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Software Release Notes & Installation Instructions

Important information

The Clarius⁺ software application suite is the software for the Model 4200A-SCS Parametric Analyzer. Clarius⁺ software requires Microsoft[®] Windows[®] 10 to be installed on your Model 4200A-SCS Parametric Analyzer.

Introduction

This document provides supplemental information about the behavior of Clarius⁺ software. This information is grouped into the following categories:

Revision history	Lists the version of software, the document version, and the date of the software release.
New features and enhancements	Summary of each significant new feature included in Clarius+ software and the 4200A-SCS.
Problem fixes	Summary of each significant software/firmware bug fix in Clarius+ software and the 4200A-SCS.
Known problems	Description of each significant known problem and ways to work around it.
Usage notes	Helpful information describing how to optimize the performance of Clarius+ software and the 4200A-SCS.
Installation instructions	Detailed instructions describing how to install all software components, firmware, and help files.

Revision history

This document is periodically updated and distributed with releases and service packs to provide the most up-to-date information. This revision history is included below.

Date	Software version	Document number	Version
6/10/2020	V1.8.1	0771326	11
4/23/2020	V1.8	0771326	10
10/14/2019	V1.7	0771326	09
5/3/2019	V1.6.1	0771326	08
2/28/2019	V1.6	0771326	07
6/8/2018	V1.5	0771326	06
2/23/2018	V1.4.1	0771326	05
11/30/2017	V1.4	0771326	04
5/8/2017	V1.3	0771326	03
3/24/2017	V1.2	0771326	02
10/31/2016	V1.1	0771326	01
9/1/2016	V1.0	0771326	00

New features and enhancements

Issue number	SCS-2202
Subsystem	Clarius
Enhancement	The new user library <code>dmm_6500_7510_temp_ulib</code> was added to Clarius. This user library uses VISA to communicate over USB with a Keithley DMM6500 or DMM7510 Digital Multimeter to measure temperature.
Issue number	SCS-3403
Subsystem	Clarius
Enhancement	The following formulas related to fast Fourier transforms (FFTs) were added to the Clarius Formulator: <code>FFT_R()</code> , <code>FFT_I()</code> , <code>IFFT_R()</code> , <code>IFFT_I()</code> , <code>FFT_FREQ()</code> , <code>FFT_FREQ_P()</code> , and <code>SMOOTH()</code> . Refer to the Learning Center or the <i>Model 4200A-SCS Clarius User's Manual</i> to learn more about these formulas.
Issue number	SCS-4559
Subsystem	Clarius
Enhancement	A new project was created for making interface trap density (DIT) measurements on MOS capacitor devices.

Issue number	SCS-5213
Subsystem	Learning Center
Enhancement	Added training modules for the 4201-SMU, 4211-SMU, and 4215-CVU.
Issue number	SCS-5257/AR64497
Subsystem	Clarius
Enhancement	Three modules were added to the user library <code>vdplib</code> that allow the measurements to be made using the 4200A-CVIV. The names of the new modules end with <code>_cviv</code> .
Issue number	SCS-5264
Subsystem	Manuals
Enhancement	Updated the section in <i>Model 4200A-SCS KULT and KULT Extension Programming</i> on the KULT Extension to reflect updates to the GUI of Visual Studio Code and the debugging process.
Issue number	SCS-5273
Subsystem	KCon, Calibration
Enhancement	Measurement uncertainty is now one of the criteria used to determine Pass or Fail during verification of the following instruments: 4200-SMU, 4201-SMU, 4210-SMU, 4211-SMU, 4200-PA, 4210-CVU, and 4220-PGU.
Issue number	SCS-5279/AR63403
Subsystem	Clarius
Enhancement	<p>You can now set the number of runs that are stored and displayed in the Run History pane. When you run a test, the number of new runs is limited to the number that is set. To maintain the number of runs, Clarius deletes the oldest run. If there is existing data that exceeds the limit, only the oldest unselected run is deleted. Runs that you have selected are not deleted automatically. For example, if you have 200 existing runs and change the maximum run history size to 5, the number of runs in the run history remains at 200. The next run triggers the deletion of the oldest unselected run.</p> <p>If you are running a project with subsite cycling or stressing, all existing runs are automatically unselected at the start of execution, so only data collected during the last run of the project is selected and displayed on the graphs. To save data between project runs, increase the run history size to be more than the number of cycles or stresses in your project.</p> <p>If the set run history size is less than the number of cycles or stresses in your project, a run is still generated for each cycle or stress.</p> <p>To set the run history size:</p> <ol style="list-style-type: none"> 1. In Clarius, select My Settings. 2. Select Run Settings. 3. In the Maximum run history size field, enter the number of runs (1 to 10,000). 4. Select OK.

Issue number

SCS-5280/AR63403

Subsystem

Clarius

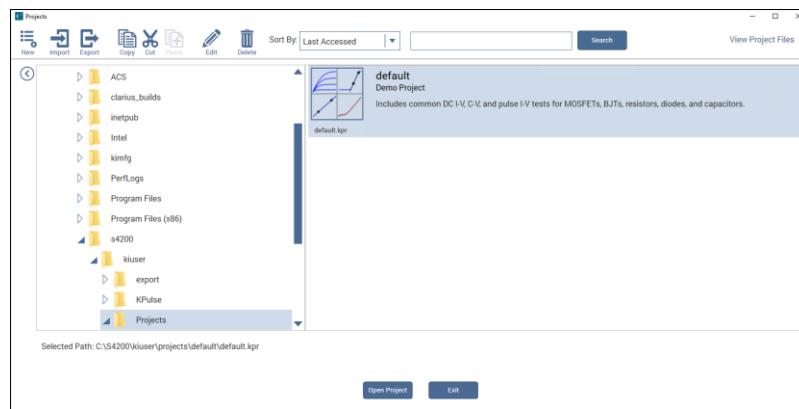
Enhancement

The Projects dialog box now includes a Show Directories pane that allows you to open a Windows File Manager view of the projects. When it opens, it automatically opens the directory of the last opened project.

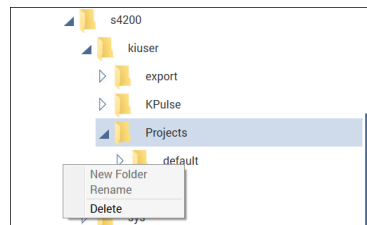
The Duplicate option was replaced with Copy, Cut, and Paste options. When a project is created by pasting, the new project does not maintain any links to the old project.

To use the File Manager view:

1. Select **Projects**.
2. Select **Show Directories** in the Projects dialog box.



3. To add new folders, rename folders, or delete folders, right-click in the directory.



To create a project using copy and paste or cut and paste:

1. In the Projects dialog box, select the project to be cut or copied.
2. Select **Copy** or **Cut**.
3. Select **Paste**.
4. If you are copying a project, to:
 - **Copy the project and load it as the active project:** Select **Copy and Load**.
 - **Copy the project without loading it:** Select **Copy Only**.

Issue number	SCS-5289
Subsystem	Clarius - Library
Enhancement	Added a new project, <code>biofet-iv-characterization</code> , and new tests, <code>biofet-id-vgs</code> and <code>biofet-id-vds</code> , to measure biosensor field-effect transistors (BioFETs).
Issue number	SCS-5290
Subsystem	Learning Center
Enhancement	Added the application note <i>DC I-V Characterization of FET-Based Biosensors Using the 4200A-SCS Parameter Analyzer</i> to the Learning Center.
Issue number	SCS-5295
Subsystem	Clarius
Enhancement	Added the project <code>dmm-meas-temp</code> to the Clarius library. This project demonstrates temperature measurements using a Keithley DMM6500 or DMM7510 Digital Multimeter that is connected to the 4200A-SCS using USB.
Issue number	SCS-5297
Subsystem	Learning Center
Enhancement	Added the application note <i>Using USB Communication to Control External Instruments with the 4200A-SCS Parameter Analyzer</i> to the Learning Center.
Issue number	SCS-5300
Subsystem	Clarius
Enhancement	Added the user library <code>generic_gpib_ulib</code> , which allows you to send a command or string of commands to an external GPIB instrument directly from Clarius.
Issue number	SCS-5301
Subsystem	Clarius
Enhancement	Added six actions to the Clarius library to communicate with USB external instruments. The actions are named <code>find-usb-resource</code> , <code>write-string-usb</code> , <code>read-string-usb</code> , <code>read-double-usb</code> , <code>query-string-usb</code> , and <code>query-double-usb</code> .
Issue number	SCS-5310/AR64575
Subsystem	Clarius
Enhancement	Added the Monitor feature, which allows you to run an I-V sweep repeatedly.

Issue number	SCS-5324
Subsystem	Learning Center
Enhancement	Added the application note <i>Automating High and Low Frequency C-V Measurements and Interface Trap Density (DIT) Calculations of MOS Capacitors using the 4200A-SCS Parameter Analyzer DIT Measurements on MOSCAPs</i> to the Learning Center.
Issue number	SCS-5340
Subsystem	CVIV, CVU, Datasheet
Enhancement	The 4200A Technical Datasheet showed the 4210-CVU accuracy specifications through the 4200A-CVIV. The Datasheet has been updated to include the 4215-CVU
Issue number	SCS-5354/AR64695
Subsystem	Clarius
Enhancement	<p>The option buttons "Load last open project at startup" and "Load default project at startup" were added to the Environment Settings tab of the My Settings dialog box.</p> <p>When the "Load last open project at startup" option is selected, Clarius loads the last open project on start up. This option is the default, which is consistent with the behavior of Clarius in previous releases.</p> <p>When the "Load default project at startup" option is selected, Clarius loads the user-selected default project on start up. When this option is selected, a field is displayed that allows you to select the project to use as a default.</p>
Issue number	SCS-5400
Subsystem	Clarius
Enhancement	If you delete a directory from the Project dialog box that contains the project that is open in Clarius, the project is closed.
Issue number	SCS-5424
Subsystem	Learning Center
Enhancement	Added the video "Using a four-point collinear probe" to the Learning Center.
Issue number	SCS-5431
Subsystem	CVU, Calibration
Enhancement	Updated the oscilloscope settings used during ac source calibration and verification to improve measurement repeatability and robustness.
Issue number	SCS-5436
Subsystem	Clarius
Enhancement	Added the device "Bio field-effect transistor, 3 terminal (biofet)" to the Device Library.

Issue number	SCS-5450
Subsystem	Learning Center, Manuals
Enhancement	<p>The <i>Model 4200A-SCS Parameter Analyzer Reference Manual</i> and <i>Model 4200A-SCS Parameter Analyzer User's Manual</i> were split into smaller, more accessible PDFs. The new manuals contain the same content as the previous manuals with updates. The new manuals are:</p> <ul style="list-style-type: none"> • Model 4200A-SCS Setup and Maintenance User's Manual (part number 4200A-908-01A) • Model 4200A-SCS Clarius User's Manual (4200A-914-01A) • Model 4200A-SCS Source-Measure Unit (SMU) User's Manual (4200A-SMU-900-01A) • Model 4200A-SCS Capacitance-Voltage Unit (CVU) User's Manual (4200A-CVU-900-01A) • Model 4200A-SCS Pulse Card (PGU and PMU) User's Manual (4200A-PMU-900-01A) • Model 4200A-SCS LPT Library Programming (4200A-LPT-907-01A) • Model 4200A-SCS KULT and KULT Extension Programming (4200A-KULT-907-01A) • Model 4200A-SCS KXCI Remote Control Programming (4200A-KXCI-907-01A) • Model 4200A-SCS Prober and External Instrument Control (4200A-913-01A)
Issue number	SCS-5501
Subsystem	System
Enhancement	<p>The Clarius Installer now includes an optional selection for NI-VISA 17.5. Uninstalling Clarius will not remove NI-VISA. It must be manually uninstalled using the Microsoft Windows Add or Remove Programs tool.</p>
Issue number	SCS-5556
Subsystem	Clarius – User Library
Enhancement	<p>Added the user library <code>PMU_freq_time_ulib</code>, which enables better fast Fourier transform (FFT) computations with the PMU.</p>
Issue number	SCS-5558
Subsystem	Clarius – Test Library
Enhancement	<p>Added the test "PMU Current Spectral Density (pmu-isd)" to the Test Library. This test captures the PMU spectral density.</p>
Issue number	SCS-5559
Subsystem	Clarius – Factory Tests
Enhancement	<p>Added the test "SMU Current Spectral Density (smu-isd)" to the Test Library. This test captures the SMU spectral density.</p>
Issue number	SCS-5578
Subsystem	Clarius
Enhancement	<p>Added the user library <code>generic_visa_ulib</code>, which allows users to send commands and retrieve data from an external instrument connected through USB communications.</p>

Issue number	SCS-5580
Subsystem	Clarius – Test Library
Enhancement	Added the test "RC Circuit AC Impedance Calculations (rs-cs-ac-impedance)" to the Test Library. This test uses the PMU to measure current and voltage in the time domain. FFT computations in the Formulator convert these signals into parameters in the frequency domain.
Issue number	SCS-5594
Subsystem	Clarius – Test Library
Enhancement	Added the test "Resistor Thermal Noise (resistor-noise)" to the Test Library. This test measures the thermal noise of a resistor.
Issue number	SCS-5598
Subsystem	Clarius
Enhancement	Added a PMU sample rate module to the user module library <code>pmu_freq_time_ulib</code> .

Problem fixes

Issue number	SCS-619
Subsystem	Clarius
Symptom	The All Parameter view of the Configure screen does not include entries for the PMU options "Load Line Effect Compensation" and "DUT Resistance."
Resolution	This issue has been corrected.
Issue number	SCS-3534
Subsystem	Clarius
Symptom	When copying a test from one subsite to another subsite, more rows of data may be copied than the rows that exist. The extra rows are copies of the last valid row.
Resolution	This issue has been corrected.
Issue number	SCS-4454/AR62458
Subsystem	Manuals
Symptom	The CVU specification in the datasheet is confusing.
Resolution	This issue has been corrected

Issue number	SCS-5020/AR63970
Subsystem	Clarius – User Libraries
Symptom	Depending on the test settings and the device under test (DUT), the <code>multiSMU_SweepV</code> user module in the <code>hivcvulib</code> user library may not control SMU outputs in a way that is optimal for the DUT.
Resolution	This issue has been corrected. The <code>multiSMU_SweepV</code> user module was modified to remove the current measuring SMU and sweep the voltage to 0 V at the end of the test.
Issue number	SCS-5202
Subsystem	User libraries
Symptom	The <code>ACSweep</code> user module in the DLCP user library and the <code>Sampling</code> user module in the <code>cvuulib</code> user library do not send the <code>rpm_config</code> LPT commands. This does not allow proper connections to the device under test (DUT) and results in incorrect measurements.
Resolution	This issue has been corrected.
Issue number	SCS-5207
Subsystem	UTM, CVU
Symptom	When multiple CVUs are in a 4200A chassis, the wrong internal open correction values are used.
Resolution	This issue has been corrected.
Issue number	SCS-5216
Subsystem	Clarius
Symptom	SMU Power On/Off Sequences did not work properly.
Resolution	This issue has been corrected. The gap between powering two SMUs will be around 4 ms.
Issue number	SCS-5217
Subsystem	Clarius - Subsite
Symptom	Cycle Stress Times can be off by 1 s in a Subsite.
Resolution	This issue has been corrected. Stress time is now within 10 ms of the specified time.
Issue number	SCS-5219
Subsystem	Clarius - Configure
Symptom	The tests <code>cviv-configure-cgs</code> and <code>cviv-configure-ciss</code> in the projects <code>mosfet-cviv-cv-bias-tees</code> and <code>mosfet-cviv-cv-bias-tees-400V</code> execute with an incorrect configuration, resulting in invalid data.
Resolution	This issue has been corrected.

Issue number	SCS-5228
Subsystem	Clarius
Symptom	The My Projects dialog box should display a busy message for operations that run for a long time.
Resolution	This issue has been corrected.
Issue number	SCS-5229
Subsystem	Clarius
Symptom	Renaming a large project in My Projects takes a long time.
Resolution	This issue has been corrected.
Issue number	SCS-5246
Subsystem	Clarius
Symptom	When importing or exporting a corrupted <code>kzp</code> file, Clarius infinitely hangs.
Resolution	This issue has been corrected.
Issue number	SCS-5254
Subsystem	Clarius
Symptom	The total test time when running a SMU sweep in Fast Speed was faster than setting Custom Speed with the same timing parameters as Fast Speed. By default, Fast Speed has these settings: Default Delay = 0.7, Filter Factor = 0.2, and A/D Aperture = Auto.
Resolution	This issue has been corrected.
Issue number	SCS-5267
Subsystem	KXCI
Symptom	In the KXCI commands <code>VL</code> , <code>VR</code> , <code>VC</code> , and <code>VP</code> , there is a compliance limit-error check for the medium power SMU models at 0.105 amperes. The 4201-SMU was not one of the models checked for this condition. A larger current compliance value can incorrectly be entered.
Resolution	This issue has been corrected.

Issue number	SCS-5268/AR64454
Subsystem	KXCI
Symptom	<p>When calling the KXCI command <code>*OPT?</code> on a 4200A-SCS that contains 4201-SMUs or 4211-SMUs, the command returns the string incorrectly.</p> <p>An example of a 4200A system configuration:</p> <ul style="list-style-type: none"> • 4201-SMU with PA • 4200-SMU with PA <p>Returns: PA1 , SMUPA2</p> <p>Valid return strings based on SMU configuration:</p> <ul style="list-style-type: none"> • SMU: Medium-power SMU without a preamplifier • HPSMU: High-power SMU without a preamplifier • SMUPA: Medium-power SMU with a preamplifier • HPSMUPA: High-power SMU with a preamplifier
Resolution	This issue has been corrected.
Issue number	SCS-5286/AR64526
Subsystem	Manuals
Symptom	The KXCI documentation contains errors regarding the <code>*RST</code> command and the status byte values.
Resolution	This issue has been corrected.
Issue number	SCS-5288
Subsystem	Clarius - Configure
Symptom	<p>If you enter a string parameter that contains a right parenthesis, <code>)</code>, in a Clarius user-module test, the string is truncated and a warning message appears when you reload the test.</p> <p>For example, if you send <code>pr) int</code>, Clarius edits it to <code>pr</code> and provides a warning of an invalid parameter.</p>
Resolution	This issue has been corrected.
Issue number	SCS-5344
Subsystem	KXCI
Symptom	If you call <code>*RST</code> in a 4200A-SCS system without a CVU card, an error code of <code>-993</code> is generated.
Resolution	This issue has been corrected.
Issue number	SCS-5348
Subsystem	KCon, Calibration
Symptom	The 4201-SMU was incorrectly using the 1 A current range for calibration and verification.
Resolution	This issue has been corrected.

Issue number	SCS-5349
Subsystem	KCon, Calibration
Symptom	The verification report is missing one of the failure messages for the CVU and PGU/PMU when the instrument fails verification.
Resolution	This issue has been corrected.
Issue number	SCS-5350/AR64625
Subsystem	KXCI Manuals
Symptom	Documentation for the KXCI DO command is incomplete.
Resolution	This issue has been corrected. The following information was added to the manuals for the KXCI DO command: NOTE: When you run a voltage sweep without measure commands, you can use DO to retrieve the voltage measurement. However, you cannot use DO to retrieve the current measurement from a voltage sweep. To retrieve the current measurement, use LI, XN, YA, YB, or DV.
Issue number	SCS-5357
Subsystem	Clarius
Symptom	Clarius crashes when saving a subsite stress configuration when more than 128 stresses are entered in the stress list.
Resolution	This issue has been corrected.
Issue number	SCS-5368
Subsystem	KXCI
Symptom	Calling the PN and PE commands together in KXCI to configure a pulse train and execution with a 4225-PMU causes the PMU card and software to hang. For example: <pre>PN 1, 0, 5, 1, 0.001, 0.0005, 1e-05, 1e-05, 0 PO 1, 1, 0 PE</pre> Workaround: When this occurs, the application must be forced to be close and the card must go through a hard reset.
Resolution	This issue has been corrected. In <i>Model 4200A-SCS KXCI Remote Control Programming</i> , please review the description of the RP command for proper use.
Issue number	SCS-5373
Subsystem	Manuals, KXCI
Symptom	When using a PMU with RPMs connected, no output was generated after sending a test that should output a pulse waveform.
Resolution	This issue has been corrected.

Issue number	SCS-5376
Subsystem	Clarius
Symptom	Subsite cycle text boxes allow multiple lines.
Resolution	This issue has been corrected.
Issue number	SCS-5404
Subsystem	Clarius
Symptom	In Projects, if you delete the folder of a large project, the Projects dialog box is hidden when the deletion is complete. You can click or move the mouse to bring the dialog box back into view.
Resolution	This issue has been corrected.
Issue number	SCS-5408
Subsystem	Clarius
Symptom	When Clarius is first installed on a personal computer, editing a project may cause a crash to occur.
Resolution	This issue has been corrected.
Issue number	SCS-5416
Subsystem	Clarius
Symptom	Aborting the first test run in Clarius may cause the SMU to have a PCI communication failure.
Resolution	This issue has been corrected.
Issue number	SCS-5426
Subsystem	Clarius, CVU
Symptom	The Open Confidence Check for the 4215-CVU always fails.
Resolution	This issue has been corrected.
Issue number	SCS-5465
Subsystem	Clarius - Subsite
Symptom	PMU is limited to 20 V when subsite stressing.
Resolution	This issue has been corrected. The limits are now 40 V.

Issue number	SCS-5479
Subsystem	Clarius - Subsite/Site/Cycling
Symptom	The SMU Power On/Off sequence when the instrument is subsite stressing is broken when the same SMU is used for multiple devices under test (DUTs).
Resolution	This issue has been corrected.
Issue number	SCS-5480
Subsystem	Clarius - Subsite/Site/Cycling
Symptom	Clarius allows you to save and use an invalid SMU Power On/Off sequence when the instrument is subsite stressing multiple devices.
Resolution	This issue has been corrected.
Issue number	SCS-5492/AR64948
Subsystem	LPT
Symptom	The blue Operate light on the 4200A-SCS remains on after running a SMU user module that calls <code>rpm_config</code> to configure a SMU using KXCI. The user module runs correctly in Clarius.
Resolution	This issue has been corrected.
Issue number	SCS-5495
Subsystem	Clarius - Configure
Symptom	When the Test Mode is set to Sampling, the Advanced Terminal Settings dialog box shows all dc and frequency operating modes instead of only the bias and single-frequency options.
Resolution	This issue has been corrected.
Issue number	SCS-5500
Subsystem	Clarius - Subsite/Site/Cycling
Symptom	In the Subsite when stressing is set to AC Voltage, the SMU current measure selection may not be saved.
Resolution	This issue has been corrected.
Issue number	SCS-5504
Subsystem	KXCI
Symptom	In KXCI, calling the <code>PE</code> (pulse execute) command a second time by itself causes the software and pulse instrument to hang. The software and firmware need to be hard reset to recover.
Resolution	This issue has been corrected. An error message is generated if the pulse instrument is not properly configured before calling the <code>PE</code> command.

Issue number	SCS-5508
Subsystem	Clarius - Formulator
Symptom	The Formulator <code>SUBARRAY ()</code> equation start and end indexes are off by one.
Resolution	This issue has been corrected.
Issue number	SCS-5547
Subsystem	CVU, KCon
Symptom	In KCon, if sequential back-to-back CVU Self Tests are run rapidly, the PLL Lock (101.1) test in the KCon Self Test may fail.
Resolution	This issue has been corrected.
Issue number	SCS-5548
Subsystem	CVU, KCon
Symptom	In KCon, the PLL Lock (101.1) test in the KCon Self Test may fail for the 4215-CVU.
Resolution	This issue has been corrected.
Issue number	SCS-5551
Subsystem	KXCI
Symptom	The input trigger count value of the KXCI <code>PN</code> (pulse train) command value can accept any input value. This could cause erratic output behavior of the pulse train.
Resolution	This issue has been corrected.
Issue number	SCS-5620
Subsystem	Clarius
Symptom	You cannot copy projects to network drives using the Projects dialog box in some situations.
Resolution	This issue has been corrected.
Issue number	SCS-5624
Subsystem	Clarius – Project Tree
Symptom	When the selected item in the project tree is an Action that is under a Device, if you try to copy a Test from the library, an error occurs.
Resolution	This issue has been corrected.

Known problems

Issue number	SCS-5621
Subsystem	System
Symptom	When ACS V5.4 is installed onto a Clarius+ V1.9 system, a compatibility problem exists that prevents Clarius USRLIB modules from compiling.
Workaround	If you will be installing ACS and compiling Clarius USRLIB modules, please contact Keithley for an ACS 5.4 Hot Fix.

Usage notes

4200A-CVIV

Before using the Model 4200A-CVIV Multi-Switch, be sure to connect the SMUs using the 4200-PAs and 4200A-CVIV-SPT SMU Pass-Thru modules, and the CVU instrument cables to the 4200A-CVIV inputs. Make sure to close the Clarius application before opening KCon on the desktop. Then run the **Update Preamp, RPM, and CVIV Configuration** option in KCon. Include the action `cviv-configure` before a SMU or CVU test in the project tree to switch between I-V and C-V measurements.

4225-RPM

Before using the 4225-RPM Remote Amplifier Switch Module to switch between I-V, C-V, and Pulse ITMs, be sure to connect all instrument cables to the RPM inputs. Make sure to close the Clarius application before opening KCon on the desktop. Then run the **Update Preamp, RPM, and CVIV Configuration** option in KCon.

When using the 4225-RPM in UTMs, include the call in your user module to the LPT command `rpm_config()`. The `RPM_switch` user module in the `pmuulib` user library is deprecated. For more information, see the Help pane in Clarius.

4210-CVU or 4215-CVU

When choosing the Custom Cable Length in the CVU Connection Compensation dialog box of the Tools menu to perform open, short, and load simultaneously, you must run **Measure Custom Cable Length** first. Then enable **Open, Short, and Load CVU Compensation** within a test.

If you are performing Open, Short, and Load CVU Compensation when the CVU is connected to the CVIV, a best practice is to use the `cvu-cviv-comp-collect` action.

4200-SMU, 4201-SMU, 4210-SMU, or 4211-SMU

Under certain conditions, when running SMU current sweeps at very fast ramp rates, the SMU may report compliance unexpectedly. This may occur if the sweep ramps are too high or too fast.

The workarounds for this situation are:

- Use the `setmode` command when generating user modules to turn off the compliance indicator value. With this workaround, the reading is returned as 105% of the present range.
- Use smaller sweep and ramp rates (dv/dt or di/dt).
- Use fixed SMU ranges.

LPTLIB

If a voltage limit of greater than 20 V is needed from a SMU set to force zero current, a `measv` call should be used to set the SMU to autorange to a higher range or set a higher voltage range with `rangev`.

If a current limit of greater than 10 mA is needed from a SMU set to force zero volts, a `measi` call should be used to set the SMU to autorange to a higher range or set a higher current range with `rangei`.

KULT

If you make changes to or need to rebuild `ki82uilib`, please note that `ki82uilib` depends on `ki590uilib` and `winuilib`. You must specify these dependencies in the Options > Library Dependencies menu in KULT before building `ki82uilib`. The Options > Build Library function will fail if the dependencies are not properly selected.

KXCI

In KXCI System Mode, in both KI4200A emulation and HP4145 emulation, the following default current measurement ranges exist:

- **Limited Auto – 1 nA:** The default current measurement range for 4200 SMUs with preamplifiers.
- **Limited Auto – 100 nA:** The default current measurement range for 4200 SMUs without preamplifiers.

If a different bottom range is needed, use the `RG` command to set the specified channel to a lower bottom range.

Example: `RG 1,1e-11`

This sets SMU1 (with preamplifier) to the Limited Auto – 10 pA range

Subsite Stress Mode

In Stress/Measure Mode, selecting Leave Stress Conditions On checkbox maintains the stress voltage or current during the subsequent device testing. However, if the system configuration includes a matrix, then all outputs are turned off, regardless of the checkbox setting to prevent damaging matrix relays. Also, with a 4200A-CVIV Switch in the configuration, all outputs are turned off if any signals are routed through the 4200A-CVIV Switch, regardless of the checkbox setting. The stress signals can be left on if they are all directly connected outside of the CVIV Switch, but they are reset when a CVIV connection is made in the subsequent device testing to prevent damaging relays.

Microsoft® Windows® mapped network drive error

When installing Clarius+ on a personal computer, Microsoft policy settings can limit Clarius from accessing mapped network drives in its file windows.

Modifying the registry will fix this issue.

To modify the registry:

1. Run **regedit**.
2. Navigate to
HKEY_LOCAL_MACHINE/SOFTWARE/Microsoft/Windows/CurrentVersion/Policies/System.
3. If one does not exist, create a new DWORD entry named `EnableLinkedConnections`.
4. Set the value to 1.
5. Restart the computer.

Computer installation, help pane PDF link errors

When installing Clarius+ on a personal computer, PDF links may not open in Clarius from the help pane if you have Adobe® Acrobat Reader installed and protected mode enabled.

Modifying Internet Explorer settings will fix this issue.

To modify the Internet Explorer settings:

1. Open Internet Explorer.
2. Select Internet Settings.
3. On the General tab, find the Startup section, and change Start with tabs from the last session to **Start with home page**.

Computer installation, language packs

Clarius does not support additional languages in Microsoft Windows 10 other than the English (United States) base language. If you encounter errors with Clarius+ while a language pack is installed, follow Microsoft instructions for removing the language pack.

Installation instructions

These directions are provided as a reference if you need to reinstall Clarius+ software on your 4200A-SCS. All CVU Open, Short, and Load compensation constants must be re-acquired after V1.2 is installed.

STEP 1. Archive your user-modified user library data (optional)

Installing Clarius+ software reinstalls the C:\4200\kiuser\usrlib. If you made changes to the user library and do not want to lose these changes when this software is installed, copy these files to an alternate location before installation.

The easiest way to archive the user library is to copy the entire C:\S4200\kiuser\usrlib folder to a network drive or an archive area on the 4200A-SCS hard drive. Copy the files back after installation to restore them.

STEP 2. Install the 4200A-SCS Clarius+ Software Tools

If you are installing Clarius+ software using the supplied USB drive, follow these instructions:

1. Insert the 4200A-SCS Clarius+ software USB flash drive into a 4200A-SCS USB port.
2. Double-click the `setup.exe` file on the USB drive to install the software on your 4200A-SCS.
3. Follow the on-screen installation instructions. If a previous version of Clarius+ software is installed on your 4200A-SCS, you will be asked if you want to remove it. When asked, select **OK** to continue; selecting **No** will abort the installation. If a previous version of Clarius+ software is uninstalled, you must restart the system and then install the new Clarius+ software version.
4. After the installation is complete, remove the USB flash drive and select **Yes, I want to restart my computer now** to restart the 4200A-SCS before attempting to initialize or use the software tools.

If you are downloading and installing the Clarius+ software from <https://www.tek.com/keithley>, follow these instructions:

1. Go to www.tek.com.
2. Select the **DOWNLOADS** link.
3. From the DOWNLOAD TYPE list, select **Software**.
4. For MODEL OR KEYWORD, type `4200A` and select **SEARCH**.
5. Select the software link that you want to download (note that you will need to log in or register to continue).
6. Once you are logged in, select the **Download File** button and choose where to download your file (rename the file as needed).
7. Unzip the downloaded file.
8. Double-click the `setup.exe` file to install the software on your 4200A-SCS.
9. Follow the on-screen installation instructions. If a previous version of Clarius+ software is installed on your 4200A-SCS, you will be asked if you want to remove it. When asked, select **OK** to continue; selecting **No** will

abort the installation. If a previous version of Clarius+ software is uninstalled, you must restart the system and then install the new Clarius+ software version.

10. After the installation is complete select **Yes, I want to restart my computer now** to restart the 4200A-SCS before attempting to initialize or use the software tools.

STEP 3. Initialize each 4200A-SCS user account

Each user account on the 4200A-SCS must be properly initialized before attempting to run any of the Clarius+ software tools. Failure to initialize may cause unpredictable behavior.

From the Microsoft Windows login screen, type the user name and password of the account to be initialized. This must be done for each of the two default Keithley factory accounts, and for any additional accounts added by the system administrator. The two factory accounts are:

User name	Password
kiadmin	kiadmin1
kiuser	kiuser1

When Windows has completed startup, select **Start > Keithley Instruments > Initialize New User**. This initializes the current user.

Repeat steps one and two for both Keithley accounts and for any additional accounts added by the system administrator.

STEP 4. Upgrade 42x0-SMU, 422x-PxU, 4225-RPM, 4225-RPM-LR, 4210-CVU and 4200A-CVIV firmware

Clarius software checks for compatible instrument firmware during startup and does not run if all instruments are not upgraded to compatible firmware versions.

To find the current hardware and firmware versions of your 4200A-SCS cards, use the KCon utility and select each card.

The firmware upgrade program automatically indicates the hardware that needs to be upgraded to the approved or latest firmware version.

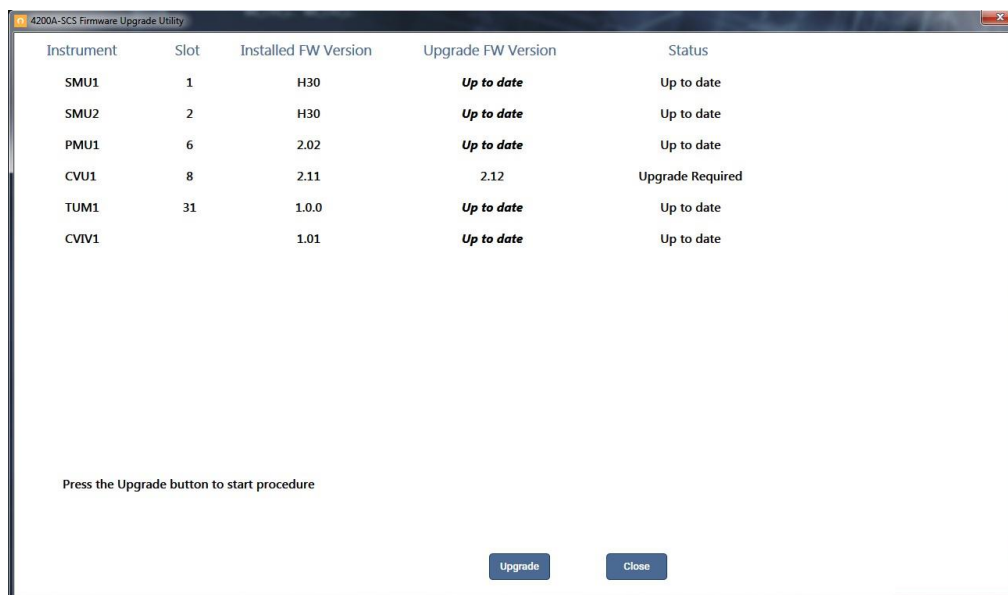
4200A-SCS cards are organized by families of related models, as shown below.

To upgrade the firmware of your 4200A-SCS cards:

It is strongly recommended that you connect the 4200A-SCS to an uninterruptible power supply during the firmware upgrade process. If power is lost during the firmware upgrade, the instruments may no longer be functional and will require factory servicing.

1. Exit all Clarius+ software programs and any other Microsoft Windows programs.
2. From the Windows taskbar, select **Start**.
3. In the Keithley Instruments folder, select the **Firmware Upgrade** tool.
4. If your instrument needs to be upgraded, the upgrade button becomes visible and there is an indication in Status that an upgrade is required for an instrument, as shown below.
5. Select **Upgrade**.

The Firmware Upgrade Utility window below shows that the upgrade is not complete. The CVU1 requires upgrading.



The Firmware Upgrade Utility window

Version table

4200A-SCS instrument family	Hardware version from KCon	Firmware version
4201-SMU, 4211-SMU, 4200-SMU, 4210-SMU ¹	05,XXXXXXXX or 5,XXXXXXXX	H31
	06,XXXXXXXX or 6,XXXXXXXX	M31
	07,XXXXXXXX or 7,XXXXXXXX	R33
4200-PA	This product cannot be flash upgraded in the field	–
4210-CVU	ALL (3.0, 3.1, 4.0, and later)	2.15
4215-CVU	1.0 and later	2.16
4220-PGU, 4225-PMU ²	1.0 and later	2.07
4225-RPM, 4225-RPM-LR	1.0 and later	2.00
4200A-CVIV ³	1.0	1.04
4200A-TUM	1.0	1.00

¹ There are several different models of SMUs available in the 4200A-SCS: 4201-SMU or 4211-SMU (medium power) and 4210-SMU or 4211-SMU (high power); all use the same firmware file.

² The 4225-PMU and 4220-PGU share the same pulse and source board. The 4225-PMU adds measure capability through an additional hardware board but uses the same firmware file.

³ The 4200A-CVIV firmware contains two files to upgrade. The firmware utility uses both files in the version folder.