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## General Information

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### Supported models

This firmware is used on the following Keithley Instruments products: Model 2701.

### Installation instructions

Use Keithley Flash Wizard version C09 or later to upgrade the Model 2701. If necessary, contact the Keithley Instruments applications department to get this program and Model 2701 instrument firmware.

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## D05 Release

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### Overview

The Model 2701 firmware version D05 corrected an error which prevented operation of the save/recall setup memory.

### Critical fixes

PR 44504

**Symptom:**

Recalling a saved user setup results in -314 “save/recall memory error”

**Resolution:**

The issue has been resolved

## Non-critical fixes

There are no non-critical fixes in firmware version D05.

## Enhancements

There are no enhancements in firmware version D05.

## D04 Release

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### Overview

The Model 2701 firmware version D04 corrected an error which could lead to loss of the MAC address.

### Critical fixes

PR 42593

**Symptom:**

Some units may lose MAC address information.

**Resolution:**

The issue has been resolved.

## D03 Release

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### Overview

The Model 2701 firmware version D03 corrected an error which prevented saving user setups properly.

### Critical fixes

PR42454

**Symptom:**

Error -314 appears when user setups are saved.

**Resolution:**

Firmware version D03 corrects this problem.

### Non-critical fixes

There are no non-critical fixes in the Model 2701 firmware version D03 release.

### Enhancements

There are no enhancements in the Model 2701 firmware version D03 release.

## D02 Release

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### Overview

The Model 2701 firmware version D02 improves the operation of the instrument when it is attached to a local area network (LAN).

### Critical fixes

**PR42039 Symptom:**

Occasionally, the instrument does not respond with the first requested reading taken after switching from DCV to ACV, frequency, or period measurement functions.

**Resolution:**

Firmware version D02 corrects this problem.

### Enhancements

**PR41206 Symptom:**

If an inaccessible computer leaves a socket connection open, the only way to close the socket and reconnect to the Model 2701 is to turn the instrument power off, and then turn it on again.

**Resolution:**

A new command was added (`:SYSTem:ETHernet:SOCKET:CLOSE`) to close the primary socket using a secondary connection on port 2842. This command can only be sent over port 2842. It will close any socket currently open on port 1394.

### Non-critical fixes

There are no non-critical fixes in the Model 2701 firmware version D02 release.

## D01 Release

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### Overview

The Model 2701 firmware version D01 release added support for new local area network (LAN) communication hardware.

### Critical fixes

There are no critical fixes in the Model 2701 firmware version D01 release.

### Enhancements

The instrument-hosted web page is faster to download and is now compatible with modern web browsers including Microsoft® Internet Explorer®, Mozilla® Firefox®, Opera™, and Google Chrome™. The web page also has a separate password to control access to the web page, which is now separate from the system password. The new password can be set and controlled from the web page.

### Non-critical fixes

There are no non-critical fixes in the Model 2701 firmware version D01 release.

## C01 Release

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### Overview

The Model 2701 firmware version C01 release added support for new flash memory.

### Critical fixes

There are no critical fixes in the Model 2701 firmware version C01 release.

### Enhancements

#### PR41343 Enhancement:

Release new firmware required to support flash upgrades for the new flash memory device. This firmware also prevents downgrades to a version that cannot support a newer flash part.

### Non-critical fixes

There are no non-critical fixes in the Model 2701 firmware version C01 release.

## B03 Release

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### Overview

The Model 2701 firmware version B03 release addressed an FRAM timing problem that can lead to lost settings.

### Critical fixes

#### PR39045 Symptom:

Information such as communication settings, MAC address, serial numbers, and so on are lost from nonvolatile memory.

#### Resolution:

This firmware revision corrects this problem; however, you will need to reprogram the lost settings (you may need assistance from Keithley applications or repair personnel).

### Enhancements

There are no enhancements in the Model 2701 firmware version B03 release.

### Non-critical fixes

There are no non-critical fixes in the Model 2701 firmware version B03 release.

## B02 Release

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### Overview

The Model 2701 firmware version B02 release addressed an Ethernet connection failure seen on some units. To eliminate the connection failure, you must also make a hardware modification, or the correction will not be implemented.

## Critical fixes

### PR38977 **Symptom:**

Some units power up with the Ethernet interface not responding.

### **Resolution:**

Return the instrument to Keithley for firmware upgrade and hardware modification.

## Enhancements

There are no enhancements in the Model 2701 firmware version B02 release.

## Non-critical fixes

There are no non-critical fixes in the Model 2701 firmware version B02 release.

## B01 Release

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### Overview

The Model 2701 firmware version B01 release was necessary to support hardware changes in the Model 2701, and is backward-compatible with older hardware.

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**CAUTION** *Do not downgrade from versions B01 or later because the Ethernet connection may not work (depending upon what hardware you downgrade).*

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No enhancements or bug fixes were made in Model 2701 firmware version B01.

## A09 Release

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### Overview

This upgrade to Model 2701 firmware version A09 is available if you wish to have the latest firmware enhancements and upgrades installed on your instrument. Upgrade to version A09 as needed to address the specific problems listed in the non-critical fixes section.

### Upgrade considerations for the Model 2701

Determine the firmware revision of your instrument using front panel or bus operation:

**From the front panel:** The firmware revision is briefly displayed when you turn the instrument power on; the display indicators will illuminate for a few seconds. After that, the firmware revision will be briefly displayed as follows:

```
REV: yyy zzz
```

Where:

*yyy* is the mainframe revision (for example, A09 of the Model 2701).

*zzz* is the display board firmware revision (for example, A01), which does not apply to this upgrade.

**From a remote interface:** Use the \*IDN? query command. After sending the \*IDN? command and addressing the instrument to talk, the following response message is sent to the computer:

```
KEITHLEY INSTRUMENTS INC., MODEL www,xxxxxxx,yyy/zzz
```

Where:

www is the mainframe model (2701).  
 xxxxxxx is the serial number of the mainframe.  
 yy is the firmware revision of the mainframe.  
 zzz is the display board firmware revision

The following table outlines the considerations that should be made when deciding to upgrade to this version from any previous version..

Upgrade consideration		From A09	From A08	From A07	From A06
Recalibration required		No	No	No	Yes

### Installation instructions

The minimum system requirements to perform the ROM upgrade:

- Pentium-class PC running Windows 95 or later.
- Either IEEE-488 interface or a RS-232 communication port
  - If using the IEEE-488 interface: Flash software supports either Capital Equipment Corporation (CEC) or National Instruments (NI) IEEE-488.2 interfaces. Also requires a standard GPIB cable
  - If using the RS-232 interface: use an RS-232C cable to connect the communications port to the Model 2701. NOTE: With RS-232, upgrade takes approximately 20 minutes.

### ROM upgrade procedure:

1. From Microsoft® Windows®, click **Start > Settings > Control Panel > Add/Remove Programs**, and then remove any Model 2701 ROM upgrades (if previously installed).

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**NOTE** All saved scan lists, setups, and buffer readings will be lost with this upgrade.

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2. Download the Model 2701 firmware version A09 `upgrade.exe` file from the Keithley Instruments website ([www.keithley.com](http://www.keithley.com)) to a temporary directory on your computer.
3. From Microsoft Windows, click **Start > Run**, and then click the **Browse** button.
4. Navigate to the temporary directory and select the Model 2701 firmware version A09 `upgrade.exe` file. This should return you to the Run dialog box.
5. Click **OK** to run the WinZip® Self-Extractor. Specify a temporary directory to unzip the install files to and click **Unzip**. When the unzip operation has finished, click **OK** and then **Close**.
6. From Microsoft Windows, click **Start > Run**.
7. Click the **Browse** button and navigate to the temporary directory where you unzipped the files, and then select the `setup.exe` file. This should return you to the Run dialog box.
8. Click **OK** to run the setup and follow all prompted instructions.
9. From Microsoft Windows, click **Start > Programs > Keithley Instruments > Model 2701 Flash Upgrade vA09** and follow all prompted instructions.
10. Determine the firmware revision of your mainframe to verify correct installation (see [Upgrade considerations for the Model 2701](#) for instructions).

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**NOTE** Error +516, "Battery Backed Memory Lost" will be displayed after the first power cycle after upgrade.

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### Critical fixes

There are no critical fixes in the Model 2701 firmware version A09 release.

## Enhancements

There are no enhancements in the Model 2701 firmware version A09 release.

## Non-critical fixes

**PR26332 Symptom:**

Units are displayed incorrectly when scanning using user-defined units with MX + B.

**Resolution:**

This has been corrected in Model 2701 firmware version A09.

**PR26465 Symptom:**

The SRQ does not occur to indicate the buffer is full. The fixed buffer overflow status bit is not reported correctly when using the "always" buffer.

**Resolution:**

The buffer overflow status bit now correctly reports the buffer status in Model 2701 firmware version A09.

**PR24600 Symptom:**

Missing data occurs when a unit is configured to power up in a user save setup and unit was flash upgraded. The user save setup is not preserved after a flash upgrade.

**Resolution:**

Default after flash upgrade is :SYST:PRES in Model 2701 firmware version A09

## A08 Release

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### Critical fixes

**PR26346 Symptom:**

The unit will become unresponsive instead of having the buffer wrap properly when using monitor channel in the infinite scan mode and querying the buffer with the :TRACe:NEXT? command.

**Resolution:**

This has been corrected in Model 2701 firmware version A08.

**PR26344 Symptom:**

Unit sometimes becomes unresponsive when scanning one channel for multiple temperature or DC volts readings.

**Resolution:**

This has been corrected in Model 2701 firmware version A08.

## Enhancements

There are no enhancements in the Model 2701 firmware version A08 release.



## Non-critical fixes

### PR24937 **Symptom:**

The `Trace:Data?` command always brings back data from the entire buffer rather than the data from the last `Trace:Data?` command. It retrieves data from buffer location 0 to the last reading taken.

### **Resolution:**

This has been corrected in Model 2701 firmware version A08. The `Trac:Data?` command is designed to only bring back data that has not been downloaded before while the instrument is still taking data.

### PR26341 **Symptom:**

The unit does not return the correct timestamp format. When using the `READ?` command or the scratch buffer is configured for a real time clock, the clock data will return `0.000`, or relative clock information. Setting the trace buffer for the real-time clock, then using the scratch buffer returns the real-time clock information from the scratch buffer.

This remains true until the instrument power is turned off and then on again. Then, only the relative clock information is returned until the trace buffer is configured for the real-time clock again.

### **Resolution:**

This has been corrected in Model 2701 firmware version A08.

### PR26203 **Symptom:**

When operating from the front panel, the exiting ratio generates a “`lockup 01`” error.

### **Resolution:**

This has been corrected in Model 2701 firmware version A08.

### PR26350 **Symptom:**

Ratio mode does not use the 1 V range. It jumps from the 100 mV range to the 10 V range, losing resolution.

### **Resolution:**

Corrected the display formatting so that ratio and MX + B readings between 1.0 and 10.0 are no longer displayed on the 10 V range. This has been corrected in Model 2701 firmware version A08.

### PR26353 **Symptom:**

An incorrect range is chosen for Ratio / Channel average when channel average was used between two channels with different ranges.

### **Resolution:**

This has been corrected in Model 2701 firmware version A08.

### PR26465 **Symptom:**

SRQ is not generated for buffer full with a small buffer size. The buffer will not stop if only two points are stored, and the buffer full status bit is not enabled.

### **Resolution:**

This has been corrected in Model 2701 firmware version A08.

**PR26345 Symptom:**

Incorrect 4-wire resistance measurements are performed when closing a channel that is configured for 2-wire measurement, and then changing the function to 4-wire resistance. Failure occurs only if Channel Autoconfigure is enabled. Unit operates correctly if changed from 4-wire to 2-wire on a closed channel. Also operates correctly if the measurement is configured for 4-wire in the scan list and a scanning operation is performed. Incorrect pairing of sense channels only occurs when "parked" on a closed channel, the autoconfigure feature is enabled, and the configuration is changed from 2-wire to 4-wire resistance measurement.

**Resolution:**

This has been corrected in Model 2701 firmware version A08.

**PR24936 Symptom:**

When connected to a corporate network with many broadcast packets, the Model 2701 could take a long time to give a reply, or may not reply at all. Sometimes it will provide only a partial response, causing query interrupted errors. Cannot re-establish communication without turning the instrument power off, then on again.

**Resolution:**

This has been corrected in Model 2701 firmware version A08.

**PR24338 Symptom:**

**PR27997**

When doing a scan, the units viewed through RECALL were not correct for MX+B math. Similarly, the units were returned over the bus incorrectly if a READ? query was used to start a scan and return the results.

**Resolution:**

This has been corrected in Model 2701 firmware version A08.

## A07 Release

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### Critical fixes

**PR23805 Symptom:**

A +461 error is generated when following the 10 mV at 1 KHz calibration procedure.

**Resolution:**

This has been corrected in Model 2701 firmware version A07.

**PR24279 Symptom:**

ROUT:CLOS:COUN:INT? and :ROUT:MON:POIN? queries may return MIN, MAX, or DEF (default) values even though the parameter is not supplied. If a previous command or query was sent with the MIN, MAX, or DEF token parameter, then these queries "remember" the parameter from the previous command and give you the corresponding value instead of the actual setting.

**Resolution:**

This has been corrected in Model 2701 firmware version A07.

**PR24126 Symptom:**

Model 2701 will become unresponsive if the temperature transducer is changed with a channel closed. For example, if `:ROUT:CLOS (@104)`, `:SENS:FUNC 'TEMP'`, and `:SENS:TEMP:TRAN FRTD` are sent, the Model 2701 will cease responding.

**Resolution:**

This has been corrected in Model 2701 firmware version A07.

**Enhancements**

PR23325 Prior to Model 2701 firmware version A07, the Model 2701 could return readings with variable bytes. For example: A `READ?` Query could return `-1.49692252E-04` for an on-scale reading and `+9.9E37` for an overflow condition. Overflows are now returned with the same number of bytes (polarity, digits, and exponent) as on-scale readings. For backward compatibility, the enhancement can be implemented by using a mode within the `FORMAT[DATA] <type>[,length]` SCPI commands that selects the fixed byte format for overflow conditions.

**Non-critical fixes**

There are no non-critical fixes implemented in Model 2701 firmware version A07.

**A06 Release**

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**Critical fixes****PR22900 Symptom:**

Using Ethernet serial communication, if the auto zero command is disabled before a read command, the instrument becomes unresponsive.

**Resolution:**

This has been corrected in Model 2701 firmware version A06.

**PR20920 Symptom:**

Auto scan will not properly resume a power-interrupted scan if using trig timer and power is interrupted while waiting for the timer to expire between scans.

**Resolution:**

This has been corrected in Model 2701 firmware version A06.

**PR22841 Symptom:**

When using Ext Triggering on the Model 2701, the instrument becomes unresponsive after a short period of time. The only way to unlock the instrument is to turn the instrument power off and then turn it on again.

Verified on firmware revisions A04 and A05 with an external square wave trigger signal of 600 Hz to 1500 Hz, from power-on reset conditions; external trigger, fixed range, auto zero, limits, filter, trigger delay are off and display on.

**Resolution:**

This has been corrected in Model 2701 firmware version A06.

**PR20742**

**Symptom:**

The `:MEAS:FRES?` query closes the channel out of sequence with the selected function between 2-wire versus 4-wire.

**Resolution:**

This has been corrected in Model 2701 firmware version A06.

**Enhancements**

There are no enhancements implemented in Model 2701 firmware version A06.

**Non-critical fixes**

PR23017 **Symptom:**

The `ROUT:CLOS` command does not work after sending the `ROUT:MULT:OPEN` Command. When closing the same channel after previously opening the channel with a `ROUT:MULTI:OPEN` command, the channel does not actually close. The `ROUT:CLOS` command works appropriately for any other channel (other than the one just reopened). For example, sending the commands will cause this symptom:

```
ROUT:CLOS (@101)
ROUT:MULT:OPEN (@101)
ROUT:CLOS (@101)
```

Channel 101 does not close. But closing any other channel works appropriately.

**Resolution:**

This has been corrected in Model 2701 firmware version A06.

PR22806

PR23110 **Symptom:**

The `SYST:KEY 17` command does not appear to put the unit in local operation because the `TALK`, `LISTN` or the `REM` indicators do not disappear.

**Resolution:**

This has been corrected in Model 2701 firmware version A06.

PR22947 **Symptom:**

The Model 2701 does not pair channels correctly for 4-wire ohms with autoconfig disabled.

**Resolution:**

This has been corrected in Model 2701 firmware version A06.

PR23066 **Symptom:**

An overflow reading error initially occurs, followed by good readings. This symptom was first reported using the `KE2700_READ` command from the IVI driver, which uses the following configuration: Auto zero disabled, auto delay off, and trigger delay set to zero. Symptom occurs in Model 2701 firmware version A05, but not in version A04.

**Resolution:**

This has been corrected in Model 2701 firmware version A06.

PR23145 **Symptom:**

Timestamp can jump by as much as 200 ms in the middle of a scan. For example, a Model 7710 is programmed to scan two voltage channels with both auto zero and display disabled, and a delay of 20 ms. After gathering 202 sample points and waiting for the buffer to fill, review the data's time stamp. It is possible to randomly see a data point that is delayed by about 200 ms.

**Resolution:**

This has been corrected in Model 2701 firmware version A06.

PR21990 **Symptom:**

Channel autoconfigure is disabled with \*RST or SYST: PRES Commands. The \*RST and SYST: PRES commands should not affect the state of the autoconfigure feature.

**Resolution:**

This has been corrected in Model 2701 firmware version A06.