



# Model 2460 System SourceMeter®

## Version v1.3.0s Firmware Release Notes

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## General Information

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### Supported models

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

2460, 2460-NFP, 2460-RACK, 2460-NFP-RACK

### Firmware Upgrade/Downgrade 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_2460_v1_3_0s.upg`.
2. Verify that the upgrade file is in the root subdirectory of the flash drive and that it is the **ONLY** firmware upgrade file in that location. 2460 firmware files end with the file extension `.upg`.  
(example: `H:\ki_2460_v1_3_0s.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 the type of upgrade you want to do:  
To upgrade to a newer version of firmware: Select **Upgrade to New**.  
To force downgrading to an older version of firmware: Select **Downgrade to Older**.
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 7 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 2460 Interactive SourceMeter® Instrument Reference Manual (document number: 2460-901-01). This manual is available online at <http://www.keithley.com/support>, Search for “2460 Reference Manual”.

### Upgrade considerations for the Model 2460

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 **2460**.
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 v1.3.0s Release

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### Overview

Version 1.3.0s is the third official firmware release for the Model 2460. Known Issues, Usage Notes, and Upcoming Enhancements are listed below in this document.

[RELEASED 10-JUN-2015](#)

### Compatibility concerns

N/A

### Critical Fixes

PR55188 **Models affected:**  
AR42592 All 2460 models

**Symptom:**

:READ? Query always returns the last reading at the end of the continuous buffer.  
For example, if a basic measurement is set up to defbuffer1 (size 10000) and then takes 11000 readings, the last 1000 readings will all return the same value. This should act as a circular buffer.

**Resolution:**

This issue has been corrected.

PR55433 **Models affected:**  
AR42690 All 2460 models

**Symptom:**

2460 locks up when programming a certain voltage step.  
When programming a voltage step from 1V to 5V in 1V increments and the performance is set to 1700 readings per second, after pressing the TRIGGER button and waiting for approximately one minute, the instrument begins to slow down and eventually locks up.

**Resolution:**

This issue has been corrected.

PR55600 \*TRG command trigger source does not work in SCPI mode trigger model.

**Models affected:**  
All 2450 models

**Symptom:**

Using a trigger model .wait block with the command event in SCPI does not work when \*TRG is sent. Instead, it generates the following error ==> Error 2713 - "No trigger model engine available".

**Resolution:**

This issue has been resolved. Now, the \*TRG command will satisfy the wait block when sent if waiting for a command event.

PR55749 Reads overflow instead of the compliance current on the 100uA range and below

**Models affected:**

All 2460 models

**Symptom:**

Under a very specific sequence of events, the front panel of the 2460 will report OVERFLOW on the 100uA and lower ranges.

**Resolution:**

This issue has been corrected.

PR55867 1uA Current Source error when using Config List  
AR43082

**Models affected:**

All 2460 models

**Symptom:**

Under a very specific sequence of events, setting the Source Config List source value to 1.0uA will revert to 0uA after pressing the Trigger button on the front panel.

**Resolution:**

This issue has been corrected.

PR56135 QuickSet Performance Setting does not work on fastest setting  
AR50078

**Models affected:**

All 2460 models

**Symptom:**

On the QuickSet Menu, when editing the Performance Slide bar, if you choose the fastest speed, the dial indicates a speed of ~1700/sec. However, the actual speed is only 10/sec no matter how much the other settings are optimized. The only way to achieve this speed is to create a simple trigger model configuration that sources, measures, and loops back continuously, then manually set NPLC to .01, turn auto ranging for source and measure off, and set source delay to 0.

**Resolution:**

This issue has been corrected and the Performance Slide bar works correctly for all settings.

## Enhancements

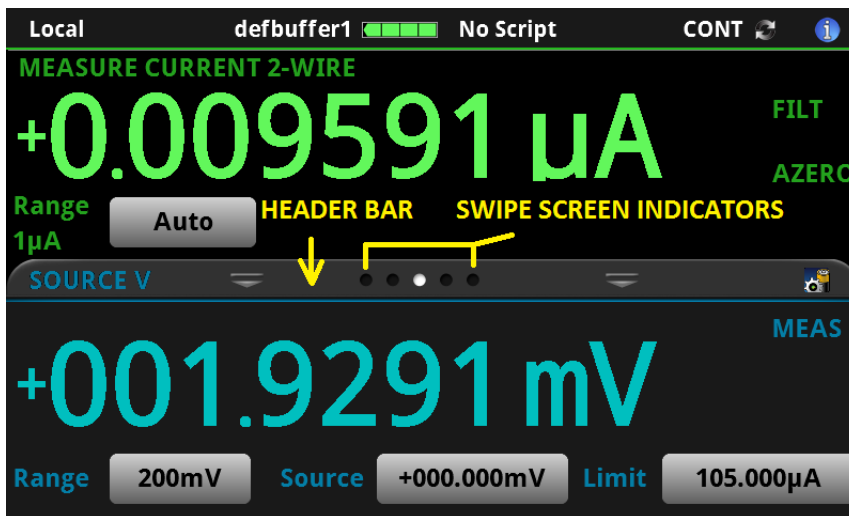
### GENERAL Models affected:

All 2460 models

### Enhancement:

A number of improvements have been made to the overall Graphical User Interface as follows:

1. Screen Colors: All screen colors have been modified for better contrast and easier readability.
2. Pinch-to-Zoom Performance: Throughout the user interface, the “Pinch-to-zoom” touch screen motion has been improved and is more responsive.
3. Improve Swiping:
  - a. The swipe user interface gesturing has been dramatically improved and is more responsive.
  - b. Added Vertical Swiping in various screens in the GUI.
  - c. Horizontal swiping has been made more smooth and is consistent with Vertical Swiping.
  - d. “Fling” swiping has been implemented where faster swiping actions result in rapid scrolling followed by decay based on the velocity of the “fling.”
  - e. Swipe Down on the Home screen will display larger readings.
4. Tabs and Buttons: Throughout the user interface multiple data display options have been made available through tabs (header bars) with swipe screen indicators to show how many different display options are available and which display tab is active.



5. Graphing:
  - a. New Auto Scale Options (X-Axis) → Track Latest, Track Group
  - b. New Auto Scale Options (Y-Axis) → y-swim lanes, y-shared, y-per trace
  - c. Multi-Trace Line Plots
  - d. Multi-Trace Scatter Plots
  - e. Various refresh and performance improvements

6. Histogram:
  - a. New Auto-Scale, Auto-Bin, and Fit
  - b. Smartscale choose best scaling option
  - c. Various refresh and performance improvements
7. TTI Synchronization: All Touch, Test, Invent® Keithley Models including the 2450, 2460, and 7510 have been carefully updated so that they are all consistent in look, feel, and general navigation.
8. Updated Reading Table: Added new reading table features and a new Reading Preview Graph. Please see the Reference Manual for further details.

Buffer Index	Time	Reading	Source
78824	06/10 07:16:22.174568	+0.009484 $\mu$ A	+001.9090 mV
78825	06/10 07:16:22.845109	+0.009590 $\mu$ A	+001.9310 mV
78826	06/10 07:16:23.515734	+0.009564 $\mu$ A	+001.9228 mV
78827	06/10 07:16:24.186322	+0.009647 $\mu$ A	+001.9427 mV
78828	06/10 07:16:24.856892	+0.009639 $\mu$ A	+001.9420 mV
78829	06/10 07:16:25.527470	+0.009541 $\mu$ A	+001.9195 mV
78830	06/10 07:16:26.198087	+0.009517 $\mu$ A	+001.9151 mV
78831	06/10 07:16:26.868617	+0.009631 $\mu$ A	+001.9391 mV
78832	06/10 07:16:27.539214	+0.009617 $\mu$ A	+001.9381 mV
78833	06/10 07:16:28.209799	+0.009630 $\mu$ A	+001.9398 mV

**PR56127 Models affected:**

All 2460 models

**Enhancement:**

Add an API command to mark the start of a group for writable buffers.

A status optional parameter has been added to the following TSP and SCPI commands:

SCPI

```
TRACe:WRITe:READIng <standard writable reading buffer>, <reading value>,
[<time sec>, <time nsec>,<status>]]
```

```
TRACe:WRITe:READIng <full writable reading buffer>, <reading value>,
<extra value>, [<time sec>, <time nsec>,<status>]]
```

TSP

```
buffer.write.reading(<standard writable reading buffer>, <reading value>,
[<time sec>, <time nsec>], [<status>])
```

```
buffer.write.reading(<full writable reading buffer>, <reading value>,
<extra value>, [<time sec>, <time nsec>], [<status>])
```

The optional status parameter indicates if the reading being added is start of group for plotting on the graph. The default is 0. Set this to 0 if not start of group or set to 256 if start of group. This parameter only accepts 0 or 256 - any other value generates an error

For TSP, `buffer.STAT_START_GROUP` can be used to set it. You would set status to 256 to help graph a family of curve traces on the graph.

**PR53815 Models affected:**

All 2450 models

**Enhancement:**

Add a `:TRIGger:LOAD` command that takes a template name as a first argument

Old Command

```
:TRIGger:LOAD:EMPTY
:TRIGger:LOAD:CONFIguration:LIST
:TRIGger:LOAD:TRIGger:EXtErnal
:TRIGger:LOAD:LOOP:SIMPlE
:TRIGger:LOAD:LOOP:DURation
<not present>
<not present>
<not present>
```

New Command

```
:TRIGger:LOAD "Empty"
:TRIGger:LOAD "ConfigList", <parameter list as before>
:TRIGger:LOAD "LogicTrigger", <parameter list as before>
:TRIGger:LOAD "SimpleLoop", <parameter list as before>
:TRIGger:LOAD "DurationLoop", <parameter list as before>
:TRIGger:LOAD "LoopUntilEvent", <parameter list as before>
:TRIGger:LOAD "GradeBinning", <parameter list as before>
:TRIGger:LOAD "SortBinning", <parameter list as before>
```

Example:

before:

```
:TRIGger:LOAD:LOOP:DURation <duration>, <delay>, "<reading buffer>"
```

after:

```
:TRIGger:LOAD <duration>. <delay>, "<readingBuffer>"
```

Usage Notes:

- o The template name is not case-sensitive
- o The template name needs to be in quotes
- o This makes the SCPI command more like the TSP equivalent `trigger.model.load()` command
- o See the Reference Manual for more details

**AR42567 Models affected:**

PR55190 All 2460 models

**Enhancement:**

Add a direct shortcut from the HOME view measurement line to the measurement settings menu.

A shortcut icon has been added to the swipe bar on the HOME source/measurement tab.





## Noncritical Fixes

N/A

## Known issues

PR49308 `Trigger.BLOCK_BRANCH_COUNTER` loop without a measure or delay block causes hang.  
SCPI: `:TRIGger:BLOCK:BRANch:COUNTER`  
TSP: `trigger.model.setblock()` with `trigger.BLOCK_BRANCH_COUNTER`

**Models affected:**

2460

**Symptom:**

When running a tight trigger loop without a measurement or delay in the sequence, the 2460 will be unresponsive until the loop ends.

**Workaround:** Simply add any measurement or short delay in the trigger loop and the 2460 will perform normally. A future firmware release will work around this problem automatically.

## Version v1.1.0c Release

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### Overview

Version 1.1.0c is the second official firmware upgrade release for the Model 2460. Known Issues, Usage Notes, and Upcoming Enhancements are listed below in this document.

[RELEASED 4-FEB-2015](#)

### Compatibility concerns

N/A

### Critical Fixes

PR53544 **Models affected:**  
AR41757 All 2460 models

#### Symptom:

2460 sinks wrong current value after range change.

In certain cases when the 2460 is connected to a power supply AND the power supply is sourcing positive voltage and the 2460 is sinking current, the 2460 will occasionally sink the wrong current value. This error happens only when changing to/from the 1A range AND the source level is a very small value.

#### Resolution:

This issue has been corrected.

PR54745 **Models affected:**  
AR42806 All 2460 models

#### Symptom:

Problem with source read back with voltages less than 1 (rounding problem).

When the source read back is turned off, the programmed voltages should be returned. However, when the programmed values are less than 1V, incorrect values are returned. This is due to a floating point rounding problem. The numbers will appear correct in the data sheet, however, the numbers returned via the bus are incorrect.

#### Resolution:

This issue has been corrected.

PR54626 **Models affected:**  
All 2460 models

#### Symptom:

Hardware in wrong state after setting auto-range low.

Changing the measure low range setting (used for auto-range) could result in incorrect operation if the new range is higher than the active measure range.

#### Resolution:

This issue has been corrected.

## **Enhancements**

No notable enhancements for this release.

## Noncritical Fixes

**PR53474 Models affected:**

All 2460 models

**Symptom:**

In some cases, the display will show XXX's in the measure area of the display. When the source function is Resistance and Measure offset compensation is on, the display will sometimes display XXX.

**Resolution:**

This issue has been corrected.

**PR54455 Models affected:**

All 2460 models

**Symptom:**

Under very rare conditions, the Ohm symbol on the display will get cut off.

**Resolution:**

This cosmetic issue has been corrected.

**PR54941 Models affected:**

All 2460 models

**Symptom:**

Certain \*.tsp file names cannot be processed on the "Scripts→Manage" menu. Trying to access a 32 character (or longer) script name from a flash drive on the front panel generates an error when trying to move or run the script file.

**Resolution:**

This issue has been corrected. The 32 character limit is now better enforced.

## Known issues

PR48636 Model 2460 does not respect a USB Flash drive that is read only.

[REPAIRED in v1.3.0s](#)

**Models affected:**

2460

**Symptom:**

The 2460 will write over read-only files on flash drives. Specifically, if the 2460 attempts to write to file aaa.txt and aaa.txt is marked read-only, the 2460 will rewrite file aaa.txt without warning. This problem does NOT suggest the 2460 randomly overwrites arbitrary files on a flash drive.

**Workaround:**

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

PR49308 `Trigger.BLOCK_BRANCH_COUNTER` loop without a measure or delay block causes hang.

SCPI: `:TRIGger:BLOCK:BRANCh:COUNter`

TSP: `trigger.model.setblock()` with `trigger.BLOCK_BRANCH_COUNTER`

**Models affected:**

2460

**Symptom:**

When running a tight trigger loop without a measurement or delay in the sequence, the 2460 will be unresponsive until the loop ends.

**Workaround:** Simply add any measurement or short delay in the trigger loop and the 2460 will perform normally. A future firmware release will work around this problem automatically.

PR55364 When executing the Resistor Demo immediately after the LED Demo, the Demo gets stuck.

[REPAIRED in v1.1.0c](#)

**Models affected:**

2460

**Symptom:**

When executing the Resistor Demo immediately after the LED Demo, the Demo will appear to be stuck and will not execute.

**Workaround:**

If this problem occurs, simply navigate to the Data tab of the Graph view and clear the default buffer (`defbuffer1`). The test will then continue as expected. This issue will be repaired in the next firmware release.

## Version v1.0.0f Release

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### Overview

Version 1.0.0f is the initial firmware release for the Model 2460. 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.  
[RELEASED 10-OCT-2014](#)

### Compatibility concerns

N/A

### Critical fixes

N/A

### Enhancements

N/A

### Noncritical fixes

N/A

### Known issues

N/A