Keysight 53210A 350 MHz RF Counter
Keysight 53220A 350 MHz Universal Frequency Counter/Timer
Keysight 53230A 350 MHz Universal Frequency Counter/Timer

Firmware Update 3.02 Release Notes

The following section contains important information if upgrading from revision 1.05 to 3.02. Changes/enhancements that occurred in 3.02 and all previous revisions are listed. Because of functionality differences between instrument model numbers, not all changes may apply to all models.

Important Information when Upgrading from Revision 1.05 to Revision 3.02

Keysight **53220A** and **53230A** Universal Frequency Counter/Timers with firmware revision **1.05** require a *one-time* **Edge Calibration** when upgrading from 1.05. The Edge Calibration assures the specified measurement accuracy of the counter's time interval measurements: time interval, pulse width, duty cycle, rise/fall time, phase, and single period. No other counter measurement functions are affected.

The Edge Calibration and firmware upgrade **must be performed by a Keysight Service Center.** The Edge Calibration applies only to the **53220A** and **53230A**, and only to those instruments with firmware revision **1.05**. Contact your Keysight Sales Representative or your nearest Keysight Service Center for more information.

Downgrading the Instrument Firmware from Revision 3.02 or 3.01

Firmware downgrades generally are not recommended as fixes provided in later upgrades may be lost. If a downgrade is necessary, the previous firmware release is posted under the 'Previous Versions' tab.

If downgrading to a previous version from 3.01 or from the current 3.02 release, note the following:

Before downgrading, check the firmware revision currently installed (Help – About).

Firmware revision A.03.01-1909.4210-**1.19** and below can be downgraded to the previous (posted) revision (3.00).

Firmware revision A.03.01-1909.4210-**3.15** cannot be downgraded, and future revisions above that (3.02 and greater) can only be downgraded to A.03.01.

Revision 3.02 Changes

1. Resolved a memory leak that over time would cause a "Program Memory Low" message on the counter display. Connecting the counter to a LAN network with the instrument remaining idle for several days

Revision 3.01 Changes

1. Improvements to reduce a memory leak that over time would cause a "Program Memory Low" message on the counter display.

Revision 3.00 Enhancements

1. Beginning with Firmware revision 3.0, Option 150 – Pulse Microwave Measurements (53230A only and used with Option 106 or 115) is now standard. 53230As upgraded to 3.0 without Option 150 previously installed will show the option as 'Included' in the instrument's Help → About window:
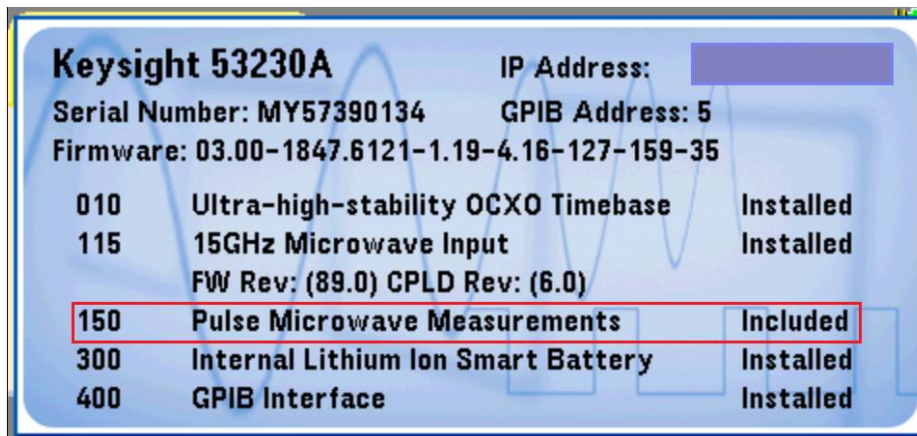
The instrument's response to *OPT? (installed options query) will return '0' for the 'Included' option. 53230As upgraded to 3.0 with Option 150 previously installed will continue to show '150' as "Installed" in the Help → About window. There is no change in functionality.

2. Adds HTML5 emulation for additional instrument control options from the WebUI (user interface) for all 53200A series counters.

Selecting 'Control Instrument' enables selection of the control options:

Revision 3.00 Changes

1. Resolved a defect that when a user-defined power-on state was loaded (recalled), the front panel soft keys associated with the state were not set accordingly.

2. Resolved a defect such that pressing the Time Interval hard key would not turn off math scaling (Math → Null / Scale → Scale) if previously enabled.

3. Resolved a defect that would cause the 'Deg' unit to be truncated during phase measurements.

4. Resolved a defect that when setting math scaling limits the scaling units were not properly displayed.

5. Resolved a defect such that duplicate error messages would occur for a single error event.

6. Resolved a defect that during a NISPOM clear, error -315 "Configuration memory lost; memory corruption detected" could occur intermittently.

7. Resolved a defect that with channel 3 included in the 53220A/53230A 'User-Defined' or 'Last' power-on state, the channel would be changed to channel 1 when any key is pressed.

Revision 2.09 Changes

1. Resolved a defect in which LXI:MDNS:HNAMe:RESolved? returned '00000' rather than the last five digits of the product serial number as part of the MDNS host name (e.g. "K-53230A-<last 5 digits of s/n>".

2. Resolved a defect where if the MDNS service name set by LXI:MDNS:SNAMe:DESired was 63 characters, the full name would not be returned when queried by LXI:MDNS:SNAMe:DESired? Or LXI:MDNS:SNAMe:RES?

Revision 2.07 Changes

1. Resolves a defect in which the Pk-Pk units in the Statistics function were incorrect for all measurement functions other than frequency.

2. Resolves a defect in which MEAS:FREQ? would cause "Data Corrupt or Stale" and "Query Unterminated" errors the first time it is executed following a power cycle.

3. Resolves a defect so that 53220A/53230A 'Gate Src Chan 1/Chan 2' now displays a 'Polarity' soft key on the Gate Setup soft key menu bar.

4. Restores the 53210A Gate Out (Off/On) soft key that was previously removed from the Gate Setup soft key menu bar.

Revision 2.05 Changes

1. Changed trend chart functionality such that when exporting readings to internal flash memory and there is insufficient internal memory available, data will not be erased when the error is reported. Existing files can be deleted by the user to create sufficient space for the new data file.
2. Resolved a 53210A defect to now allow fast/slow auto-leveling to be selected from the front panel.

3. Resolve a defect such that programmatically changing the display mode to trend chart (TCH) or histogram (HIST) using DISP:MODE will now change the display.

4. Resolved a defect such that following an instrument self-test (*TST?), a reset occurs to return the instrument to a known state.

5. Removed the units 'Hz' from the Allan Deviation provided in the 53230A Statistics display.

6. Resolved a defect such that with the binary data format selected R?, *<max_count>* will now return the count specified rather than all readings currently in the buffer.

7. Resolved a defect in which the Mx-B scale function when set to 'Invert x' (on) would corrupt the PPM, PPB, and PCT functions.

8. Added an enhancement to the PPM, PPB, and PCT scale functions that allows engineering units (i.e. k, m, μ, n) to be included in the quantity measured. Or, the decimal point location can remain fixed and readings remain in units of ppm, ppb, pct.

9. Allows the 53210A/53220A/53230A WebUI instrument control window to open and be used with Java 8.

Revision 2.02 Changes

1. Resolved a defect that prevented battery Option 300 from being disabled prior to long term storage to prevent discharge.

2. Modified the 53200A power-on sequence such that the counter's LXI WebUI (user interface) starts approximately 35 seconds after power is applied. Previously, the WebUI would start 3 minutes following power-on.

Revision 2.01 Changes

1. Sending the *IDN? command from Keysight Connection Expert or from other programming environments will no longer put the counter into remote mode.

2. Added '53131A' as a parameter of the SYSTem:LANGuage command. When set, '53131A' is returned when the instrument ID is queried in 53220A or 53230A compatibility mode.

3. Corrected a defect that when powering up with a user-defined state file with frequency measurements with continuous mode selected, the measurements would not begin until the frequency mode was changed from continuous to auto and the measurements were restarted.

4. Corrected a defect that when frequency measurements and continuous mode were selected, the measurement timeout was applied to the entire set of measurements in the sample count rather than to each individual measurement.

5. Corrected a defect that when frequency measurements with continuous mode were selected with a low frequency signal (e.g., 3 Hz) applied, no measurements were made when statistics were enabled.

6. Improved processor performance such that the instrument will not hang should UDP broadcast storms occur on the network.

7. Added a 3x improvement to time required to write measurement data to flash memory/USB using the MMEMory:STORe:DATA command.

8. Added a check of the number of readings parameter in the DATA:REMove? command to verify the number of readings requested is not greater than memory size.

9. Corrected a defect in the DATA:REMove? command where the command would intermittently generate -230,"Data corrupt or stale" even though there were sufficient measurements available.

10. Corrected memory leak in the CALibration:DATA command.

11. Corrected a defect such that Device Clear will no longer intermittently generate a -230,"Data corrupt or stale" error.

12. Added modifications such that firmware updates now use the new firmware update utility (FWUpdate.exe) rather than the older (FirmwareUpdateUtilityType2.exe) utility. The new utility is posted on the firmware update page.

13. Added a ~2x improvement to the power-on (boot) time (from about 54 seconds to ~30 seconds).

14. The MMEMory:CATalog command will now accept the wildcards.

15. Corrected crash condition that could occur if too many errors were reported during boot-up.

16. The WebUI Java applet is now signed to allow it to run on browsers without a warning.

17. Added LAN Status information (Fault, Good) to the LAN settings screen.

18. Corrected defect where, if MMEMory:STORe:DATA encountered an error (e.g., file system full), it would leave the file locked, requiring a reboot.

19. Saving data from the instrument trend chart/histogram would clear the data afterwards. This behavior was changed such that data is not cleared when the acquisition is stopped and the data save is performed.

Revision 1.12 Changes

1. Resolved a defect in the Totalize function in which measurement overflow errors (Error +322) would occur at event counts below the 10^{15} limit. This was incorrectly reported as 'resolved' in revision 1.10.

2. Resolved a defect which removed a 5 second power down delay following after 'On/Stby' was pressed.

3. Resolved a defect in which instruments with battery Option 300 would intermittently display the "Battery Low" message with > 97% charge remaining.

4. Added an enhancement such that the number of digits displayed by the Auto Digits (off) setting is non-volatile and is restored at power on (Last).

5. Resolved a defect in 53132A compatibility mode that resulted in -310 "System Error" after sending CONF:FREQ (@3) or CONF:PERiod (@3).

6. Resolved a defect that caused the histogram function to increment the 'X Max' outer bin with readings below the upper limit due to floating-point round-off.

7. Resolved a defect which caused incorrect timestamp measurements to occur at the 10 kHz timestamp rate when legitimate not a number (NaN) readings were present.

8. Resolved a defect in which Continuous mode only displayed 11 digits rather than 12.

9. Resolved a defect in which the instrument would display the user-defined power-on state file on the USB drive as "Internal" rather than "External".

10. Added an enhancement such that in screen saver mode the 53200A counter display dims to a brightness setting of 1%, rather than turning off.

11. Fixed an input attenuation coupling error in 531xxA compatibility mode.

12. Resolved a defect in which stored 2-channel time interval measurements following an extended time interval (e.g. 1 hour) measurement would not match the actual measured intervals following the extended interval.

13. Resolved a defect in 53220A/53230A compatibility mode in which the 53220A/53230A did not set the correct trigger level (as specified) after setting the input attenuation level to x10.

14. Resolved a defect that allowed firmware updates over USB with CALibration:SECurity:STATe enabled. USB updates now require calibration security to be disabled.

15. Resolved a defect such that changing the calibration string now correctly updates the calibration count in all appropriate locations in counter memory.

16. Resolved a defect within the 10 kHz timestamp measurement rate where the NaN (not a number) value (9.9E37) was multiplied by 10 resulting in NaN values of 9.9E38.

17. Resolved a defect such that the MMEMory:CDIRectory? query now returns INT:\ rather than INT:

18. Resolved a defect in which the maximum histogram reading count is now 2^31-1 rather than 2^27-1.

Revision 1.10 Changes

1. Resolved a defect in which a Time Interval 2-1 measurement immediately following a Time Interval 1-2 measurement would not complete or complete intermittently.

2. Resolved a defect in which edges (events) on the input channels would be missed when making repeated frequency measurements over hours to several days. This would result in sporadic incorrect measurements.

3. Resolved a defect in which multiple events (packets) could be missed when making measurements over an extended period (hours to days) in CONTinuous mode.

4. Resolved a defect in which the measurement timeout period would not be honored if the signal was present to start the measurement, but was removed before the measurement was complete.

5. Resolved a defect in which the reading count in Statistics mode would display a negative number if the count exceeded 2,147,483,647 readings.

6. Removed a 5 second power-off delay that could occur from the time the power (off) button was pressed until the power down occurred.

7. Resolved the following 53210A Emulation Mode defects:

  - CALCulate function defaulted to NULL instead of SCALe in MLB mode, resulting in incorrect computation

  - CALC:DATA? did not wait for reading in progress to complete, but always returned previous value

  - The 53210A uses the number of stop digits specified (FREQ:ARM:STOP:DIGITS) to determine the counter gate time. Time was based on observed 53181A timing. Timing changed to reflect the 53210A's actual resolution.

  - Changed default displayed digits in emulation mode digit-based arming to show requested digits

8. Added an enhancement which enables the counter to ignore 9.9E+37 (NAN) readings when using the Statistics feature, thus preserving the statistics for the current set of readings.

This feature is enabled by creating a file with the name: **Agilent 532xxA\StatsIgnoreNANs.txt** on a USB thumb drive and inserting the thumb drive into the front panel USB host port. Cycling power with the thumb drive installed enables the feature. The feature remains enabled until power is cycled with the thumb drive removed.

9. Resolved a defect in which the ABORt command followed by a READ? could produce "Data stale" errors.

Revision 1.09 Changes

1. Resolved a defect in which repeating Totalize measurements followed by a device clear and error register query would sometimes result in a "+322 Measurement Overflow" or "-240 Hardware Error" message.

2. Resolved defects related to the calibration count not incremented following channel 3 calibration, and the calibration count not incremented following a firmware update.

3. Resolved a defect in which execution of *TRG would cause a deadlock within the instrument due to an internal race condition.

4. Added updates to graphical (trend chart) data presentation with and without decimation.

5. Resolved a defect in which *LRN? would return a corrupt string if 53230A Option 106/115 and 150 were not installed

6. Resolved a defect in which INPut:LEVel:MIN?, INPut:LEVel:MAX?, and INPut:LEVel:PTPeak? would return incorrect readings while a measurement was in progress.

7. Resolved a defect in which soft key behavior and appearance associated with channel 3 burst width measurements was not consistent with Option 115.

8. New behavior – a 5 second power-off delay occurs after pressing the power button while a measurement is in progress. The front panel will go dark immediately, and the internal processor and measurement will shut down after the (5 second) delay.

9. Resolved a defect in which the instrument deadlocks when two firmware threads attempt to update the Standard Operation Register simultaneously. This could occur when communicating with the instrument through two separate I/O paths, with one path sending configuration commands while the other path sends the READ? command.

10. New behavior – trigger delay capability for measurements involving optional channel 2 (53210A) or channel 3 (53220A/53230A) is disabled. The trigger delay command and front panel keys continue to accept settings; however, the settings are ignored.

11. New behavior – when using auto-level an additional 1 ms delay occurs prior to the start of the frequency/time measurement to allow the threshold determined by the counter to fully settle.

12. Resolved a defect such that user-specified trigger settings are now restored and used for each triggered pulse width measurement in pulse/burst mode. Previously for trigger counts greater than 1, the first trigger would occur using the user settings, and all subsequent triggers would be immediate (internal) triggers.

13. Resolved a defect such that the SENSe:TINTerval:ARM:ESTART and ESTOP sub-trees are now supported by the 53220A and 53230A in 53131A and 53132A compatibility mode.

Revision 1.08 Changes

1. Fixed defect related to re-establishing a Telnet or socket session to the instrument. Status bits in the STATus:OPERation and/or STATus:QUEStionable registers previously remained set for conditions that no longer existed.

2. Added capability and soft key menus for upgrading firmware (revision 1.09 and greater) from a USB stick on the front panel 'Host' port.

3. Resolved defect related to instrument not powering up in the state at last power-down when configured to do so.

4. -12db trigger threshold level setting removed (both SCPI and front panel soft keys) from the 15 GHz (Option 115) channel.

5. Resolved memory leak issue associated with Trend Chart function leading to 'Out of Memory' error.

Revision 1.07 Changes

1. Battery option display ICON's changed to provide a new indication capability when the internal battery option is present but has been locked out by firmware from being used due to either temperature or voltage level hysteresis controls.

2. Updated internal help and messages to add multiple language support.

3. Added capability from the Front Panel to enter/edit Time Internal, Hold-off delay settings with nanosecond (NS) resolution.

4. Changed Front Panel LED trigger controls to improve I/O transaction throughput when Display-Off mode is selected.

5. Single channel Time Interval measurement, Stop edge ICON toggle fixed.

6. Firmware support of Option 106 (6 GHz Channel 3 input) and Option 150 (Pulse Microwave Measurement capability – 53230A only).

7. External reference detection and error message handling corrected.

8. Improvements to timing accuracy and last reading preservation when the data logging duration is set to 'Time'.

9. Channel 2 measurement accuracy improvements for low frequencies.

10. Updated 5313xA mode capability for SENSe:EVENt:LEVel:ABSolute value to track hardware threshold value changes.

11. Factory default measurement timeout changed from 'Infinite' to 1 second. Timeout message now occurs only during remote operation and only one time per INITiate command issued.

12. MINimum hold-off by time specification changed to 60ns. Firmware updated to default any programmed request to MIN.

13. Channel 3 frequency mode 'Continuous' added to front panel menu. 'Reciprocal' mode removed.

14. Added Channel 3 (zero input) calibration point to support Option 150 capability. Accessed via Utility $\rightarrow$ Cal/AutoCal $\rightarrow$ Perform Cal $\rightarrow$ Cal Step $\rightarrow$ uWave $\rightarrow$ Perform Zero Cal.

15. Added soft key for Phase/Measure for the 53220A product.

16. Fixed defect related to displayed Vpp, Vmin, and Vmax values when switching between the 10:1 and 1:1 (none) probe settings.

17. Added a battery sleep mode prompt to allow instrument to be turned on with the battery disabled to preserve battery charge. The prompt will disable sleep mode (i.e. enable the battery) when battery use is required.