measurements in what was previously the active buffer.

Workaround:

There are several ways to avoid this:
(1) Change the Active Buffer before configuring the trigger.
(2) After changing the Active Buffer, force regeneration of the trigger model by making a change to any setting on the Graph's Trigger tab.
(3) Manually reconfigure the trigger model to change the buffer selected in the Measure/Digitize block (Menu > Trigger Flow).

PR54974, PR54934 UI graph occasionally appears to be missing digitizer data

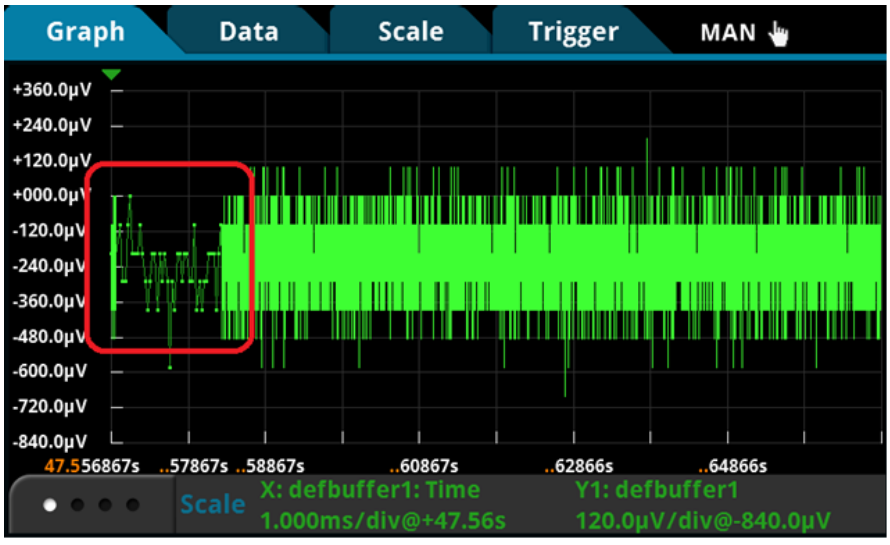
Models affected:

All DMM7512 models

Symptom:

When using the UI to view bursts of digitizer data on the graph, you may see areas that appear to have missing data. See the example in the image below. Even though data is being sampled consistently throughout the viewable range, it appears as though fewer points are available in the circled area.

This may only occur when more than 5,000 points are visible on the graph at once and sample rates exceed 50k.



Workaround:

Pan or scale the graph by touching it to force a refresh. All data will appear. The measurements were taken and are in the buffer.

If you touch the screen in “Continuous Measurement Triggering” mode, panning in the time dimension will lock your time position. This will freeze your view on older data. If you continue to take measurements, your data will correctly disappear when the buffer wraps and the older data you were looking at is overwritten (assuming your buffer is continuous). If you wish to avoid this, it may be helpful to put the instrument in Manual (“Trigger Key Triggering”) mode and manually trigger each acquisition using the TRIGGER key.

PR54436 UI graph may fail to autoscale under certain circumstances

Models affected:

All DMM7512 models

Symptom:

When viewing the graph, the graph may not autoscale correctly when the x-axis scale is set to “All”.

Workaround:

Pan or scale the graph by touching it to force a refresh. The autoscale algorithm will correct itself.

PR54415 UI graph does not display the dashed lines for the analog trigger levels set over the bus

Models affected:

All DMM7512 models

Symptom:

Configure the analog trigger using remote bus commands. Then view the graph from the front panel. The dotted line to indicate the analog trigger level(s) will not appear.

Workaround:

There is no workaround over the bus. The only option is to program the level from the UI for it to be visible.

PR54741 UI graph can encounter scaling and panning difficulties when displaying 2 or more traces

Models affected:

All DMM7512 models

Symptom:

Configure the graph to show 2 or more traces at once. Autoscale may not always work correctly. Panning and zooming the signals may also be difficult at times.

Workaround:

For screen gestures, try repeating the operation over the trace you wish to modify. If autoscale is not yielding expected results, try manually setting scale. The “Scale” tab can always be used to precisely set a scale to pan or zoom into a trace.

PR54718 UI Reading Table does not always allow scrolling to access all digitized readings

Models affected:

All DMM7512 models

Symptom:

The UI Reading Table (Menu > Reading Table) may not allow you to scroll down using the touch screen or the on screen arrows even though there is additional data. This problem is particularly pronounced after using the “Jump to” option to navigate the table.

Workaround:

Use the “Refresh” button and then try to navigate again. This often works if the “Jump to” option has never been invoked. If this still does not work, use the “Jump to” option. Jumping should allow for full access to the entire data set.

PR48636 DMM7512 writes to a USB Flash drive file that is read only

Models affected:

All DMM7512 models

Symptom:

The DMM7512 will write over read-only files on flash drives. For example, if the DMM7512 attempts to write to file aaa.txt that is marked read-only, the DMM7512 will rewrite file aaa.txt without warning. This problem does NOT suggest the DMM7512 randomly overwrites arbitrary files on a flash drive.

Workaround:

There is no known workaround for this issue at this time.