



Model DMM7510 7½ Digit Graphical Multimeter

Version 1.1.0f Firmware Release Notes

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General Information

Supported models

This firmware is intended for use on the following Keithley Instruments product models:

DMM7510, DMM7510-NFP, DMM7510-RACK, DMM7510-NFP-RACK

Firmware Upgrade Instructions

NOTE: 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 to a USB flash drive. The file is: `ki_DMM7510_v1_1_0f.upg`.
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. Model DMM7510 firmware files end with the file extension `.upg`.
(example: `H:\ ki_DMM7510_v1_1_0f.upg`)
3. Disconnect any input and output terminals that are attached to the instrument.
4. Turn on instrument power.
5. Insert the flash drive into the USB port on the front panel of the instrument.
6. From the instrument front panel, press the **MENU** key.
7. Under System, select **Info/Manage**.
8. Select **Upgrade to New**.
9. If the instrument is controlled remotely, a message is displayed. Select **Yes** to continue.
10. When the upgrade is complete, reboot the instrument.

NOTE: A message is displayed while the upgrade is in progress. Do not remove power until the upgrade message shows complete (it should take less than 15 minutes).

For additional information about upgrading the firmware, refer to the “How do I upgrade firmware?” topic in the “Frequently Asked Questions (FAQs)” section of the *Model DMM7510 7 ½ Digit Graphical Sampling Multimeter Reference Manual* (document number: DMM7510-901-01). This manual is available online at <http://www.keithley.com/support>. Search for “DMM7510 Reference Manual”.

Upgrade considerations for the Model DMM7510

Upgrade files are available on the Keithley Instruments website (<http://www.keithley.com>).

To find firmware files on the Keithley Instruments website:

1. Select the **Support** tab.
2. In the model number box, type **DMM7510**.
3. Select **Firmware**.
4. Click the search button. A list of available firmware updates and any available documentation for the instrument is displayed.
5. Click the file you want to download.

Version 1.1.0f Release

Overview

Version 1.1.0f is an update to the Model DMM7510 firmware. This version was released in March 2015. Known Issues, Usage Notes, and Upcoming Enhancements are listed below in this document.

Compatibility concerns

PR54340 LoopUntilEvent and the Graph screen's "Trigger" tab no longer remember triggers by default

Models affected:

DMM7510 (all variations)

Concern:

The LoopUntilEvent trigger model template defaults to always clear observed events when entering the wait block. This is opposite behavior in 1.0.0h firmware. In 1.0.0h, events were never cleared.

The Graph's "Trigger" tab uses the LoopUntilEvent template. Therefore, this applies equally to the UI if configured from this screen.

Recommendation:

If the original behavior is needed, specify Never on the Graph's Trigger tab or when configuring the LoopUntilEvent template. The bus commands are listed below:

SCPI

```
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>, <delay>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>,
<delay>, "<readingBuffer>"
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>,
<delay>, "<readingBuffer>", <readingBlock>
```

where <clearBehavior> is ENTER or NEVER. ENTER is the default.

TSP

```
trigger.model.load("LoopUntilEvent", triggerEvent, position)
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior)
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior,
delay)
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior,
delay, bufferName)
```

```
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior,  
delay, bufferName, readingBlock)
```

where *clearBehavior* is `trigger.CLEAR_NEVER` or `trigger.CLEAR_ENTER`.
`trigger.CLEAR_ENTER` is the default.

Critical Fixes

PR55094

Compact buffers do not support negative measurements.

Models affected:

DMM7510 (all variations)

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.

Resolution:

This issue has been corrected.

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

Models affected:

DMM7510 (all variations)

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.

Resolution:

This issue has been corrected.

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

Models affected:

DMM7510 (all variations)

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.

Resolution:

This issue has been corrected.

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

PR54700

Models affected:

DMM7510 (all variations)

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 the TSP command sequence. Most configurations are not affected.

Resolution:

This issue has been corrected. If scripts had been modified to deal with this issue in the past, the script will continue to work fine.

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

Models affected:

DMM7510 (all variations)

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
```

```
:SENSE:DIG:VOLT:APER 0
```

Resolution:

This issue has been corrected. It is still recommended to use AUTO instead of the number.

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

Models affected:

DMM7510 (all variations)

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.

Resolution:

This issue has been corrected.

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

Models affected:

DMM7510 (all variations)

Symptom:

Create a trigger model using a Measure block that also loads an index 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.

Resolution:

This issue has been corrected. An error will be generated if a conflict prevents the trigger model from executing.

PR55118 Trigger model doesn't update to follow active buffer

Models affected:

DMM7510 (all variations)

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.

Resolution:

This issue has been corrected.

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

Models affected:

DMM7510 (all variations)

Symptom:

When using the UI to view bursts of digitizer data on the graph, you may see areas that appear to have missing data. 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.

Resolution:

This issue has been corrected. Not every measurement point is sent to the display when zoomed out and acquiring high speed digitizer readings in real time. An effort is made to send enough so that the signal can be rendered closely. Pan or scale the graph by touching it to force a refresh if more detail is needed. All data will appear if any improved precision is possible.

PR54436 UI graph may fail to autoscale under certain circumstances

Models affected:

DMM7510 (all variations)

Symptom:

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

Resolution:

This issue has been corrected.

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

Models affected:

DMM7510 (all variations)

Symptom:

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

Resolution:

This issue has been corrected.

The dotted line will only appear if analog level is used with the LoopUntilEvent template. It will not necessarily appear on the graph if connected to other stimulus destinations.

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

Models affected:

DMM7510 (all variations)

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.

Resolution:

This issue has been corrected.

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

Models affected:

DMM7510 (all variations)

Symptom:

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

Resolution:

This issue has been corrected. You can use the graph in the upper right corner of the screen to help navigate large sets of data. Swipe using the table itself for fine adjustment.

On the full screen Graph, it is also possible to zoom into a point on a graph and then touch the point. A pop up will appear and describe the point value. It includes an option to go to the reading table location where that point resides.

PR48636 DMM7510 does not respect a USB Flash drive file that is read only.

Models affected:

DMM7510 (all variations), 2450, 2460

Symptom:

The DMM7510 will write over read-only files on flash drives. For example, if the DMM7510 attempts to write to file aaa.txt and aaa.txt is marked read-only, the DMM7510 will rewrite file aaa.txt without warning.

Resolution:

This issue has been corrected.

PR55204 Secondary measurement problems from the UI.

Models affected:

DMM7510 (all variations)

Symptom:

Depending upon configuration of the instrument, the secondary measurement feature may cause errors or odd behavior. Enable secondary measurements by going to the Home screen and swiping over to the Secondary measurement screen. Select your secondary function and turn it on.

Resolution:

This issue has been corrected.

PR55466 Timestamps sometimes have errors with autozero on and may distort graphed data.

Models affected:

DMM7510 (all variations)

Symptom:

Use the DMM DCV or DCI function with autozero on. A graph of a known waveform such as a sine wave may appear slightly misshaped due to gaps in timestamps.

Resolution:

This issue has been corrected.

PR55472 Problems requesting status byte over USB.

Models affected:

DMM7510 (all variations)

Symptom:

Disconnect and reconnect to the instrument many times while attempting to read the status byte. This may result in a connection error at times.

Resolution:

This issue has been corrected.

PR55701 TSP-Link connection problems when digitizing data

Models affected:

DMM7510 (all variations)

Symptom:

Connect two DMM7510 instruments using TSP-Link. Configure both to digitize large amounts of measurements. Sometimes when the master node triggers the measurements, you may receive a connection lost error.

Resolution:

This issue has been corrected.

TSP-Link cannot send digitized readings over the bus in real time. It is generally recommended that you complete acquisition of your measurements before attempting to transfer them between TSP-Link nodes.

Enhancements

PR54340 LoopUntilEvent and the Graph screen's "Trigger" tab remember triggers by default.

Models affected:

DMM7510 (all variations)

Symptom:

If you use the "LoopUntilEvent" Trigger Model template or the Graph's Trigger tab (Menu > Graph > Trigger tab), trigger events that occur during execution of other trigger model blocks will be remembered. This will cause the trigger model's "Wait" block to advance and finish making measurements when it is later reached.

No count is maintained for multiple triggers. The instrument latches only one trigger event and clears it when the Wait block advances.

Example: Configure LoopUntilEvent to wait for a digital input line. When the digital input is pulsed, it will advance the trigger model. If a second pulse occurs (even while the instrument trigger model is executing other blocks), the instrument will latch its occurrence. The next time the instrument waits on the event, it will fire immediately.

Previous firmware gave no control over this behavior.

Resolution:

The Trigger Model Wait block now accepts a new parameter to specify this behavior. If set to Never clear, the trigger model will advance through the wait block even if an event was seen prior to executing the wait block. If set to Enter, it will clear any events previously observed when entering the Wait block. This forces the wait block to wait on a new event to occur.

Example: Assume a trigger model is configured to wait, make a measurement, and then branch so this occurs 2 times. The trigger model will first wait on the event (such as a digital I/O event). Once that event occurs, it will take a measurement. Assume the event occurs again while taking the measurement but before reaching the Wait block again. If the Wait block is configured to Never clear, it will remember the occurrence of this event and immediately flow through the Wait block. If it is set to Clear On Enter, it will erase memory of this event and wait for a fresh occurrence of the event.

SCPI

```
:TRIGger:BLOCK:WAIT <blockNumber>, <event>, <clearBehavior>
:TRIGger:BLOCK:WAIT <blockNumber>, <event>, <clearBehavior>, <logic>, <event>
:TRIGger:BLOCK:WAIT <blockNumber>, <event>, <clearBehavior>, <logic>, <event>,
<event>
```

where <clearBehavior> is ENTER or NEVER. NEVER is the default.

```
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>, <delay>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>,
<delay>, "<readingBuffer>"
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>,
<delay>, "<readingBuffer>", <readingBlock>
```

where `<clearBehavior>` is `ENTER` or `NEVER`. `ENTER` is the default.

TSP

```
trigger.model.setblock(blockNumber, trigger.BLOCK_WAIT, event)
```

```
trigger.model.setblock(blockNumber, trigger.BLOCK_WAIT, event, clearBehavior)
```

```
trigger.model.setblock(blockNumber, trigger.BLOCK_WAIT, event, clearBehavior,
logic, event)
```

```
trigger.model.setblock(blockNumber, trigger.BLOCK_WAIT, event, clearBehavior,
logic, event, event)
```

where `clearBehavior` is `trigger.CLEAR_NEVER` or `trigger.CLEAR_ENTER`. `trigger.CLEAR_NEVER` is the default.

```
trigger.model.load("LoopUntilEvent", triggerEvent, position)
```

```
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior)
```

```
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior,
delay)
```

```
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior,
delay, bufferName)
```

```
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior,
delay, bufferName, readingBlock)
```

where `clearBehavior` is `trigger.CLEAR_NEVER` or `trigger.CLEAR_ENTER`. `trigger.CLEAR_ENTER` is the default.

PR54718 Support navigation from the Graph to the corresponding point in the Reading Table.

Models affected:

DMM7510 (all variations)

Symptom:

Navigating the reading table to find a specific measurement point may be difficult if there are millions of measurements in the buffer. The new Reading Table screen improves this, but still may be difficult at times.

Resolution:

Navigate to the full screen Graph and view your data. Use the Pinch/Zoom gesture to zoom in on the data point of interest. When only a few points are on the screen, touch the point. A dialog box will appear and show the reading value. Select the "Go to Reading" button. This will take you to the Reading Table and automatically put focus on that exact measurement.

PR55598 Better scaling options added to Histogram graph.

Models affected:

DMM7510 (all variations)

Symptom:

The histogram required you to specify the span of the bins manually. It did not have an option to automatically pick them for you.

Resolution:

Histogram now supports 3 different scaling options:

- **Auto Bin** – Automatically sets the min and max boundaries to fit the data available in the selected buffer.
- **Fit** – Adjusts the pan and zoom to fit the entire histogram on the screen. This does not affect the min or max boundaries.
- **SmartScale** – Automatically selects to Auto Bin or Fit based on analyzing data in the chosen buffer.

PR54205 UI supports manually setting REL value.

Models affected:

DMM7510 (all variations)

Symptom:

Previously, it was not possible to program a specific REL value from the user interface. You could only enable REL based upon the current measurement.

Resolution:

Select Menu > Calculations and then modify the Rel Value.

PR55581 Improved Performance Slider settings.

Models affected:

DMM7510 (all variations)

Symptom:

The Performance Slider did not make use of all settings related to speed and accuracy tradeoffs.

Resolution:

Access the Performance Slider by pressing the QuickSet key. The settings loaded when dragging the slider to trade off performance have been improved. To see the applied settings, navigate to the Event Log (Menu > Event Log) after using it. All settings are logged.

Performance Slider settings may change between firmware releases. If you want to mimic behavior, note the individual settings and apply them.

PR55628 Track Group now supports panning and zooming within the group.

Models affected:

DMM7510 (all variations)

Symptom:

Previously, panning or zooming while Track Group was enabled would exit the Track Group scaling mode. Scaling reverted to manual mode and would lock to a point. If the data in that group was overwritten as the buffer wrapped, the data would disappear from the graph. It was not possible to adjust scale and still view the latest group of data.

Resolution:

Track Group now has an offset and scale. When you pan and zoom, you set the offset within that group. That offset is maintained even when you advance to the next group. Similarly the zoom is also preserved.

You can no longer pan outside of the group. If you want to pan to previous groups of data in the buffer, disable Track Group by selecting "Off" as the graph's x-axis scaling method.

PR55646 Frequently used swipe screens were positioned far apart from one another

Models affected:

DMM7510 (all variations)

Symptom:

The Graph and Statistics swipe are commonly referenced when analyzing data. These two swipe screens were 3 swipes apart. This made navigation between them tedious.

Resolution:

The order of the swipe screens was updated. Screens likely to be used together were co-located. The order was also set based upon anticipated frequency of use.

Noncritical Fixes

N/A

Known issues

PR55746 Reading table mini graph is sometimes incomplete.

Models affected:

DMM7510 (all variations)

Symptom:

When navigating to the Reading Table screen, the miniature graph in the upper right corner may not show all readings correctly. It will render a horizontal line which indicates no measurements during that interval, even though there may be measurements. These measurements are still accessible. The miniature graph fails to show them.

This only affects the Reading Table screen. The full screen graph and the Home graph swipe screen are not affected.

Workaround:

When new measurements force the mini graph to rescale, it will correct itself. Exiting and returning to the Reading Table screen or toggling selected buffers may also fix the problem.

PR55784 Reading table does not work correctly with compact buffers.

Models affected:

DMM7510 (all variations)

Symptom:

Create a buffer and set the Style to Compact. If you try to view the data in the buffer using the Reading Table (Menu > Reading Table), the table will be empty and display "loading".

Workaround:

Use another style of buffer. If you need to use the Compact style, you can visualize data using the graphing feature. Zoom in and click on points to see more information about the measurement. For further analysis, export the data to a CSV file for analysis on a remote PC (Menu > Reading Buffers > Save to USB).

PR55744 Switching measure count can confuse SmartScale.

Models affected:

DMM7510 (all variations)

Symptom:

Set the measure or digitize count to a value greater than one. Trigger at least 2 groups of measurements into the buffer. Then change the measure or digitize count to 1. Trigger additional readings. When graphing the data, SmartScale will not show new measurement points that used the count of 1.

SmartScale looks for group markers in the data buffer to decide which scaling method to use. A group marker accompanies the first reading whenever a measure or digitize count is a finite number greater than 1. By setting the measure count to a larger value, it creates group markers in the buffer. SmartScale selects Track Group as the best scaling method. It waits for the next group before showing that data. With the measure count set to 1, there will never be a new group. Track Group therefore will wait indefinitely and never advance to the new points.

Workaround:

Clear the buffer or use Track Latest or Track All as the scaling method.

PR55743 May observe slight delays between measurements when navigating the UI while in CONT mode

Models affected:

DMM7510 (all variations)

Symptom:

Put the UI in continuous trigger mode. Set the measure count to 1 on any DMM function with the NPLC set to 0.1 or lower so that readings are triggered quickly. The user interface will trigger readings as quickly as possible once the previous reading completes. When navigating the UI, there may be a slight delay before triggering the next measurement. This occurs most often when navigating to a view that includes the graph. The graph requires processing of potentially large amounts of data and can cause a small delay initiating the next measurement.

This delay is most apparent if you view the graph and zoom in very closely on the data. The timestamps also will show a discontinuity (on the order of tens of milliseconds typically).

Workaround:

One workaround is to use a large measure count. All readings in the burst performed for the measure count will not be affected by any delays caused by UI interactions.

Another workaround is to use the trigger model. The trigger model executes more closely to hardware for optimal performance.

Setting the x-axis scaling to "All" also worsens the issue. Using another scaling method reduces the impact.

PR55735 UI responsiveness may suffer when graphing multiple traces at once with x-scaling set to "All"

Models affected:

DMM7510 (all variations)

Symptom:

Store data into 2 different buffers. Navigate to the graph and enable both buffers so both can be viewed on the graph. Set the x-axis scaling to "All". Continue to acquire data in one of the buffers and allow it to wrap. The graph will update the scale each time new measurements come in. The excessively frequent updates will slow down responsiveness of the UI.

Workaround:

Select another scaling method other than "All".

You can also avoid this problem if you graph the signals separately.

PR55725 Histogram axis labels show more resolution than necessary.

Models affected:

DMM7510 (all variations)

Symptom:

The axis at the bottom of the histogram may show more significant digits than are appropriate.

Workaround:

There is no workaround for this issue.

PR55782 Once a continuous buffer wraps, READ? always returns the same last value in the buffer.

Models affected:

DMM7510 (all variations)

Symptom:

Create a buffer with fill mode set to continuous. Fill the buffer beyond 100% of its capacity so that it begins to wrap. If you issue a READ? query, it will always give you the same measurement at the end of the buffer. It should give you the latest measurement.

Workaround:

This issue does not exist if the buffer fill mode is set to Once. It also does not exist with Continuous buffers until the buffer wraps. If you need to work with a continuous buffer that is wrapping, the following commands can be used instead of READ to query the latest data.

	SCPI	TSP
Get index of latest measurement	TRACe:ACTual:END? "bufferName"	bufferVar.endindex
Query value from buffer at specific index	:TRACe:DATA? <startIndex>, <endIndex>,"<bufferName>"	printbuffer(startIndex, endIndex, bufferVar)

PR55702 TSP-Link does not support programming an infinite count value

Models affected:

DMM7510 (all variations)

Symptom:

Use TSP-Link to create a trigger model on a remote node. If you try to set a digitize or measure block to make infinite measurements using the `trigger.COUNT_INFINITE` option, it will generate a TSP link error:

Workaround:

Replace `trigger.COUNT_INFINITE` with `4294967295`. This is the unsigned equivalent to -1 which is what is trying to be sent unsuccessfully.

PR54696 Web page virtual front panel stops updating after long periods left viewing a live graph

Models affected:

DMM7510 (all variations)

Symptom:

Configure your instrument to make measurements continuously and navigate to the graph screen. Meanwhile, launch the instrument webpage and view the virtual front panel. If you leave the virtual front panel connected for longer than an hour, the web page image may freeze. Once it freezes, the virtual front panel will no longer display the screen image until the instrument is rebooted. The

instrument UI will continue to work correctly, as will all other instrument functionality. Only the virtual front panel is affected.

Resolution:

Once the problem is encountered, the only workaround is to reboot the instrument. Try to avoid leaving the virtual front panel connected for long periods on the graph screen while it is continuously being updated with high speed measurements.

PR54610 TSP-Linked networks cannot support transferring data to the master in real time at high speeds

Models affected:

DMM7510

Symptom:

Setup a TSP network and configure a slave instrument to digitize measurements at high speeds (for example, 1 million readings/second). Attempting to transfer data across the TSP bus in real time at high speeds will cause bus errors. This may manifest as either of the following errors being reported.

```
"Error 1211: Node N is inaccessible"
```

```
"-1073807305, Device reported an input protocol error during transfer."
```

Resolution:

Transfer data after the measurement acquisition completes.

To avoid accidentally configuring a real time transfer, specify the node prefix when entering the buffer to store measurements. A slave should store high speed digitizer data in `node[N].defbuffer1` instead of `defbuffer1` when executing scripts on the master. If the `node[N]` prefix is missing, it will attempt to store data in the master node's buffer, which will require measurements to be transferred at acquisition speeds and will overrun the bus.

Version 1.0.0h Release

Overview

Version 1.0.0h is the initial production release for the Model DMM7510. Known Issues, Usage Notes, and Enhancements are listed in the following pages of this document.

Compatibility concerns

PR54340 LoopUntilEvent and the Graph screen's "Trigger" tab may not remember triggers by default in future firmware releases.

Models affected:

DMM7510

Concern:

The LoopUntilEvent trigger model template defaults to never clear observed events (see description in "Known Issues" section). This is the only option available in 1.0.0h firmware and is therefore the default. In future firmware versions, support will be added to clear events on entry of the wait block. This will become the new default selection.

The Graph's "Trigger" tab uses the LoopUntilEvent template. Future firmware will add a new option to clear event on entry or never. The default will be "on entry" which differs from 1.0.0h firmware since it only supports "never" implicitly.

Recommendation:

If using this command, specify the fourth parameter to indicate the delay (normally optional and 0 when not specified). This will ensure that future firmware retains the existing default for clear behavior.

```
trigger.model.load("LoopUntilEvent", <event_number>, <percent>, [<delay>],  
[<reading buffer>], [<reading block>])
```

If possible, adopt the new command arguments once available in a future firmware release. The older argument list above will still be accepted for legacy support.

Critical Fixes

N/A

Enhancements

PR55094 Command needed for earliest point in a continuous (circular) buffer

Models affected:

DMM7510 (all variations)

Symptom:

When working with continuous buffers, indexing the first measurement will not necessarily give you the oldest one when the buffer starts to wrap around. This is due to data being written to a continuous buffer in a circular fashion where it continues to overwrite the oldest data after it fills. Unless you know how many measurements were taken, it can be unclear how to index the oldest measurement.

Workaround:

New start and end properties were added to buffers. They return the index to the earliest and latest point in the buffer. These will be documented in a future update to the manual.

	SCPI	TSP
Index of earliest measurement	TRACeACTual:START? <optional buffer name as string>	bufferVar.startindex
Index of latest measurement	TRACeACTual:END? <optional buffer name as string>	bufferVar.endindex

For the SCPI command, if no buffer name is provided, it will default to “defbuffer1”.

Example: You can print the measurements in a buffer (b) in chronological order as follows. This should not be attempted while the buffer is being filled since it is then chasing a moving target.

```
b = buffer.make(1000)

-- Placeholder: Assume you take many measurements here to fill buffer b

printbuffer(b.startindex, b.capacity, b)
printbuffer(1, b.endindex, b)
```

PR55234 It may be easy to forget to delete autoexec script after a system reset

Models affected:

DMM7510 (all variations)

Symptom:

Create a config script and make it run at power up (Copy to Power Up). This makes a copy of it as the “autoexec” script which runs each time the instrument powers up. If you later perform a System Reset, this will not delete the “autoexec” script causing the instrument to revert back to custom settings after a power cycle.

Similarly deleting the original script will not delete the “autoexec” script. A copy gets made when you select the option to run a script at power up.

Workaround:

Delete the “autoexec” script. Clarity will be added to a future version of the manual.

Noncritical Fixes

N/A

Known issues

PR55094 Compact buffers do not support negative measurements

Models affected:

DMM7510 (all variations)

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.

PR54340 LoopUntilEvent and the Graph screen’s “Trigger” tab remember triggers by default

Models affected:

DMM7510 (all variations)

Symptom:

If you use the “LoopUntilEvent” Trigger Model template or the Graph’s Trigger tab (Menu > Graph > Trigger tab), trigger events that occur during execution of other trigger model blocks will be remembered. This will cause the trigger model’s “Wait” block to advance and finish taking measurements when it is later reached.

No count is maintained for multiple triggers. The instrument latches only one trigger event and clears it when the Wait block advances.

Example: Configure LoopUntilEvent to wait for a digital input line. When the digital input is pulsed, it will advance the trigger model. If a second pulse occurs (even while the instrument trigger model is executing other blocks), the instrument will latch its occurrence. The next time the event is waited on, it will fire immediately.

Workaround:

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

A future firmware version will involve adding an optional parameter to the Wait block to clear previously seen events on entry. Clearing “on entry” will become the new default. Never clearing will still be supported by a future setting that will be added.

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

Models affected:

DMM7510 (all variations)

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:

DMM7510 (all variations)

Symptom:

Use the [SENSe[1]]:<function>.THRShold: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:

DMM7510 (all variations)

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:

DMM7510 (all variations)

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:

DMM7510 (all variations)

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:

DMM7510 (all variations)

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:

DMM7510 (all variations)

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, UI graph occasionally appears to be missing digitizer data
PR54934

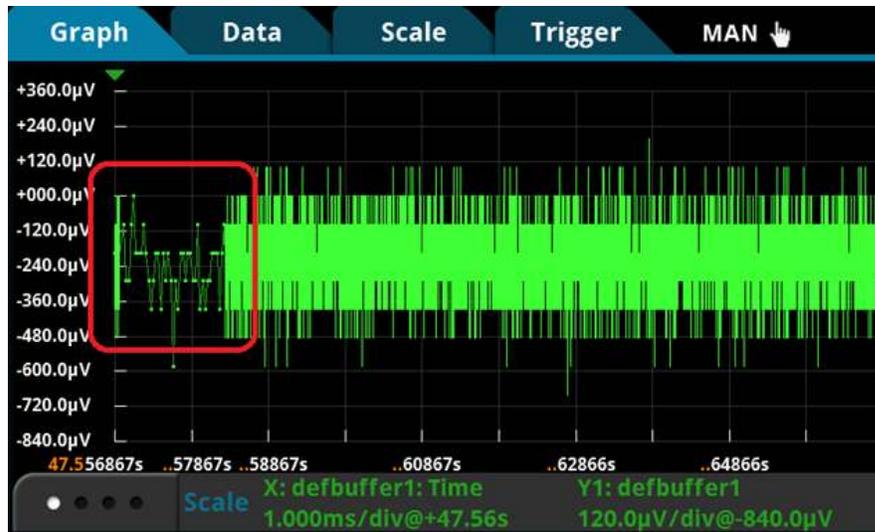
Models affected:

DMM7510 (all variations)

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:

DMM7510 (all variations)

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:

DMM7510 (all variations)

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:

DMM7510 (all variations)

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:

DMM7510 (all variations)

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.

PR54696 Web page virtual front panel stops updating after long periods of viewing a live graph

Models affected:

DMM7510 (all variations)

Symptom:

Configure your instrument to take measurements continuously and navigate to the graph screen. Meanwhile launch the instrument webpage and view the virtual front panel. If you leave the virtual front panel connected for longer than an hour, the web page image may freeze. Once it freezes, the virtual front panel will no longer display the screen image until rebooted. The instrument UI will continue to work correctly as will all other instrument functionality. Only the virtual front panel is affected.

Workaround:

Once the problem is encountered, the only workaround is to reboot the instrument. Try to avoid leaving the virtual front panel connected for long periods on the graph screen while it is continuously being updated with high speed measurements.

PR54610 TSP-Linked networks cannot support transferring data back to the master in real time at high speeds

Models affected:

DMM7510 (all variations)

Symptom:

Set up a TSP network and configure a slave instrument to digitize measurements at high speeds (for example, 1 million readings/second). Attempting to transfer data across the TSP bus in real time at high speeds will cause bus errors. This may manifest as either of the following errors being reported.

"Error 1211: Node *N* is inaccessible"

"-1073807305, Device reported an input protocol error during transfer."

Workaround:

Transfer data after the measurement acquisition completes.

To avoid accidentally configuring a real time transfer, specify the node prefix when entering the buffer to store measurements. A slave should store high speed digitizer data in "node[N].defbuffer1" instead of "defbuffer1" when executing scripts on the master. If the node[N] prefix is left off, it will attempt to store data in the master node's buffer which will require measurements to be transferred at acquisition speeds and will overrun the bus.

PR48636 DMM7510 writes to a USB Flash drive file that is read only

Models affected:

DMM7510 (all variations), 2450, 2460

Symptom:

The DMM7510 will write over read-only files on flash drives. For example, if the DMM7510 attempts to write to file aaa.txt that is marked read-only, the DMM7510 will rewrite file aaa.txt without warning. This problem does NOT suggest the DMM7510 randomly overwrites arbitrary files on a flash drive.

Workaround:

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