KEITHLEY
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Clarius+ Version 1.6

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Software Release Notes & Installation Instructions

Important information

The 4200A-SCS Clarius+ software application suite is a release of the software for the 4200A-SCS. Clarius+ software requires **Microsoft® Windows® 10** to be installed on your 4200A-SCS Parameter Analyzer.

Introduction

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

Revision history	Lists the version of software, the document version, and the date of the software release.
New features / 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
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
5/08/2017	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/enhancements

Issue number	SCS-3732
Subsystem	Clarius
Enhancement	The Clarius Subsite Cycling/Stressing user interface has been improved. See the Configure Subsite Cycling section of the Reference Manual for a description. The new interface is compatible with previously created test configurations.
Issue number	SCS-3818
Subsystem	Learning Center
Enhancement	A new Applications Note that discusses 3-terminal device CV measurements has been added to the Learning Center.
Issue number	SCS-3920 / AR61388
Subsystem	Clarius
Enhancement	When looping tests only data from the current loop will be saved to the Run History data file to optimize disk space usage.
Issue number	SCS-3970
Subsystem	Learning Center
Enhancement	An archive of previous Release Note documents is included in the Learning Center.
Issue number	SCS-4000
Subsystem	KCon
Enhancement	Uncertainty values were added to 4210-CVU calibration report.
Issue number	SCS-4015
Subsystem	LPTLib
Enhancement	The LPT command, `pulse_burst_count()`, can now be used with the `pulse_exec()` command.

Issue number	SCS-4016
Subsystem	KXCI

Enhancement	The following KXCI commands have been added to support PMU/PGU operations.
	
	`PE`
	This command is used to start the execution of a configured pulse test.
	
	Usage
	`PE`
	
	Corresponding LPT library function
	`pulse_exec`
	
	Details
	You can use this command to start test execution.
	------ 	
	`PN`
	This command configures the pulse of the pulse channel.
	
	Usage
	`PN`
	`A,BBB.BBBB,CCC.CCCC,DDD.DDDD,EEE.EEEE,FFF.FFFF,GGG.GGGG,HHH.HHHH,<JJJ.JJJJ>`
	
	A: Pulse card channel number: 1 to 8; the largest value is the number of channels in the system.
	B: Voltage Low Level
	C: Voltage High Level
	D: Pulse Trigger Count
	E: Pulse Period
	F: Pulse Width
	G: Pulse Rise Time
	H: Pulse Fall Time
	J: Pulse Delay Time (optional), if left blank 0 will be used.
	
	Corresponding LPT library functions
	`pulse_train`
	`pulse_source_timing`
	
	Details
	You can use this command to set up a pulse train to output on the pulse channel.
	
	Example
	`PN 1, 0.0, 5.0, 10, 100e-6, 20e-6, 200e-9, 200e-9`
	This command string sets channel 1 of pulse card for a pulse train with a 5 V amplitude, 100 µs period, 20 µs width, and 200 nS rise and fall times. This pulse will output 10 times.

Issue number	SCS-4022 / AR61723
Subsystem	Manuals
Enhancement	A new CVU Test Settings section has been added to the Clarius chapter of the Reference Manual to explain the relationships between Delay Factor, Filter Factor, and A/D Aperture Time.
Issue number	SCS-4029
Subsystem	Clarius
Enhancement	Project `mosfet-dc-pulse-iv-sweeps` has been added to the project library. This project combines DC and Pulse I-V data using the new project level spreadsheet.
Issue number	SCS-4030
Subsystem	Learning Center
Enhancement	A 4200A Overview video has been added to the Learning Center.

Issue number	SCS-4031
Subsystem	Clarius
Enhancement	A new Hall Effect user module has been added to the `vdpulib` user library.
Issue number	SCS-4032
Subsystem	8101-PIV and 4200A-DEMO-PARTS
Enhancement	The devices provided with the 8101-PIV have been updated. The Clarius default Demo Project has been updated to use the new devices. The demo devices can be purchased separately as 4200A-DEMO-PARTS.
Issue number	SCS-4034
Subsystem	Clarius
Enhancement	Updated data grid in ITM/UTM Analyze view: • Simplifies the view of data: The grid contains tabs with data from different runs only. The user still has access to settings via separate button. The Calc sheet was removed with replacement via the project level analyze view that provides improved and increased features to compare data from different tests. • Makes it touch-friendly: bigger tabs, better swiping, improved auto-scrolling, etc.
Issue number	SCS-4035
Subsystem	KULT
Enhancement	KULT has been enhanced to use the `MinGW gcc` compiler instead of Visual Studio. This compiler is provided with Clarius+.
Issue number	SCS-4047
Subsystem	KULT
Enhancement	Starting with Clarius+ V1.6, KULT will be functional on PCs.
Issue number	SCS-4061
Subsystem	Learning Center
Enhancement	An AC Guarding video has been added to the Learning Center.
Issue number	SCS-4065
Subsystem	Clarius
Enhancement	Diagrams have been added to the Bias Tee (3 terminals) UTM for clarification.
Issue number	SCS-4066
Subsystem	Learning Center
Enhancement	A CVIV Bias Tee tutorial video has been added to the Learning Center.

Issue number	SCS-4072
Subsystem	KULT
Enhancement	The following information can be found by running `KULT.exe help` or `KULTArchive.exe help` in a command prompt. Subcommand: `zip -l<lib_name> [-password <opt>] zipfile` Creates a zip for a given library Optional parameters: `-password` Required parameters: `-l<lib_name> zipfile` Example: `kult zip -lmy_lib -password pass c:\\temp myzip.zip` Subcommand: `unzip [-dest_path <opt>] [-password <opt>] zipfile` Unzips a file containing a KULT library This command will not overwrite libraries with the same name. If `-dest_path` is not given, the default user directory is used. You should not use `-dest_path` when importing a library. Optional parameters: `-password`, `-dest_path` Required parameters: `zipfile` Example: `kult unzip -password pass c:\\temp myzip.zip`
Issue number	SCS-4080
Subsystem	Clarius
Enhancement	Added the new project, `mosfet-cviv-cv-bias-tees-400V`. This project uses a new user module added to the `hivcvulib` library, `multipleSMU_SweepV`.
Issue number	SCS-4106
Subsystem	Clarius
Enhancement	A capacitance measurements application note was added to the Learning Center.
Issue number	SCS-4109
Subsystem	Clarius
Enhancement	A reliability application note was added to the Learning Center.
Issue number	SCS-4112
Subsystem	Clarius
Enhancement	The current site indicator has been moved from the site and project configuration views to the Project Tree view.
Issue number	SCS-4123
Subsystem	Prober driver, User library
Enhancement	The 4200A-SCS now provides support for the following MPI probers: TS2000, TS2000-DP, TS2000-HP, TS2000-SE, TS3000, and TS3000-SE. Refer to the Learning Center and Reference Manual section "Set up a probe station" and "Using an MPI Probe Station" for additional information.
Issue number	SCS-4134
Subsystem	Clarius
Enhancement	A new app note was added to the Learning Center named "Making Low Current Pulse I-V Measurements with the 4225-PMU Pulse Measure Unit and 4225-RPM Remote/Preamplifier Switch Modules."

Issue number	SCS-4148
Subsystem	KULT
Enhancement	The new KULT command `add_mod` has been added in Clarius V1.6. Refer to the manual or run `KULT.exe help` for more information.
Issue number	SCS-4173
Subsystem	Clarius
Enhancement	To support the new 1 gigaohm demo device included with the 8101-PIV, a `pulse-high-resistance` test was added to the library and replaced the `pulse-resistor` test in the default project.
Issue number	SCS-4181
Subsystem	Clarius
Enhancement	Periodic testing is a mode that was available within subsite cycling on previous versions of Clarius and KITE. In this mode, stress intervals were set on a logarithmic scale until a set point, then stress intervals were set linearly. This was to provide more data points for very long stress cycles. This mode is now enabled for legacy projects only. If an existing project is loaded that has this mode enabled, the same list of stress intervals will be maintained, but in the subsite cycling list mode rather than log mode as it was previously. If this list is not changed and the subsite cycling operation mode does not change, the stress intervals will continue to be preserved through legacy conversion whenever the project is loaded. If the list is changed in any way (intervals added or removed), or if the subsite cycling operation changes, the changes will be saved as it is and legacy conversion will no longer occur when loading this project.
Issue number	SCS-4194
Subsystem	KultArchive
Enhancement	V1.6 comes with `KultArchive.exe`. This aids in transferring user libraries from one unit to another. It requires the Microsoft Visual C++ 2017 Redistributable that is included with this release. It will be installed to `C:\s4200\sys\Microsoft\Microsoft Visual C++ 2017 Redistributable\vc_redist.x86.exe`. You must install it on machines that do not already have it installed.
Issue number	SCS-4197
Subsystem	Clarius
Enhancement	A new test called Hall Coefficient, Mobility, and Resistivity Measurements of a Material (`hall-coefficient`) was added to the library.
Issue number	SCS-4214
Subsystem	Clarius
Enhancement	The error message that appears when subsite stress parameters are invalid differs from the message given under the same conditions as Clarius V1.5 but the resource checking remains the same.
Issue number	SCS-4221
Subsystem	Clarius
Enhancement	VPU StressLow settings have been made read-only for legacy projects in Clarius V1.6. The new project will have this value set to zero. Please contact Keithley Applications for support if this interferes with your testing.

Issue number	SCS-4320
Subsystem	Clarius
Enhancement	In previous versions of Clarius and KITE, the user was able to select Do Not Measure, First Stress Only, or Every Stress for measuring stress values while performing subsite stress operations. This pull-down menu has been replaced in Clarius V1.6 with a checkbox corresponding to either Do Not Measure or Every Stress. Projects created with First Stress Only specified as the measurement type will be converted to Every Stress.

Problem fixes

Issue number	SCS-3180
Subsystem	Clarius
Symptom	When the Windows taskbar is positioned vertically on the left or right side of their display, Clarius will be clipped.
Workaround	Position the Windows taskbar at the bottom of the display.
Resolution	This issue has been corrected.
Issue number	SCS-3281 / AR56849
Subsystem	Clarius+ installation
Symptom	Installing Clarius+ on a PC may result in a grayed-out box appearing in the top-right corner of the Clarius application, covering some of the available icons and buttons.
Resolution	This issue has been corrected.
Issue number	SCS-3712 / AR60504
Subsystem	4200A-CVIV
Symptom	A device can be damaged when an SMU is executing a range change. This is due to an SMU loop being unable to handle a CVIV inductive load during one step in the range change process. SMU output can slew to the power supply rail. If the interlock is present, output voltage can be as high as 210 V for a short time during a range change. This issue affects high-current ranges of the SMU, therefore it is present with or without the preamp.
Workaround	Use OVP (AVM) at a setting just above required test voltage. This will reduce the likelihood of DUT damage.
Resolution	This problem was repaired with hardware versions V1.1 and V1.2.
Issue number	SCS-3947
Subsystem	Manual
Symptom	More information is needed in the manual explaining the SMU filter factor setting.
Resolution	This issue has been corrected.
Issue number	SCS-3953
Subsystem	LPTLib
Symptom	The LPT command setmode (`CVU1`, `KI_CVU_FILTER_FACTOR`, `value`) limits the value to 100 instead of the allowed maximum of 707.
Resolution	This issue has been corrected.

Issue number	SCS-3962
Subsystem	4200A-SCS Operating System Software
Symptom	If the system fan has slowed or stopped, providing insufficient cooling of the system, the System Monitor will force an emergency shutdown of the system after 5 minutes. On Windows 10 based 4200A-SCS systems, on every subsequent boot up of the system, a warning message will appear stating that an emergency shutdown occurred due to a problem with the system fan. This message appears on the next boot up following the emergency shutdown but does not appear unless another emergency shutdown occurs.
Workaround	To clear out any previous emergency shutdowns and to prevent the System Monitor repeatedly presenting the warning message on subsequent boots, delete the following file from the system and restart the 4200A-SCS: `C:\4200A-SCS\system\monitoring\system_monitor_status.json`
Resolution	This issue has been corrected.
Issue number	SCS-3990
Subsystem	Clarius
Symptom	When in Subsite Segment Stress, the limit setting was not saved.
Resolution	This issue has been corrected.
Issue number	SCS-3991
Subsystem	Clarius
Symptom	Clarius may crash when adding items to the Project Level Data Analyze view
Resolution	This issue has been corrected.
Issue number	SCS-3994
Subsystem	Clarius
Symptom	The Typical Minimum Timing Recommendation 4225-PMU and 4225-RPM table, available in Clarius, contains a mistake. The PMU 40V row should have a Pulse Width Time of 6.5 µs (not 6.4 ns), and the Rise and Fall Time should be 1 µs (not 1 ns).
Resolution	This issue has been corrected.
Issue number	SCS-3995
Subsystem	Datasheet
Symptom	The datasheet has an error regarding the 10 mA range noise specification with and without RPMs.
Resolution	This issue has been corrected.
Issue number	SCS-4005
Subsystem	Manuals
Symptom	Video port specifications are incomplete.
Resolution	This issue has been corrected.
Issue number	SCS-4010
Subsystem	Manuals
Symptom	The manual does not stipulate that the CVIV GNDU connection is only available with CVIV hardware version 2.0 or later.
Resolution	This issue has been corrected.

Issue number	SCS-4018 / AR61744
Subsystem	LPTLib
Symptom	The `GetKITESite` function returns negative numbers if the number of sites > 127.
Resolution	This issue has been corrected.
Issue number	SCS-4019
Subsystem	LPTLib
Symptom	The `GetKITECycle` function returns negative numbers if number of sites > 127
Resolution	This issue has been corrected.
Issue number	SCS-4038 / AR61829
Subsystem	Datasheet
Symptom	A typo in the 4200A datasheet's CV Measurement Accuracy Table incorrectly uses units of ns and µs instead of nS and uS.
Resolution	This issue has been corrected.
Issue number	SCS-4041 / AR61845
Subsystem	Datasheet
Symptom	The 4200A-SCS datasheet's 4210-CVU specifications no longer include the typical resolution in degrees.
Resolution	This issue has been corrected.
Issue number	SCS-4042
Subsystem	KULT
Symptom	An older version of KULT allowed library names to begin with a number. The library names are used internally and labels beginning with a number are invalid in the C-standard.
Resolution	This issue has been corrected.
Issue number	SCS-4043
Subsystem	KULT
Symptom	`_declspec` will report a compilation error with MinGW.
Workaround	`_declspec` must be written as `__declspec`.
Resolution	This issue has been corrected.
Issue number	SCS-4044
Subsystem	Manuals
Symptom	More information is needed in the manual explaining the CVU aperture setting.
Resolution	A new section titled "CVU speed settings" has been added to the Clarius chapter of the Reference Manual. This issue has been corrected.
Issue number	SCS-4050
Subsystem	LPTLib
Symptom	Executing the `PMU_SegArb_ExampleFull` user module gives a -122 error. This error signified that an illegal value was used for an LPT parameter.
Resolution	This issue has been corrected.

Issue number	SCS-4051
Subsystem	LPTLib
Symptom	Executing the `PMU_SegArb_ExampleB` user module causes a memory access violation.
Resolution	This issue has been corrected.
Issue number	SCS-4054
Subsystem	Clarius
Symptom	In the `cvu-bjt-cviv` project in the project library, there are three `cviv-configure` user modules to connect the CVU terminals to the output. If you open this project and select either the `cviv-configure-collector-base` user module or the `cviv-configure-collector-emitter` user module, you will see that the Group configurations have been set up for the CVU. However, if you select another part of the project tree and come back, you will notice that the settings have been changed to default settings of the user module and does not keep the original settings.
Resolution	This issue has been corrected.
Issue number	SCS-4055
Subsystem	Datasheet
Symptom	The PMU measure accuracy specifications are misleading as listed in the datasheet.
Resolution	The formatting of the specifications has been updated. This issue has been corrected.
Issue number	SCS-4071
Subsystem	KULT
Symptom	When using the KULT commands, output should be sent to the normal console window instead of `Msgcon`.
Resolution	This issue has been corrected.
Issue number	SCS-4074
Subsystem	KULT
Symptom	KULT generated files should be generated when building the library. This reduces the risk of potential errors in migrating libraries.
Resolution	This issue has been corrected.
Issue number	SCS-4113
Subsystem	Clarius
Symptom	The PMU Settling Times table is half empty.
Resolution	This issue has been corrected.
Issue number	SCS-4114
Subsystem	Clarius
Symptom	Pinching and zooming on a graph with a y-axis set to log scale may hang.
Resolution	This issue has been corrected.
Issue number	SCS-4118
Subsystem	Clarius
Symptom	Line fits in the `vfd` diode test are 0.
Resolution	This issue has been corrected.

Issue number	SCS-4120
Subsystem	Clarius
Symptom	A recent Windows update broke styling for some of the Clarius text blocks by rendering them white.
Resolution	This issue has been corrected.
Issue number	SCS-4129
Subsystem	Clarius
Symptom	Updated the `pulse_cap` test in the default project for use with a 10 pf capacitor.
Resolution	This issue has been corrected.
Issue number	SCS-4161 / AR62165
Subsystem	Clarius
Symptom	This is a Microsoft® breaking change in VS2015. Internally, Clarius writes double values to a KDF file, converting the data to strings. The string representation was changed by Microsoft, breaking code that searched for the old values. This issue affects Clarius version 1.4 and later. From the Visual Studio Release notes: https://docs.microsoft.com/en-us/previous-versions/bb531344(v=vs.140) "Infinity and NaN Formatting In previous versions, infinities and NaNs would be formatted using a set of Visual C++-specific sentinel strings. Infinity: 1.#INF Quiet NaN: 1.#QNAN Signaling NaN: 1.#SNAN Indefinite NaN: 1.#IND Any of these may have been prefixed by a sign and may have been formatted slightly differently depending on field width and precision (sometimes with unusual effects, e.g. printf("%.2f\n", INFINITY) would print 1.#J because the #INF would be "rounded" to a precision of 2 digits). C99 introduced new requirements on how infinities and NaNs are to be formatted. The Visual C++ implementation now conforms to these requirements. The new strings are as follows: Infinity: inf Quiet NaN: nan Signaling NaN: nan(snan) Indefinite NaN:nan(ind) Any of these may be prefixed by a sign. If a capital format specifier is used (%F instead of %f) then the strings are printed in capital letters (INF instead of inf), as is required. The scanf functions have been modified to parse these new strings, so these strings will round-trip through printf and scanf."
Resolution	This issue has been corrected.
Issue number	SCS-4210
Subsystem	Clarius
Symptom	Calc sheets can no longer be used to compare data from different tests.
Resolution	The following tests used Calc sheets and were deleted from the Test Library: • `moscap-vsweep-hif-lof` • `vds-id-pulse-noheating`

Issue number	SCS-4216
Subsystem	Clarius
Symptom	Calc sheets are no longer usable in the `moscap-vlf-cv` project.
Resolution	The `moscap-vlf-cv` project was updated by removing the Calc sheet and adding a Project level graph. This issue has been corrected.
Issue number	SCS-4226
Subsystem	Clarius
Symptom	Project `vds-id-pulse-smu` project needs to update to delete the Calc sheet.
Resolution	The project was updated to remove the Calc sheet and the data was graphed in the Project Analyze view. This issue has been corrected.
Issue number	SCS-4240
Subsystem	Clarius
Symptom	The Calculation sheet in the moscap-cvsweep test that contains garbage data needs to be removed.
Resolution	This issue has been corrected.
Issue number	SCS-4248
Subsystem	Clarius
Symptom	In a project with multiple sites, changing between DC Voltage stress mode to DC Current stress mode could leave invalid stress values on sites not in view.
Workaround	Manually go through all sites and set all stress values on all terminals to valid values.
Resolution	Clarius will now set all subsite cycling terminal stress values to 0 when changing between DC Voltage and DC Current stress modes. If the new mode is DC Voltage, current limits will be set to 0.1 A. If the new mode is DC Current, voltage limits will be set to 20 V. This issue has been corrected.
Issue number	SCS-4251
Subsystem	Clarius
Symptom	A recent change from Windows updates causes some of the Clarius text to display white. In this case, the autocomplete drop down on the search bar is affected.
Resolution	This issue has been corrected.
Issue number	SCS-4263
Subsystem	Prober library, User library
Symptom	When using the Cascade 12000 Prober or the Signatone CM500 (WL250) Prober, undefined status values could be returned when running the `PrInit` or `PrMovNxt` user modules.
Resolution	This issue has been corrected.
Issue number	SCS-4267
Subsystem	Clarius
Symptom	When the `Track Site during stress` test is enabled, Clarius would select a final site greater than the finish site if both the start and finish sites had the same value.
Resolution	This issue has been corrected.
Issue number	SCS-4297
Subsystem	Clarius
Symptom	Renaming a test to something that has a character length approaching 100 characters and a project name of 100 characters results in a vague path limit error.
Resolution	The maximum name length of an item in the tree is now 80 characters instead of 100 characters. This change should not affect existing projects. This issue has been corrected.

Issue number	SCS-4314
Subsystem	Clarius
Symptom	Importing a project without devices or tests will not automatically create the sub folders necessary for certain Clarius operations. This may result file access errors.
Workaround	You can use File explorer to manually create the sub folders. You should see under a project at `C:\s4200\kiuser\Projects\<project name>` • devices • tests • subsites If any of the above are missing, create a new folder with the missing name.
Resolution	Clarius V1.6 will automatically create the folders as needed. This issue has been corrected.
Issue number	SCS-4316
Subsystem	Clarius
Symptom	Naming errors in one library may appear when compiling another library. This is because all libraries include a common header file that include proto header files for all libraries.
Workaround	Fix the library causing the error or delete it. Possible methods to remove a library generating an error. • Deleting the library from KULT. • Deleting the library manually by deleting the library folder, `proto.h` file, as well as modifying the `usrlib_proto.h` file.
Resolution	This issue has been corrected.
Issue number	SCS-4322
Subsystem	Clarius
Symptom	Changes made to the subsite analyze Calc sheet were not being saved. If the Calc sheet was changed and focus was changed to the project tree without changing to another sheet tab, Clarius would crash when focus was returned to the subsite.
Resolution	The crash no longer happens, and the sheet is saved as expected. This issue has been corrected.
Issue number	SCS-4321
Subsystem	Clarius
Symptom	The number of devices that can be configured for stressing or cycling is limited to 40 due to memory limitations during execution. This is planned to be addressed in a future version of Clarius. For now, only the first 40 devices from the subsite project tree will be loaded into the subsite config pane. There is no limit on the number of devices that a single subsite can have otherwise.
Workaround	Create another subsite within the project with the overloaded subsite. Click and drag devices to the new subsite.
Resolution	This issue has been corrected.
Issue number	SCS-4342
Subsystem	LPTLib
Symptom	CVIV configuration CTM hangs in ACS 5.3.1 installed on a 4200A-SCS with Clarius+ V1.5.
Resolution	This issue has been corrected.

Known problems

Issue number	SCS-619
Subsystem	Clarius
Symptom	The Configure screen's All Parameter view does not include entries for the PMU's Load Line Effect Compensation and DUT Resistance options.
Workaround	Select Key Parameters pane on the Configure screen. In the right pane, select Terminal Settings, then select Advanced to open the PMU Advanced Terminal Settings dialog box, where you can enter PMU Load Line Effect Compensation and DUT Resistance values.
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 exist. The extra rows are copies of the last valid row.
Workaround	To keep this situation from occurring, set up the subsite and tests completely before collecting data. When creating a new collection of subsite tests copied from existing subsites, run from this new subsite or higher to generate a new, valid set of data.
Issue number	SCS-3574
Subsystem	Clarius+ applications, including Clarius, KCon, KXCI, KPulse, Message Console, Firmware Upgrade, and InitializeNewUser
Symptom	By default, User Account Control (UAC) notifications are disabled on the 4200A-SCS. This allows Clarius and the other Clarius+ applications noted above to make required system changes without prompting for increased privileges each time they are launched. It also allows third-party applications, including applications potentially categorized as malware, to make system changes without such prompts. You may wish to enable UAC notifications to provide an additional layer of protection when running third-party applications on the 4200A-SCS.
Workaround	You can enable UAC notifications from the User Account Control Settings in Windows. To access these settings, type `uac` in the Windows Search Bar and select **ENTER**. Raise the slider from the "Never notify" position to enable notifications. Note that the notifications will appear as prompts asking, "Do you want to allow this app to make changes to your device?" each time you launch the Clarius+ applications noted above.
Issue number	SCS-3959
Subsystem	System
Symptom	When installing Clarius+, if software dependencies are required they will be installed and may require a reboot. When prompted for a reboot, if No is chosen and the install is attempted again without a reboot, the installation will fail.
Workaround	Uninstall Clarius+, if necessary, and re-install, allowing reboots when requested.
Issue number	SCS-4321
Subsystem	Subsite cycling
Symptom	The number of devices that can be configured for stressing and cycling is limited to 40 due to memory limitations during execution. This is planned to be addressed in a future version of Clarius. For now, only the first 40 devices from the subsite project tree will be loaded into the subsite config pane. There is no limit on the number of devices that a single subsite can have otherwise.
Workaround	Create another subsite within the project with the overloaded subsite. Click and drag your devices to the new subsite.

Usage notes

4200A-CVIV

Before using the 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. Then run the “Update Preamp, RPM, and CVIV Configuration” option in KCon. Make sure to close the Clarius application before opening KCon on the desktop. 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, and run the “Update Preamp, RPM, and CVIV Configuration” option in KCon. Make sure to close the Clarius application before opening KCon on the desktop.

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

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, it is recommended that you use the `cvu-cviv-comp-collect` action.

42x0 SMUs

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:

a. Use the `setmode` command when generating user modules to turn off the compliance indicator value.

   With this workaround, the reading will be returned as 105% of the present range.

b. Use smaller sweep and ramp rates (dv/dt or di/dt).

c. Use fixed SMU ranges.

Keithley Default User Libraries

The User Libraries in Clarius+ software were compiled with Visual Studio C++. If your 4200A-SCS has a different version of Visual Studio installed (see version list below) and you wish to change or debug (using the debug task feature described in Section 8 of the *4200A-SCS Reference Manual*) any of the user libraries listed below (see Default User Libraries table), you will need to recompile all modules in that user library. You will then rebuild the user library. If you do not recompile all user modules, you will receive the error “LINK: fatal error LNK1207: incompatible PDB format in <`your usrlib`>; delete and rebuild.” Follow this message or use the provided batch file, `reBuildKILibs.bat`, for this purpose. `reBuildKILibs.bat` will compile all modules and build all user libraries listed in the Default User Libraries section below. `reBuildKILibs.bat` is in `C:\S4200\sys\bin`. Earlier versions of Visual Studio may install and operate properly but are not supported.

Versions of Visual Studio supported by Clarius+ software:

- Microsoft Visual Studio 2017 C++
- Microsoft Visual Studio 2015 C++
- Microsoft Visual Studio 2013 C++

LPTLIB

1. 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 auto range to a higher range or set a higher voltage range with `rangev`.
2. 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 auto range to a higher range or set a higher current range with `rangei`.

KULT

If you make changes to or need to rebuild `ki82ulib`, please note that `ki82ulib` depends on `ki590ulib` and `winulib`. You must specify these dependencies in the Options > Library Dependencies menu in KULT before building `ki82ulib`. 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 – 1nA" is the default current measurement range for 4200 SMUs with preamplifiers.

"Limited Auto – 100nA" is the default current measurement range for 4200 SMUs without preamplifiers.

NOTE: 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 will set SMU1 (with preamplifier) to the “Limited Auto - 10pA” range.

Subsite Stress Mode

In "Stress/Measure Mode," the "Leave Stress Conditions On" checkbox will maintain the stress voltage or current during the subsequent device testing. However, if the system configuration includes a matrix, then all outputs will be turned off, regardless of the checkbox, to prevent damaging matrix relays. Likewise, with a 4200A-CVIV Switch in the configuration, all outputs will be 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 will be reset when a CVIV connection is made in the subsequent device testing to prevent damaging relays.

Windows® mapped network drive error

When installing Clarius+ on a PC, 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 PC.

PC Installation, Help Pane PDF Link errors

When installing Clarius+ on a PC, PDF links may not open in Clarius from the help pane if you have 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."

PC Installation, language packs

Clarius does not support additional languages in Windows® 10 besides 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 re-install Clarius+ software on your 4200A-SCS.

NOTE: 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)

CAUTION: Installing Clarius+ software will reinstall 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 www.tek.com, follow these instructions:

1. Go to www.tek.com
2. Click the **DOWNLOADS** link.
3. From the DOWNLOAD TYPE list, choose **Software**.
4. For MODEL OR KEYWORD, type **4200A**, and click **SEARCH**.
5. Click 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, click 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

NOTE: 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 Windows® login screen, type the user name and password of the account to be initialized. This will need to 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 will initialize the user who is currently logged in.

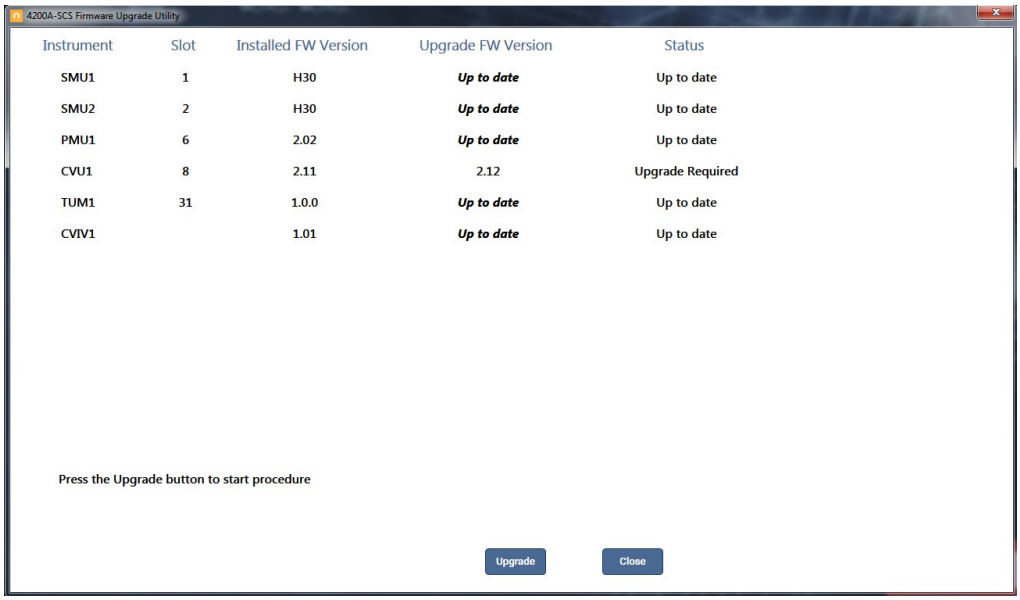
Repeat steps 1 and 2 for both Keithley accounts and for any additional accounts added by the system administrator.

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

- **NOTE:** Clarius software checks for compatible instrument firmware during startup and will not run if all instruments have not been upgraded to compatible firmware versions.
- **NOTE:** To find the current hardware and firmware versions of your 4200A-SCS cards, use the KCon utility and select each card.
- **NOTE:** The firmware upgrade program will automatically indicate the hardware that needs upgraded to the approved or latest firmware version.
- **NOTE:** 4200A-SCS cards are organized by families of related models as shown in the table below. To upgrade the firmware of your 4200A-SCS cards:

CAUTION: 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 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 a instrument as shown below.
5. Select **Upgrade**.
6. The upgrade is not complete, and CVU1 requires upgrading.



The Firmware Upgrade Utility window

Version Table

4200A-SCS instrument family	Hardware version from KCon	Firmware version
4200-SMU/4210-SMU[1]	05,XXXXXXXX or 5,XXXXXXXX	H31
	06,XXXXXXXX or 6,XXXXXXXX	M31
4200-PA	<this product cannot be flash upgraded in the field>	–
4210-CVU	ALL (3.0, 3.1, 4.0 and later)	2.14
4220-PGU/4225-PMU[2]	1.0 and later	2.05
4225-RPM/4225-RPM-LR	1.0 and later	2.00
4200A-CVIV[3]	1.0	1.04
4200A-TUM	1.0	1.0.0

[1] There are two different models of SMUs available in the 4200A-SCS, 4200-SMU (medium power) and 4210-SMU (high power); both models 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 will use both files in the version folder.