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GENERAL INFORMATION

This document describes the features added to the Keithley Instruments Automation Characterization Suite (ACS) Standard Edition software (version 6.3).

The Keithley Instruments ACS Standard Edition software supports component characterization testing of packaged parts and wafer-level testing using probers. ACS Standard Edition software can be installed on any computer, including the Keithley Instruments Model 4200A-SCS Parameter Analyzer and Model 4200A Semiconductor Characterization System (4200-SCS).

SUPPORTED OPERATING SYSTEMS

ACS Standard Edition software is supported on the following operating systems:

Microsoft® Windows® 11, 64-bit

Microsoft Windows 10, 64-bit

Microsoft Windows 10, 32-bit

Microsoft Windows 7, 64-bit (with Service pack 1)

Microsoft Windows 7, 32-bit (with Service pack 1)



ACS STANDARD REVISION HISTORY

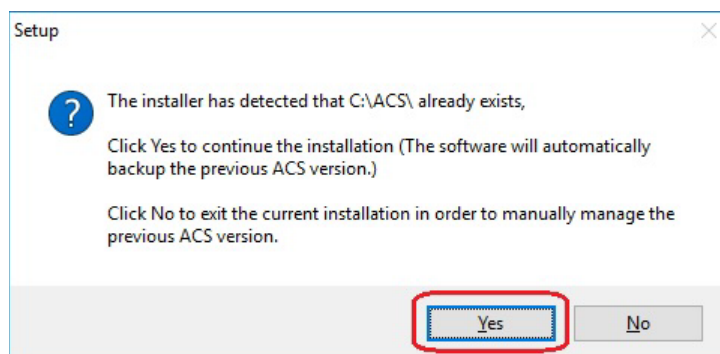
Version	Release date
6.3	November 2023
6.2	November 2022
6.1	March 2022
6.0	August 2021
5.4	February 2021
5.3	December 2017
5.2.1	September 2015
5.2	December 2014
5.1	May 2014
5.0	February 2013
4.4	December 2011
4.3.1	June 2011
4.3	March 2011
4.2.5	October 2010
4.2	June 2010

INSTALL ACS

To install ACS software on a personal computer or 4200A-SCS:

1. Log in to your computer as an Administrator.
2. Open the ACS executable file.
3. Follow the software installation instructions.
4. Select **Yes** if you have an older version of ACS installed, as shown in the following figure.

Figure 1: ACS Software installation

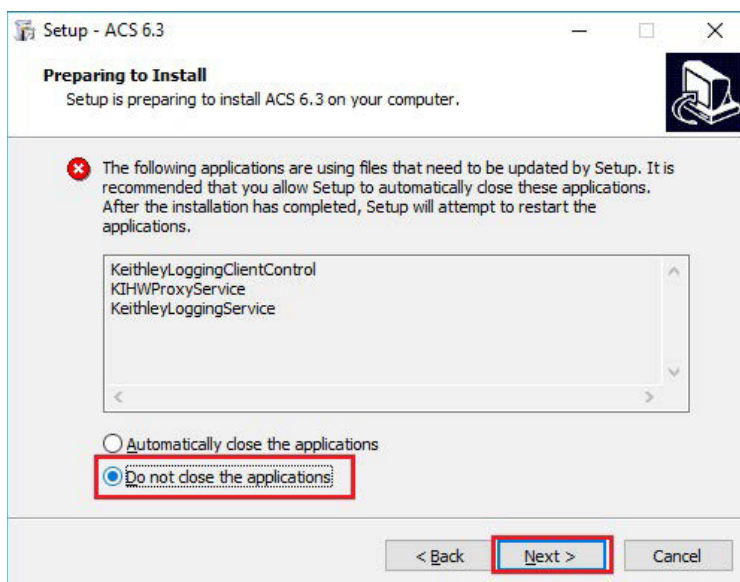


5. Follow the instructions to specify how you want to install the software on your system.
6. If you have projects you need to backup or restore from a previous version of ACS, see the following [Update previous versions of ACS files](#).

INSTALL ACS ON A 4200A-SCS PARAMETER ANALYZER

If you are installing ACS on a 4200A-SCS Parameter Analyzer, the following dialog box is displayed, indicating the applications identified are needed for installation. Make sure you select **Do not close applications** and **Next** to install (see the following figure).

Figure 2: ACS 6.3 prepare to install



UPDATE PREVIOUS VERSIONS OF ACS FILES

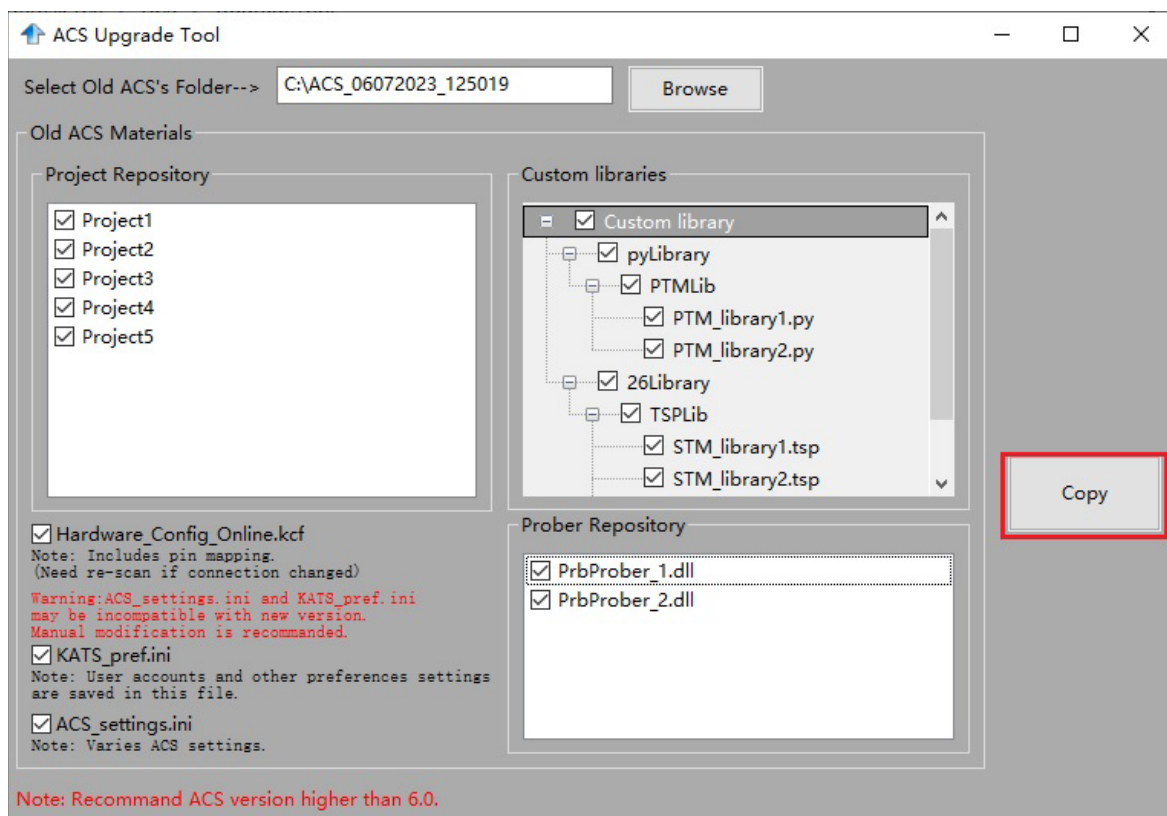
NOTE

Once ACS is installed, you can use the `UpgradeTool.exe` to convert your ACS 6.0 files or later to the current version, which includes projects, libraries, and settings from previous versions.

To update previous software files:

1. Go to `C:\ACS\UpgradeTool\`.
2. Double-click **UpgradeTool.exe**.
3. Choose the items in the folder you want to update (see the following figure).

Figure 3: ACS Software installation



5. Select **Copy**.

When the updated version of ACS is installed, the previous version is renamed. You can copy the projects and libraries from the previous version using the following steps.

NOTE

If you have ACS version 5.4, or a previous version, you must manually copy the projects and libraries by following the steps below.

To copy and paste folders:

1. Find the C:\ACS_DDMYYYY_HHMMSS\Projects\ folder.
2. Copy and paste to the present C:\ACS\Projects\ folder.
3. Find the C:\ACS_DDMYYYY_HHMMSS\library\pyLibrary\PTMLib\ folder.
4. Copy and paste to the present C:\ACS\library\pyLibrary\PTMLib\ folder.
5. Find the C:\ACS_DDMYYYY_HHMMSS\library\26library\ folder.
6. Copy and paste to the present C:\ACS\library\26library\ folder.

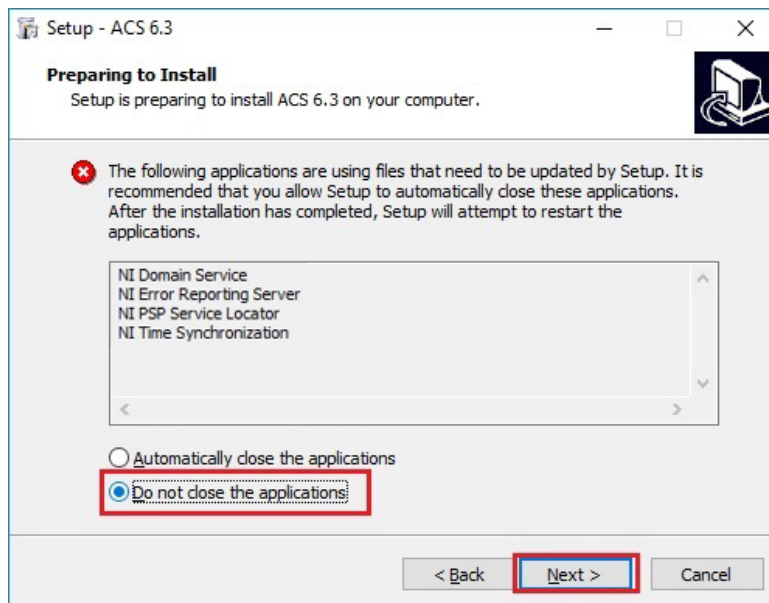
NOTE

ACS 6.3 is based on the Python 3.7 programming language. If you customized your projects in a previous version of ACS you may need to change the projects created in the previous version of ACS, which includes the Python language test module (PTM) script libraries. You can go to this site to review the Python changes for more detail: <https://docs.python.org/3/whatsnew/3.7.html#porting-to-python-37>

INSTALL ACS AFTER INSTALLING NI-488.2 DRIVERS

If you are installing ACS on a system that contains NI-488.2 drivers, the following dialog box is displayed, indicating the applications identified are needed for installation. Make sure you select **Do not close applications** and **Next** to install (see the following figure).

Figure 4: ACS 6.3 prepare to install



SUPPORTED MODELS AND TEST CONFIGURATIONS

ACS software is used to characterize semiconductor devices with a variety of Keithley Instruments products in a variety of different test configurations. The *ACS Fundamentals Reference Manual* (part number ACS-914-01) and *ACS Advanced Features Reference Manual* (part number ACS-908-01) contain detailed information about the supported hardware and test configurations.

- Perform multi-group testing with the Series 2600B and 2400 Graphical Touchscreen Series (GTS) instruments using ACS software installed on a personal computer or laptop.
- Control hardware using ACS software installed on the Model 4200A-SCS Parameter Analyzer or Model 4200-SCS.

- Perform combined group testing with a 4200A-SCS Parameter Analyzer or 4200-SCS and Series 2600B instruments using the combined test-execution engine in ACS software.
- Control other external GPIB, LAN, or USB instruments using ACS software installed on a personal computer or laptop.

The following table summarizes the instruments supported in the ACS test libraries.

Instrument type	Supported models
SMU Instruments	2600B Series: 2601B-PULSE (DC only), 2601B, 2602B, 2604B, 2611B, 2612B, 2614B, 2634B, 2635B, 2636B
	2600A Series: 2601A, 2602A, 2611A, 2612A, 2635A, 2636A
	2400 Graphical Series SMU (KI24XX TTI): 2450, 2460, 2460-NFP, 2460-NFP-RACK, 2460-RACK, 2461, 2461-SYS, 2470
	2400 Standard Series SMU: 2401, 2410, 2420, 2430, 2440
	2650 Series for High Power: 2651A, 2657A
	4200A and the following modules: 4210-CVU, 4215-CVU, 4225-PMU/4225-RPM, 4225-RPM-LR, 4200-SMU, 4201-SMU, 4210-SMU, 4211-SMU, 4200-PA, 4200A-CVIV
Parameter Analyzers	DMM6500, DMM7510, 2010 Series
DMMs	707A/B, 708A/B, 3700A
Ultra-sensitive Current Sources and Nanovoltmeter	6220, 6221, 2182A
Switching and data acquisition systems	DAQ6510, 707A/B, 708A/B, 3700A
Pulse Generators	3400 Series

The following probers are supported in ACS:

Probers	Manual Prober Micromanipulator 8860 Prober Suss MicroTec PA200/Cascade CM300 Prober Cascade 12000 Prober Cascade S300 Prober Electroglas EG2X Prober Electroglas EG4X Prober TEL P8/P12 Prober TEL 19S Prober Tokyo Semitsu TSK9(UF200/UF3000/APM60/70/80/90) Prober Wentworth Pegasus 300S Prober with SRQ check Micromanipulator P300A Prober Yang Sagi3 Prober with SRQ check Signatone CM500 Prober (WL250) TEL T78S/80S Prober MPI SENTIO Prober Semiprobe SPFA Prober MJC AP-80 (SP-80) prober Apollowave AP200/AP300 Prober Vector Semiconductor AX/VX Series prober HiSOL prober (Python code)
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NOTE

The graphical interactive test module (ITM) supports 24xx Graphical Series SMU instruments and 26xx instruments at the same time. The 24xx instrument should be connected as the primary instrument, and the 26xx connected as the subordinate.

You can control any Test Script Processor (TSP™) instrument using a script test module (STM) script.

You can control any instrument using the Python language test module (PTM) script, including instrumentation from other vendors.

Existing ACS STM and PTM libraries support specific instruments based on the library definition.

SUPPORTED COMMUNICATIONS INTERFACE

- GPIB
- LAN (Auto Scan and LAN)
- USB
- RS-232

NOTE

If you are using a RS-232 connection, the instrument is not automatically added to the hardware configuration. Add instruments connected with RS-232 manually and change the hardware configuration file that is in the following directory on your computer to the following:

C:\ACS\HardwareManagementTool\HWCFG_pref.ini. In this file you change the baud rate, parity, byte, and stopBit settings. Review the following figure for details.

Figure 5: RS-232 connection



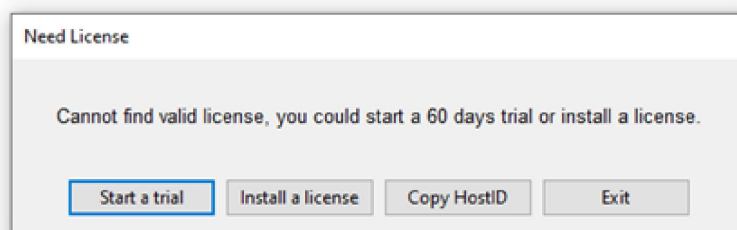
```

HWCFG_pref.ini - Notepad
File Edit Format View Help
rs232_enable=0
auto_scan_lan_enable=0
manual_lan_enable=0
kxci_enable=1
#ip_addr=192.168.1.1
ip_addr=
#kxci_addr=127.0.0.1
kxci_addr=127.0.0.1
[RS232]
#config number of RS232/Baud_Rate/Parity/Com/Byte/StopBit, Com is necessary! below is
example
Ins_num=4
Ins1=Baud_Rate@9600,Parity@N,Com@Com1,Byte@8,Stop_Bit@1
Ins2=Baud_Rate@9600,Parity@N,Com@Com2,Byte@8,Stop_Bit@1
Ins3=Baud_Rate@9600,Parity@N,Com@Com3,Byte@8,Stop_Bit@1
Ins4=Baud_Rate@9600,Parity@N,Com@Com4,Byte@8,Stop_Bit@1
  
```

SOFTWARE LICENSE

ACS allows you to create tests, manipulate settings, and view previous data without a license. However, you must have a license for ACS to control and retrieve data from a physical instrument. You can launch a one-time, 60-day trial for ACS after the initial installation. Once the license expires, you need to purchase a full license to use the software.

Figure 6: ACS 6.3 license information



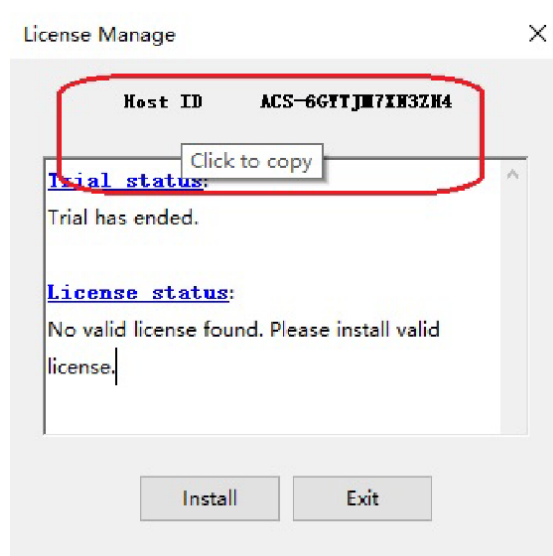
LICENSE MANAGEMENT

The ACS software license is managed using the Tektronix Asset Management System (TekAMS).

To generate a license file:

1. You must submit your Host ID to TekAMS. For more information about TekAMS, see tek.com/products/product-license.
2. To find the host ID, open the License Manage dialog box from the ACS Help menu. Select **License > Host ID**, then **Click to copy** to copy the Host ID.
3. Select **Install**.

Figure 7: ACS Host ID 6.3 license information



ACS STANDARD VERSION 6.3

ENHANCEMENTS:

Issue number:	ACS-784, CAS-209266-Y5K4F1
Enhancement:	Support for the Keysight E4980A added
Issue number:	ACS-716
Enhancement:	Support added for TSP-Link connections to the DMM6500 and DMM7510.
Issue number:	ACS-677
Enhancement:	Add Hardware Scan Tool support for: 6221 through GPIB and ethernet 6220 through GPIB 2182 and 2182A through RS232 or Trigger Link cable to the 6220 or 6221

HARDWARE CONFIGURATION:

Issue number:	ACS-766, CAS-199477-J6M6T8
Enhancement:	Slow response when switching between PTMs and ITMs.
Issue number:	ACS-762
Enhancement:	Support added for saving data to the Microsoft® Excel® format .xlsx.
Issue number:	ACS-724
Enhancement:	Shared-Stress App: Added example library and project to show how the application works.
Issue number:	ACS-694, ACS-721
Enhancement:	Develop HiSOL python prober driver in ACS.
Issue number:	ACS-718
Enhancement:	DMM7510 and DMM6500 support: added tsp library <code>DMM_SMU_lib.tsp</code> including function <code>FIMV_Sweep</code> and <code>FIMV_Sample</code> .
Issue number:	ACS-717
Enhancement:	2601B and DMM7510 support: Add <code>LIV_Lib.tsp</code> library into ACS.
Issue number:	ACS-713, ACS-712
Enhancement:	Created test module template <i>Power MOSFET (SiC) Reliability</i> application for ACS, including <code>VTH_SiC</code> , <code>HTRB</code> , <code>HTGB</code> .
Issue number:	ACS-690, ACS-689
Enhancement:	Added standard PTM <code>KI622x_2182_Lib.py</code> to support KI622x+2182(A) Delta and Differential mode.
Issue number:	ACS-681, ACS-680, ACS-679
Enhancement:	Shared-Stress App: Added python library <code>Share_Stress_App.py</code> and <code>Shared Stress Demo.py</code> .
Issue number:	ACS-676
Enhancement:	Add a PTM demo script to run UTM library remotely on 4200A through KXCI.
Issue number:	ACS-664, CAS-143278-Z7L7T3
Enhancement:	Supported generalized Shared-Stress in ACS.
Issue number:	ACS-653, CAS-124875-V3W1G7
Enhancement:	<code>UpgradeTool.exe</code> was added to help convert your ACS 6.0 files or later to the present version, including projects, libraries, and settings from previous versions.

ACS MANUAL UPDATES:

Issue number:	ACS-790, ACS-783, ACS-733, ACS-729, ACS-728, ACS-725, ACS-719, ACS-711
Enhancement:	ACS 2600 RTM User's Manual, ACS Programmer's Manual, ACS Advanced Features Manual, ACS Fundamentals Reference Manual, and ACS Quick Start Guide update.

RESOLVED ISSUES:

Issue number:	ACS-787
Symptom:	The status of spool is also 0 when it times out.
Resolution:	This issue has been corrected.
Issue number:	ACS-763, CAS-198461-L5X8W7
Symptom:	ACS formula issue, when the VTCI formula returns #REF unable to save data to a .xls file.
Resolution:	This issue has been corrected.
Issue number:	ACS-758
Symptom:	ITM 2461 Pulse mode incorrectly reached compliance at current lower than the <code>limiti</code> setting.
Resolution:	This issue has been corrected.
Issue number:	ACS-755
Symptom:	Formula from the last device-level running file is copied to all ITMs.
Resolution:	This issue has been corrected.
Issue number:	ACS-754, CAS-191991-W5S8D8
Symptom:	ACS CSV subsite unit is wrong.
Resolution:	This issue has been corrected.
Issue number:	ACS-753, CAS-191970-C6C2F3
Symptom:	ACS graph problem Fixed Scale.
Resolution:	This issue has been corrected.
Issue number:	ACS-752, CAS-191977-V4N4T0
Symptom:	ACS graph problem Log Scale.
Resolution:	This issue has been corrected.
Issue number:	ACS-751, CAS-191987-Q2T8Q5
Symptom:	ACS graph scale format error (Scientific Linear)
Resolution:	This issue has been corrected.
Issue number:	ACS-750, CAS-191988-X7C2L0
Symptom:	ACS graph scale format error (Scientific LOG)
Resolution:	This issue has been corrected.
Issue number:	ACS-740
Symptom:	The 2450, DMM6500, and DAQ6510 report errors when starting ACS.
Resolution:	This issue has been corrected.
Issue number:	ACS-737, CAS-183556-J8P1L6
Symptom:	ACS crashes during an abort test in an ITM sweep.
Resolution:	This issue has been corrected.
Issue number:	ACS-732
Symptom:	Need to enable the High C mode in the ITM when connected to a Model 2657A.
Resolution:	This issue has been corrected.
Issue number:	ACS-706
Symptom:	<code>sintgv()</code> is missing in TSPLPT.
Resolution:	This issue has been corrected.
Issue number:	ACS-705
Symptom:	Enabled the <i>Combine SMU</i> button in the hardware management configuration demo mode.
Resolution:	This issue has been corrected.
Issue number:	ACS-704, CAS-168192-R6R9C0
Symptom:	Inaccurate C measurement value is only at 10 kHz with ACS.
Resolution:	This issue has been corrected.

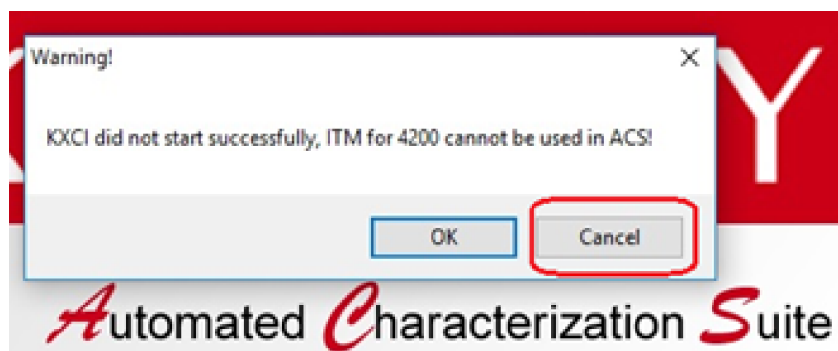
Issue number:	ACS-703
Symptom:	Manual - Some graphics are blurry and hard to read.
Resolution:	This issue has been corrected.
Issue number:	ACS-701
Symptom:	In the manual, the instructions for the ACSLPT <code>checkparam()</code> command is difficult to understand.
Resolution:	This issue has been corrected.
Issue number:	ACS-699
Symptom:	Add a Message Dialog to disallow renaming the ACS pattern, subsites, and device name that start with a number.
Resolution:	This issue has been corrected.
Issue number:	ACS-698
Symptom:	Grammar mistake in the error report of ACSLPT and SPLPT matrix functions.
Resolution:	This issue has been corrected.
Issue number:	ACS-697
Symptom:	Manual - ACSLPT matrix connection functions mistakenly add content for <code>conpin</code> , <code>conpth</code> , and <code>delcon</code> commands.
Resolution:	This issue has been corrected.
Issue number:	ACS-696
Symptom:	Manual - ACSLPT matrix path connection functions and the SMU should not be connected through the path.
Resolution:	This issue has been corrected.
Issue number:	ACS-695
Symptom:	TSPLPT <code>delcon</code> command is not working correctly.
Resolution:	This issue has been corrected.
Issue number:	ACS-693, CAS-162206-X6Q0Q9
Symptom:	ACS corrected the prober name <i>Apolo</i> to <i>Apollo</i> .
Resolution:	This issue has been corrected.
Issue number:	ACS-692, ACS-684, CAS-162203-C3L1R7
Symptom:	<code>ACSPostGData()</code> should be changed to <code>ACSPostGdata()</code> in the ACS Programmer's manual.
Resolution:	This issue has been corrected.
Issue number:	ACS-688
Symptom:	ACS cannot scan the Matrix 707B with 7072B cards in the hardware management tool.
Resolution:	This issue has been corrected.
Issue number:	ACS-687, CAS-157136-K7R9R0
Symptom:	High Open Offset Capacitance issue on the PCT HVCV Test.
Resolution:	This issue has been corrected.
Issue number:	ACS-686
Enhancement:	Added ACSLPT functions <code>bsweepi</code> , <code>bsweepv</code> , <code>sweepX</code> , <code>rtfary</code> , <code>savgi</code> , <code>savgv</code> , <code>sintgi</code> , <code>sintgv</code> , <code>smeasi</code> , <code>smeasv</code> , <code>sweepi</code> , <code>sweepv</code> , <code>trigig</code> , <code>trigvg</code> , <code>trigil</code> , and <code>trigvl</code> commands for the 4200-SMU, 4201-SMU, 4210-SMU, and 4211-SMU.
Resolution:	This issue has been corrected.
Issue number:	ACS-686
Symptom:	Added ACSLPT <code>sweepX</code> , <code>bsweepX</code> functions for the 4200A SMU.
Resolution:	This issue has been corrected.

Issue number:	ACS-685
Symptom:	Y1 and Y2 min/max scale in the plot setting is automatically changed when running a test.
Resolution:	This issue has been corrected.
Issue number:	ACS-671
Symptom:	Manual - Missing instructions for the ACSLPT sweep functions.
Resolution:	This issue has been corrected.
Issue number:	ACS-668
Symptom:	Manual - <code>ACSPostArrayDouble</code> function description is missing the array length parameter.
Resolution:	This issue has been corrected.
Issue number:	ACS-659
Symptom:	Added matrix to the TSP LPT instructions in the manual.
Resolution:	This issue has been corrected.
Issue number:	ACS-658
Symptom:	Removed <code>smeasz_sweepv()</code> from ACS programmer's manual.
Resolution:	This issue has been corrected.

SOFTWARE COMPATIBILITY

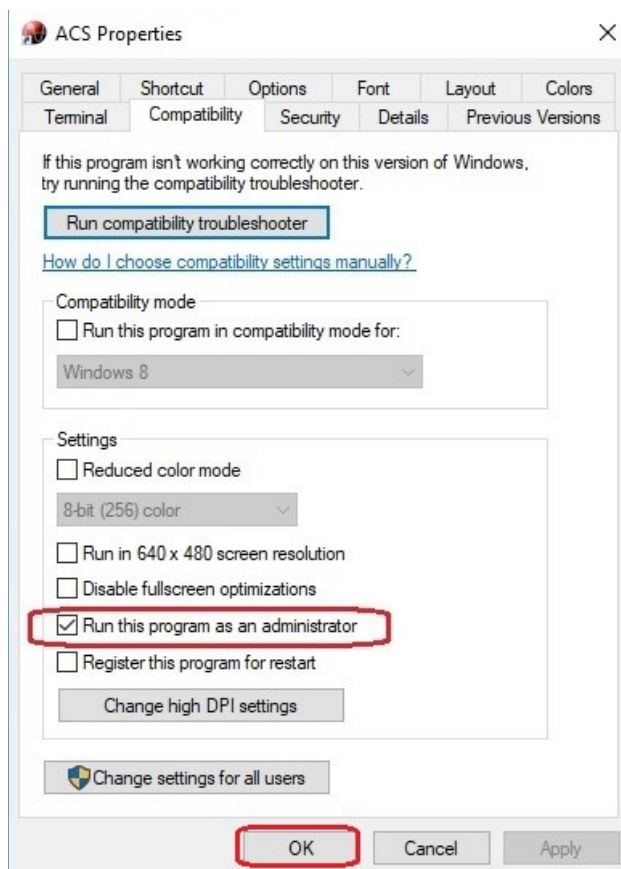
Issue number:	N/A
Resolution:	When you start ACS on a 4200A-SCS that has Clarius software version 1.4 or later (with Windows 10 operating system), a warning message may appear indicating that KXCI did not start successfully. Select Cancel to dismiss the warning.

Figure 8: KXCI did not start



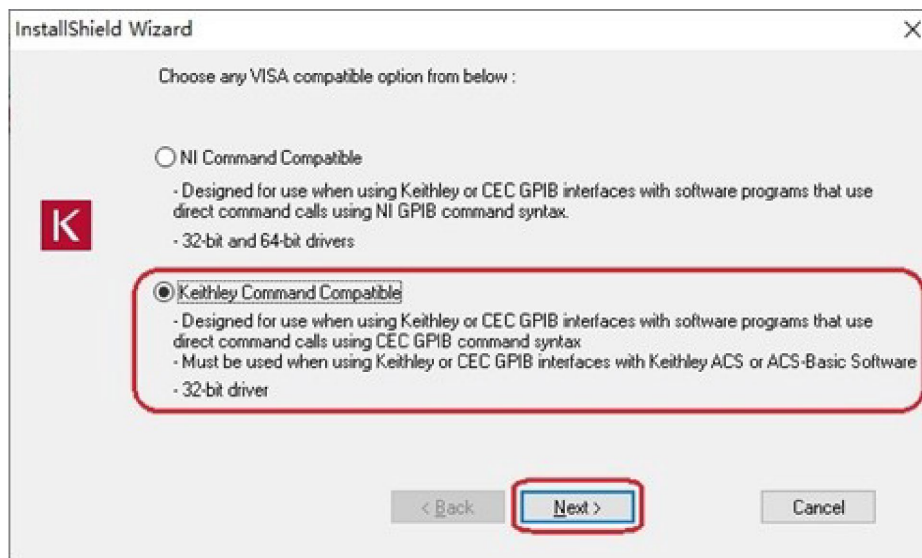
To manually configure the compatibility settings:

1. Right-click the **ACS icon** and select **Properties**.
2. Open the **Compatibility** tab.
3. Select **Run this program as an administrator** and select **OK** to save.

Figure 9: ACS properties

USAGE NOTES

Issue number:	N/A
Resolution:	When you install a KUSB-488B GPIB driver, the following message displays. You must select the Keithley Command Compatible option. Select Next to continue the installation.

Figure 10: ACS command compatible

Issue number:	ACS-691, CAS-162126-B3Y7Y6
Resolution:	Microsoft® Windows® mapped network drive error. When installing ACS Basic on a personal computer, Microsoft policy settings can limit ACS Basic from accessing mapped network drives in its file windows. Modifying the registry fixes 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 (32-bit) entry named EnableLinkedConnections. 4. Set the value to 1. 5. Restart the computer.