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Software Release Notes and 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 organized into the categories presented in the following table.

Revision history	Lists the version of software, the document version, and the date of the software release.
New features and updates	Summary of each significant new feature and update included in Clarius⁺ software and the 4200A-SCS.
Problem fixes	Summary of each significant software or firmware bug fix in Clarius⁺ software and the 4200A-SCS.
Known issues	Summary of known issues and workarounds where possible.
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.
Version table	Lists the hardware and firmware versions for this release.

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
3/2023	v1.12	077132617	17
6/2022	V1.11	077132616	16
3/2022	V1.10.1	077132615	15
10/2021	V1.10	077132614	14
3/2021	V1.9.1	077132613	13
12/2020	V1.9	077132612	12
6/10/2020	V1.8.1	077132611	11
4/23/2020	V1.8	077132610	10
10/14/2019	V1.7	077132609	09
5/3/2019	V1.6.1	077132608	08
2/28/2019	V1.6	077132607	07
6/8/2018	V1.5	077132606	06
2/23/2018	V1.4.1	077132605	05
11/30/2017	V1.4	077132604	04
5/8/2017	V1.3	077132603	03
3/24/2017	V1.2	077132602	02
10/31/2016	V1.1	077132601	01
9/1/2016	V1.0	077132600	00

New features and updates

Major new features in this release include updates to the data storage format, changes to the subsite Analyze graph and sheet, and improvements to the UTM GUI Editor.

When Clarius+ v1.12 is installed, you may also need to upgrade the SMU firmware (refer to Version table). Refer to Upgrade 42x0-SMU, 422x-PxU, 4225-RPM, 4225-RPM-LR, 4210-CVU, and 4200A-CVIV firmware for information.

Updated data storage format (SCS-6994)

Clarius was updated to a new storage format (HDF5) for data files. This change allows the acquisition of up to 65,535 data points in user test modules (UTMs), reduces the data file size, and improves the time required to load data files.

If you update to v1.12 from a prior version of Clarius, data files are automatically updated. Clarius performs a one-time conversion operation when data files in the legacy format are loaded from projects created in the prior version.

If you use Clarius 1.12 to open a project that contains legacy format data files (`.xls`), Clarius performs a one-time conversion that converts the data files to the new storage format and deletes the legacy files.

Updates to the Analyze Graph for subsites (SCS-5171)

The Clarius Analyze Graph for subsites has been replaced with a modern, user-friendly graph that provides additional features and faster performance.

The graph is defined through a Graph Definition Menu that allows you to customize the axes, add text, and add legends. The x-axis and y-axis can be customized using fly-in controls from the edges of the graph.

Touchscreen interactivity of the graph has been improved. You can scale, pan, or autoscale the graph view.

For detailed information on the Graph feature for subsites, refer to the "Analyze data for subsites" section of the Learning Center and the *Model 4200A-SCS Clarius User's Manual*.

Document changes

The following documents were updated to reflect the changes for this release:

- Model 4200A-SCS Capacitance-Voltage Unit (CVU) User's Manual (4200A-CVU-900-01B)
- Model 4200A-SCS Clarius User's Manual (4200A-914-01D)
- Model 4200A-SCS KULT Programming (4200A-KULT-907-01C)
- Model 4200A-SCS LPT Library Programming (4200A-LPT-907-01C)
- Model 4200A-SCS Pulse Card (PGU and PMU) User's Manual (4200A-PMU-900-01B)
- Model 4200A-SCS Setup and Maintenance User's Manual (4200A-908-01D)

Other features and updates

Issue number	SCS-88
Subsystem	Clarius - Help pane
Enhancement	Information on the Winulib user library was moved from the Clarius software manual to the user module Help pane. The Help now shows examples of the dialogs that are generated by each user module.

Issue number	SCS-5171
Subsystem	Clarius - Subsite/Site/Cycling
Enhancement	The Clarius Subsite spreadsheet and graph were updated with modern spreadsheet and graph controls, similar to the spreadsheet and graph in the test Analyze view.

Issue number	SCS-6205
Subsystem	KPulse
Enhancement	The "Export Segment Arb" menu item is only shown when the waveform type is set to Segment Arb.

Issue number	SCS-6257/AR66455
Subsystem	Clarius - PGU and PMU configuration.
Enhancement	Added the following note to the documentation: For the 40 V range for the 4220-PGU and 4225-PMU in pulse mode, the pulse generator is limited to slew no more than 160 MV/s when pulsing more than 10 s.

Issue number	**SCS-6662**
Subsystem	Clarius - Analyze Sheet and Data
Enhancement	You can now save data to the Microsoft Excel `xlsx` format in addition to the `xls`, `csv`, and `txt` formats.

Issue number	**SCS-6889**
Subsystem	Clarius – Site and Subsite
Enhancement	When pasting device terminal stress settings, Paste is only available when the copied device stress configuration is compatible with the selected device.

Issue number	**SCS-6915**
Subsystem	Clarius - Learning Center
Enhancement	The Embedded Computer Policy was updated to clarify which Microsoft Windows updates can be installed.

Issue number	**SCS-6966/CAS-86315-P0M6B5**
Subsystem	Clarius – Instrument Test Module (ITM) Configuration, PMU Advanced Test Configuration
Enhancement	The Clarius PMU Advanced Test Settings dialog has been updated to clarify that the time between steps in pulses configuration is not deterministic and can be 10ms or greater.

Issue number	**SCS-6994**
Subsystem	Clarius
Enhancement	Clarius was updated to a new data storage format. If you update from a prior version of Clarius, when version 1.12 is installed, Clarius performs a one-time conversion operation when loading legacy format data files from projects created in the prior version. Any projects or tests that still use the Calc sheet may lose some precision. The Calc sheet is obsolete and presented as read-only.

Issue number	**SCS-7013**
Subsystem	Clarius – User Test Module (UTM) Configuration, UTM GUI Editor
Enhancement	The Clarius UTM GUI Editor has been updated to allow you to use Clarius to set up stepping and sweeping functions in UTMs.

Issue number	**SCS-7016**
Subsystem	Clarius – User Test Module (UTM) Configuration, UTM GUI Editor
Enhancement	The Clarius UTM GUI Editor was updated to allow alias names for parameters. The alias name defined in the UTM Configuration is displayed in Configure instead of the KULT parameter name.

Issue number	SCS-7020
Subsystem	Clarius – User Test Module (UTM) Configuration, UTM GUI Editor
Enhancement	The Clarius UTM GUI Editor has been updated to allow you to set up custom verification rules and error messages if verification fails on a UTM test.

Issue number	SCS-7022
Subsystem	Clarius – User Test Module (UTM) Configuration, UTM GUI Editor
Enhancement	The Clarius UTM GUI Editor has been updated to allow a group of parameters to be placed in the central and right configuration panes of Clarius.

Issue number	SCS-7152
Subsystem	Clarius - User Modules
Enhancement	The maximum size for output arrays (`X_ARRAY_T` output parameter types) has been increased to 65,535 points.

Issue number	SCS-7167
Subsystem	Clarius - User Modules
Enhancement	The user module `CVU_Sampling_Max_Points` was added to the `cvuulib` library. This user module allows you to sample up to 65,535 points with the CVU.

Issue number	SCS-7215
Subsystem	Clarius - User Module
Enhancement	The `PMU_SMU-sampleRate` user module has been updated to support 65,534 points.

Issue number	SCS-7228
Subsystem	Clarius - User Modules, CVU
Enhancement	In a user library module using a 4210-CVU or 4215-CVU, it is possible to retrieve the timestamp of the last measurement. It is common to normalize the measurement timestamps to zero by using the first measurement timestamp as t0 and subtracting this value from subsequent measurement timestamps. Because the timestamp is a free-running 32-bit counter, it is possible, although rare, for the counter to roll over while a test is running, since it rolls over to zero every 119 hours. The `CVU_CLOCK_ROLLOVER` #define was added to `lptparam.h` for users who want to account for this phenomenon. The source code for the new factory user module `CVU_Sampling_Max_Points.c` in the `cvuulib` library shows an example of how to use this #define to compensate for the timestamp rollover.

Issue number	SCS-7233
Subsystem	Clarius - Library
Enhancement	Added the new `capacitance-time-65k` test to the library. This test takes up to 65,000 capacitance versus time readings and calculates the noise.

Issue number	**SCS-7278**
Subsystem	Clarius - Analyze
Enhancement	The Save Data dialog in the Analyze view has been updated so that the graph and sheet files are saved to the same default directory.

Issue number	**SCS-7286**
Subsystem	Clarius
Enhancement	When Clarius 1.12 is uninstalled, the user is prompted to convert data files to the legacy data format for compatibility with prior releases of Clarius.

Issue number	**SCS-7311**
Subsystem	Clarius - Library
Enhancement	The `moscap-mobile-ion` project has been updated to use the project Analyze view to calculate the mobile charge instead of using the Subsite Analyze view.

Issue number	**SCS-7357**
Subsystem	Clarius - Library
Enhancement	The `solar-cell` project has been updated to use the project Analyze view to calculate the resistivity instead of using the Subsite Analyze view.

Issue number	**SCS-7363**
Subsystem	Clarius - Project Export
Enhancement	The Clarius Export Project dialog has been updated to export projects for Clarius 1.11 or prior versions.

Issue number	**SCS-7370**
Subsystem	Clarius - Library
Enhancement	The `vdp-resistivity` project has been updated to use the project Analyze view to determine the resistivity of a material instead of using the Subsite Analyze view.

Problem fixes

Issue number	**SCS-4635**
Subsystem	Clarius – Site and Subsite
Symptom	More than 40 devices cannot be graphed in the Subsite Analyze view.
Resolution	This issue has been corrected.
Issue number	**SCS-5159**
Subsystem	Clarius - User Modules
Symptom	Clarius can hang when running a UTM sweep command if the size of a return array is less than the size that is expected.
Resolution	This issue has been corrected.
Issue number	**SCS-6619/AR67183**
Subsystem	Clarius - UTM GUI Editor
Symptom	Clarius could crash when editing the UTM GUI configuration for a user module with a large number of parameters.
Resolution	This issue has been corrected.
Issue number	**SCS-6933**
Subsystem	Clarius - Formulator
Symptom	Special characters in the project directory name can prevent projects that use Formulator data from working.
Resolution	This issue has been corrected.
Issue number	**SCS-6957**
Subsystem	Clarius - Graph
Symptom	The Clarius graph crashes when the **Graph Definition > Advanced Settings > Set Data Series to Defaults** option is selected for some tests.
Resolution	This issue has been corrected.
Issue number	**SCS-6963/CAS-88331-Y1K2H7**
Subsystem	Clarius - Configure
Symptom	The PMU output limitations and errors are not described in the graphical user interface or manual.
Resolution	This issue has been corrected and the error message was improved.

Issue number	SCS-6979
Subsystem	Clarius, KULT, KULT Extension
Symptom	Building a user module using KULT or the KULT Extension may fail when Clarius is open and the "Reinitialize hardware after run" setting is disabled.
Resolution	This issue has been corrected.
Issue number	SCS-6987
Subsystem	KCon
Symptom	KCon update may not display newly connected external instruments. In addition, external instruments that have been recently disconnected may not be removed.
Resolution	This issue has been corrected.
Issue number	SCS-7067
Subsystem	Clarius
Symptom	If the Projects directory contains the @ character, creating or opening a project could cause Clarius to crash.
Resolution	This issue has been corrected.
Issue number	SCS-7084
Subsystem	Clarius – Analyze Graph
Symptom	The Analyze Graph does not plot series for all runs for some tests added from the factory library.
Resolution	This issue has been corrected.
Issue number	SCS-7090
Subsystem	Clarius
Symptom	The VCSAT formula for the vcsat test contains a hard-coded value of 10 mA for the current, which is incorrect.
Resolution	This issue has been corrected. The value from the ICSAT formula is now used as the current value. This change affects the vcsat test in the default, bjt, and ivswitch projects.
Issue number	SCS-7092
Subsystem	Clarius - Analyze
Symptom	Data variables displayed in the graph may not match the value shown in the sheet because of an incorrect rounding representation.
Resolution	This issue has been corrected.

Issue number	**SCS-7099**
Subsystem	Clarius - Analyze and User Libraries
Symptom	If a test contains invalid or duplicate parameter names, Clarius only displays one of the parameters with the duplicate name, even if the data file contains both parameters.
Resolution	This issue has been corrected. The test data can now be displayed in Clarius Analyze. However, user modules with invalid parameter names need to be modified so that all parameters have unique names to ensure operation with the Formulator and other features that require unique names.
Issue number	**SCS-7115**
Subsystem	Clarius - User Modules
Symptom	If there is no 4200A-CVIV attached to the 4200A-SCS, Clarius could hang when trying to run tests using the `hivcvulib` user library.
Resolution	This issue has been corrected. The `hivcvulib` user library was modified to initialize output parameters appropriately.
Issue number	**SCS-7117**
Subsystem	Clarius - Analyze and Run History
Symptom	Test settings are not imported correctly from KITE projects with appended data. When the test settings are imported, the most recent run has the correct test settings but all other runs display the test settings from the oldest run. If the project uses cycles, the test settings are handled correctly.
Resolution	This issue has been corrected. However, any KITE projects that were originally imported in prior Clarius releases will continue to display the incorrectly imported test settings.
Issue number	**SCS-7124**
Subsystem	Clarius
Symptom	If a directory name contains the @ character, creating or opening a project in that directory could cause Clarius to crash.
Resolution	This issue has been corrected.
Issue number	**SCS-7130**
Subsystem	Clarius - UTM GUI Editor
Symptom	If **Edit UTM UI** is selected and no user library or module is selected, Clarius crashes.
Resolution	This issue has been corrected.
Issue number	**SCS-7170/CAS-115399-C8T9F5**
Subsystem	KCon, KXCI
Symptom	When modifying the KXCI settings in KCon, the String Terminator Character combo box is disabled when Ethernet Communication is selected.
Resolution	This issue has been corrected.

Issue number	**SCS-7192**
Subsystem	Clarius – Analyze sheet
Symptom	Clarius hangs after selecting a column header in an Analyze sheet with many rows.
Resolution	This issue has been corrected.
Issue number	**SCS-7197**
Subsystem	Clarius - Analyze
Symptom	In rare circumstances, copying data from the Analyze sheet could cause Clarius to crash if the clipboard is locked by a third-party program, such as a clipboard manager or TightVNC.
Resolution	This issue has been corrected.
Issue number	**SCS-7224**
Subsystem	Clarius - UTM GUI Editor
Symptom	Using the UTM GUI editor to add more than four OptionBtn controls could cause Clarius to crash.
Resolution	This issue has been corrected. The number of OptionBtn controls is now limited to four.
Issue number	**SCS-7229**
Subsystem	Clarius - Formulas
Symptom	The Clarius displays some formulated data in UTMs as `-nan(ind)`. This affects formulas calculated at the end of a run, such as AT, AVG, COND, and NOISE.
Resolution	This issue has been corrected.
Issue number	**SCS-7244/CAS-898790Q5Q2**
Subsystem	42xx-SMU Firmware
Symptom	When running a current sweep from a negative current value to a positive current value on Revision 7 SMU hardware, large glitches of –13 V and –10 V were observed at the start of each sweep. Revision 7 4211-SMU and 4201-SMU models had larger spikes than the 4200 and 4210 SMU models.
Resolution	A new firmware version has been created to address and reduce the spike.
Issue number	**SCS-7263**
Subsystem	Clarius - Graph
Symptom	When multiple runs are selected, the Clarius Graph may corrupt plotting of real-time data for some test configurations.
Resolution	This issue has been corrected.

Issue number	SCS-7325
Subsystem	Clarius
Symptom	When a site is selected in the project tree, deleting a site or subsite could cause Clarius to crash.
Resolution	This issue has been corrected.
Issue number	SCS-7329
Subsystem	Clarius - Subsite
Symptom	The Clarius Subsite Analyze view displays the subsite name in top left corner as "Subsite" instead of the subsite name.
Resolution	This issue has been corrected.
Issue number	SCS-7350
Subsystem	Clarius - UTM GUI Editor
Symptom	In the UTM GUI Editor, when the Reset Defaults button is selected, the Image tab disappears.
Resolution	This issue has been corrected.
Issue number	SCS-7451
Subsystem	Clarius - UTM GUI Editor
Symptom	In the Clarius UTM GUI Editor, the image path cannot be removed.
Resolution	This issue has been corrected.

Known issues

Issue number	SCS-6486
Subsystem	Clarius
Symptom	It is difficult to move the line fit markers using the touchscreen.
Workaround	Use a mouse to move line fit markers.
Issue number	SCS-6908
Subsystem	4215-CVU
Symptom	Performing a frequency sweep with the start frequency higher than the stop frequency (sweep down) may calculate incorrect frequency points.
Workaround	None.

Issue number	**SCS-6936**
Subsystem	Clarius
Symptom	Monitoring of PMU multi-channel tests does not work.
Workaround	None.
Issue number	**SCS-7468**
Subsystem	Clarius
Symptom	Some projects created in Clarius 1.12 cannot be opened using Clarius 1.11 and prior releases. Attempting to open the project in Clarius 1.11 results in "Corrupted test run history" messages.
Workaround	Use Clarius 1.12 to export the project to a `.kzp` file with the "Export run data for Clarius version 1.11 or earlier" enabled. Import the project in Clarius 1.11.

Usage notes

Visual Studio Code Workspace Trust

As of May 2021, Visual Studio Code opens new file directories in Restricted Mode. Some Visual Studio Code features such as code execution and extensions are automatically disabled. Some features of the Clarius software (such as the KULT code extension) will not work unless you enable Workspace Trust for the applicable folders.

Follow this link for more information on trusting workspaces, enabling code extensions, and other topics related to Restricted Mode:

https://code.visualstudio.com/docs/editor/workspace-trust

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 change 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 – 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

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, 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 the latest version is installed.

If you are installing Clarius⁺ and ACS on the same system, Clarius⁺ must be installed first.

If you are using the KULT Extension, you must uninstall and reinstall the KULT Extension after installing Clarius⁺.

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. Uninstall the 4200A-SCS Clarius⁺ Software Tools

Before installing Clarius+, you need to uninstall the existing version using Windows Control Panel.

If you are uninstalling a version of Clarius+ later than V1.12 and plan to install a prior version, you need to convert the projects from the HDF5 data file format to the Microsoft Excel 97 `.xls` data format.

NOTE

If you want to export run data for use in a prior version of Clarius+ without uninstalling, you can use the Projects > Export option. Refer to the topic "Export a project" in the Learning Center for detail.

To uninstall Clarius⁺:

1. From Start, select **Windows System > Control Panel**.

2. Select **Uninstall a program**.

3. Select **Clarius+**.

4. For the prompt "Do you want to completely remove the selected application and all of its features?", select **Yes**.

5. On the Convert Data Files dialog, if you want to:

    • Install a version prior to v1.12: Select **Yes**.

    • Reinstall v1.12 or a later version: Select **No**.

6. After completing the uninstall procedure, install Clarius⁺ as described in the release notes for the version you are installing.

STEP 3. Install the 4200A-SCS Clarius⁺ Software Tools

You can download the Clarius⁺ software from the [tek.com](tek.com) website.

To download and install the Clarius⁺ software from the website:

1. Go to [tek.com](tek.com).

2. Select the **Support** link.

3. Select **Find Software, Manuals, FAQs by Model**.

4. In the Enter Model field, enter **4200A-SCS**.

5. Select **Go**.

6. Select **Software**.

7. Select the software version.

8. Select the software link that you want to download. Note that you will need to log in or register to continue.

9. Unzip the downloaded file.

10. Double-click the `setup.exe` file to install the software on your 4200A-SCS.

11. 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.

12. 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 4. 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.

NOTE

The HTML5-based Learning Center is not supported in Internet Explorer. The installation will install Microsoft Edge Chromium, but you may need to change the default browser on user accounts that have the default set to Internet Explorer. You can use one of the following browsers: Microsoft Edge Chromium, Google Chrome, or Firefox.

STEP 5. 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.

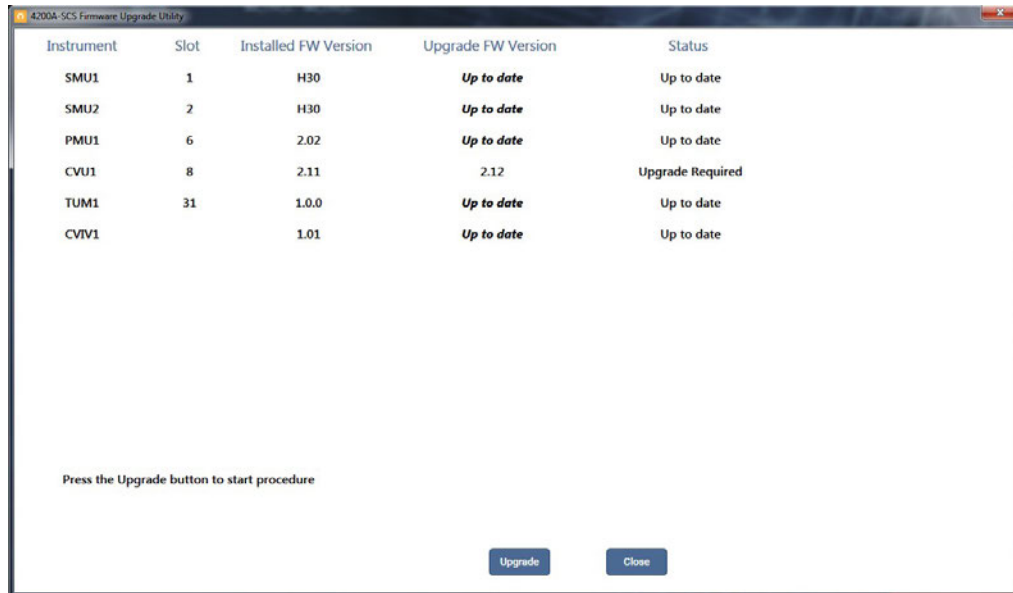The 4200A-SCS cards are organized by families of related models, as shown in the following.

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 dialog below shows that the upgrade is not complete. The CVU1 requires upgrading.

The Firmware Upgrade Utility dialog

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	R34
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	2.08
4225-RPM, 4225-RPM-LR	1.0 and later	2.00
4200A-CVIV[3]	1.0	1.04
4200A-TUM	1.0	1.00
	1.3	1.1.30

[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.