4200-SCS IC-CAP Driver

Quick Start Guide

4200ICCAP-903-01 Rev. C /May 2006

KEITHLEY

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4200-SCS IC-CAP Driver
Quick Start Guide

Manual Print History

The print history shown below lists the printing dates of all Revisions and Addenda created for this manual. The Revision Level letter increases alphabetically as the manual undergoes subsequent updates. Addenda, which are released between Revisions, contain important change information that the user should incorporate immediately into the manual. Addenda are numbered sequentially. When a new Revision is created, all Addenda associated with the previous Revision of the manual are incorporated into the new Revision of the manual. Each new Revision includes a revised copy of this print history page.

Revision A (Document Number 4200ICCAP-903-01) .... December 2001
Revision B (Document Number 4200ICCAP-903-01) .... April 2006
Revision C (Document Number 4200ICCAP-903-01 .... May 2006

KEITHLEY Safety Precautions

The following safety precautions should be observed before using this product and any associated instrumentation. Although some instruments and accessories would normally be used with non-hazardous voltages, there are situations where hazardous conditions may be present.

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product. Refer to the manual for complete product specifications.

If the product is used in a manner not specified, the protection provided by the product may be impaired.

The types of product users are:

Responsible body is the individual or group responsible for the use and maintenance of equipment, for ensuring that the equipment is operated within its specifications and operating limits, and for ensuring that operators are adequately trained.

Operators use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.

Maintenance personnel perform routine procedures on the product to keep it operating properly, for example, setting the line voltage or replacing consumable materials. Maintenance procedures are described in the manual. The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.

Service personnel are trained to work on live circuits, and perform safe installations and repairs of products. Only properly trained service personnel may perform installation and service procedures.

Keithley products are designed for use with electrical signals that are rated Measurement Category I and Measurement Category II, as described in the International Electrotechnical Commission (IEC) Standard IEC 60664. Most measurement, control, and data I/O signals are Measurement Category I and must not be directly connected to mains voltage or to voltage sources with high transient over-voltages. Measurement Category II connections require protection for high transient over-voltages often associated with local AC mains connections. Assume all measurement, control, and data I/O connections are for connection to Category I sources unless otherwise marked or described in the Manual.

Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures. The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30V RMS, 42.4V peak, or 60VDC are present. **A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.**

Operators of this product must be protected from electric shock at all times. The responsible body must ensure that operators are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product operators in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000 volts, **no conductive part of the circuit may be exposed.**

Do not connect switching cards directly to unlimited power circuits. They are intended to be used with impedance limited sources. NEVER connect switching cards directly to AC mains. When connecting sources to switching cards, install protective devices to limit fault current and voltage to the card.

Before operating an instrument, make sure the line cord is connected to a properly grounded power receptacle. Inspect the connecting cables, test leads, and jumpers for possible wear, cracks, or breaks before each use.

When installing equipment where access to the main power cord is restricted, such as rack mounting, a separate main input power disconnect device must be provided, in close proximity to the equipment and within easy reach of the operator.

For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any capacitors before: connecting or disconnecting ca-

bles or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers.

Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground. Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured.

The instrument and accessories must be used in accordance with its specifications and operating instructions or the safety of the equipment may be impaired.

Do not exceed the maximum signal levels of the instruments and accessories, as defined in the specifications and operating information, and as shown on the instrument or test fixture panels, or switching card.

When fuses are used in a product, replace with same type and rating for continued protection against fire hazard.

Chassis connections must only be used as shield connections for measuring circuits, NOT as safety earth ground connections.

If you are using a test fixture, keep the lid closed while power is applied to the device under test. Safe operation requires the use of a lid interlock.

If a ⏚ screw is present, connect it to safety earth ground using the wire recommended in the user documentation.

The ⚠ symbol on an instrument indicates that the user should refer to the operating instructions located in the manual.

The ⚡ symbol on an instrument shows that it can source or measure 1000 volts or more, including the combined effect of normal and common mode voltages. Use standard safety precautions to avoid personal contact with these voltages.

The ⏚ symbol indicates a connection terminal to the equipment frame.

The **WARNING** heading in a manual explains dangers that might result in personal injury or death. Always read the associated information very carefully before performing the indicated procedure.

The **CAUTION** heading in a manual explains hazards that could damage the instrument. Such damage may invalidate the warranty.

Instrumentation and accessories shall not be connected to humans.

Before performing any maintenance, disconnect the line cord and all test cables.

To maintain protection from electric shock and fire, replacement components in mains circuits, including the power transformer, test leads, and input jacks, must be purchased from Keithley Instruments. Standard fuses, with applicable national safety approvals, may be used if the rating and type are the same. Other components that are not safety related may be purchased from other suppliers as long as they are equivalent to the original component. (Note that selected parts should be purchased only through Keithley Instruments to maintain accuracy and functionality of the product.) If you are unsure about the applicability of a replacement component, call a Keithley Instruments office for information.

To clean an instrument, use a damp cloth or mild, water based cleaner. Clean the exterior of the instrument only. Do not apply cleaner directly to the instrument or allow liquids to enter or spill on the instrument. Products that consist of a circuit board with no case or chassis (e.g., data acquisition board for installation into a computer) should never require cleaning if handled according to instructions. If the board becomes contaminated and operation is affected, the board should be returned to the factory for proper cleaning/servicing.

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List of Illustrations

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1

General Overview

General information

Contact information

If you have any questions, please contact your local Keithley representative or call one of our Application Engineers at 1-800-348-3735 (U.S. and Canada only). Additional information may be obtained at www.keithley.com.

Addenda

Any improvements or changes concerning the driver software or guide will be explained in an addendum included with the guide. Be sure to note these changes and incorporate them into the guide.

Specifications

4200-SCS system specifications are subject to change without notice. These specifications can be found on the 4200-SCS Complete Reference CD, available at www.keithley.com.

Product overview

The 4200-SCS IC-CAP driver provides the software interface between the 4200-SCS Semiconductor Characterization System and the IC-CAP Modeling software. With the driver installed and properly configured, all 4200-SMU, 4210-SMU, and 4200-PA modules can be controlled from within the IC-CAP environment.

The 4200-SCS IC-CAP driver can be installed by either installing the pre-compiled driver onto the machine running IC-CAP, or by recompiling the included 4200-SCS IC-CAP driver source code. All pre-compiled drivers and source code are included on the 4200ICCAP CD.

The specific IC-CAP versions, C/C++ compiler versions, and pre-compiled 4200-SCS IC-CAP driver versions are covered later in this document and in the Release Notes included on the 4200-SCS IC-CAP CD.

Using this guide

This Quick Start Guide contains information necessary to install, configure, and test the 4200-SCS IC-CAP driver on your system. For information on using the IC-CAP Modelling Suite, refer to the IC-CAP User's Guide provided with that software package.

Refer to the following sections for pertinent information:

- Section 2: includes information on installing, configuring, and testing the precompiled 4200-SCS IC-CAP driver specific to your particular IC-CAP setup.
- Section 3: contains information on installing, configuring, and compiling the 4200-SCS IC-CAP source code specific to your particular IC-CAP setup.

NOTE   *Refer to the software release notes on disk for any changes to the installation and configuration procedures covered by this guide.*

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2

Using the Pre-Compiled IC-CAP Driver

Introduction

This section contains information on installing, configuring, and testing the 4200-SCS IC-CAP driver. The information in this section pertains to enabling the pre-compiled 4200-SCS IC-CAP driver for your particular IC-CAP setup.

To complete the installation process, you must first manually install the driver files as covered in "Installation" on page 2-4, and then configure both the 4200-SCS Keithley External Control Interface (KXCI) and IC-CAP as described in "Software configuration" on page 2-6.

General description

Hardware overview

The 4200-SCS can be equipped with two to eight programmable source/measurement units (SMU):

- Up to four SMUs can be high power
- Each SMU can be equipped with an optional preamp
- Each SMU can be assigned as SMU, Voltage Source (VS), or Voltage meter (VM)

NOTE   Because of the flexibility of 4200-SCS configuration, you cannot manually add the 4200-SCS to the IC-CAP instrument list. You must rebuild the list as covered in "IC-CAP configuration" on page 2-9.

Hardware name assignments

IC-CAP driver assigns the following names to the units:

- **SMUn:** Source/Measurement Unit n (1, 2, .., 8)
- **HPSMUn:** High Power Source/Measurement Unit n (3, 4, .., 8; only four of them are available at one time)
- **VSn:** Voltage Source Unit n (1, 2 , .., 8)
- **VMn:** Voltage Monitor Unit n (1, 2, ..,8)

NOTE   Because the 4200-SCS is always operated in auto-range by IC-CAP, there is no need for IC-CAP to know the existence of the optional preamps. Internally, the software tracks the existence of preamps so that proper input checking can be implemented.

Fixed ranges are available by setting "Init Command" accordingly; it may be important to take measurements on a fixed range. Use the RG command to set lowest current range. No range command is necessary for voltage ranges.

A ground unit (GNDU) provides a means for connecting device terminals to a ground reference without consuming a SMU resource and can sink up to 4.4A. The ground unit is supported in IC-CAP, but it will not appear in the **Hardware Editor Configuration** dialog box.

Instrument options

Table 2-1 summarizes 4200-SCS instrument options used by IC-CAP.

Table 2-1
Instrument options

Option	Description
Use User Sweep	Yes = use user sweep. No = use instrument's internal sweep. Default = No. Dependencies: None.
Hold Time	Time the instrument waits before starting an internal or user sweep. Range is 0 to 655.3 sec in 10 msec steps. Default = 0. Dependencies: None.
Delay Time	Time the instrument waits after the source is changed but before taking a measurement at each step of an internal or user sweep. The range is 0 to 6.553 sec in 1 msec steps. Default = 0. Dependencies: None.
Integration Time	Instrument settling time and A/D integration time; set to S (short), M (medium), L (long), C (custom). Default: M. Dependencies: Delay factor, Filter factor, nPLC.
Delay Factor	Instrument delay factor. Delay factor is only valid if Integration Time is C (Custom). The internal default delay will be multiplied by the delay factor. Default equals 1. Min equals 0, max equals 100. Dependencies: Integration Time.
Filter Factor	Instrument filter factor. Filter factor is only valid if Integration Time is C (Custom). The A/D integration time will be multiplied by the square of filter factor. Default equals 1. Min equals 0, max equals 100. Dependencies: Integration Time.
nPLC	Number of power line cycles (PLC) used for integration. nPLC is only valid if Integration Time is C (Custom). Default equals 1. Min equals 0.01, max equals 10. Dependencies: Integration Time.
Measurement Timeout	Timeout in seconds for data reading. Minimum 5 sec. Maximum 86400 sec. Default = 900 sec. Dependencies: None.
Init Command	This command field is used to set the instrument to a mode not supported by the option table. This command is sent at the end of instrument initialization for each measurement. Normal C escape characters such as \n (new line) are available. Default = none. Dependencies: None.
Forbid User Sweeps	No = Allow user sweeps. Yes = Override IC-CAP default and force system sweeps in all situations. Default = No. Dependencies: None.

Installation

> *NOTE*   *Check the software release notes for any changes to the installation procedure.*

Supplied files

The 4200-SCS IC-CAP Driver CD contains all compiled drivers. Table 2-2 summarizes these supplied files.

Table 2-2
Supplied files

IC-CAP VERSION	IC-CAP OS	4200-SCS IC-CAP DRIVER BINARY FILE	DESCRIPTION
2002	Solaris	<UNSUPPORTED>	<Any Solaris version of IC-CAP older than 2002 must be recompiled. Refer to Section 3 for details.>
2004	Solaris	libicusercxx.so	Library used by IC-CAP to hold instrument drivers.
2006	Solaris	(As of March 2006, Agilent had not yet released IC-CAP 2006 for Solaris)	
2002	WIN32	icusercxx.dll	DLL used by IC-CAP to hold instrument drivers.
2004	WIN32	icusercxx62.dll	DLL used by IC-CAP to hold instrument drivers.
2006	WIN32	icusercxx63.dll	DLL used by IC-CAP to hold instrument drivers.

Building for use with the 4200-SCS driver only

Follow these steps for basic installation (4200-SCS driver with no other user drivers):

To copy the *icusercxx.so* file to SOLARIS operating system:

> *NOTE*   *<ICCAP_ROOT> refers to the directory where you installed IC-CAP. The default is /opt/iccap2004.*

1.   Close IC-CAP if it is running.
2.   Copy **icusercxx.so** to <ICCAP_ROOT>\bin.
3.   Start IC-CAP and **Rebuild** the instrument list:
     - Under **Instrument List**, click **Rebuild**. IC-CAP will then rebuild the instrument list, a process that will take some time. During the process, any error messages shown on the 4200-SCS KXCI screen are normal.
4.   You are now ready to use the 4200-SCS through IC-CAP.

To copy icusercxx(62)(63).dll file to WIN32 operating system:

NOTE   <ICCAP_ROOT> refers to the directory where you installed IC-CAP. The default is

C:\Agilent\ICCAP_2002

-or-

C:\Agilent\ICCAP_2004

-or-

C:\Agilent\ICCAP_2006

1. If you are running ICCAP2002, copy **icusercxx.dll** to <ICCAP_ROOT>\bin.

    If you are running ICCAP2004, copy **icusercxx62.dll** to <ICCAP_ROOT>\bin.

    If you are running ICCAP2006, copy **icusercxx63.dll** to <ICCAP_ROOT>\bin.

2. Start IC-CAP and **Rebuild** the instrument list:
    *   Under **Instrument List**, click **Rebuild**. IC-CAP will then rebuild the instrument list, a process that will take some time. During the process, any error messages shown on the 4200-SCS KXCI screen are normal.

3. You are now ready to use the 4200-SCS through IC-CAP.

Building for use with other drivers

If you need to activate the 4200-SCS IC-CAP driver and use it in conjunction with other custom instrument drivers, you will need to follow the source code compilation instructions shown in Section 3 of this document.

System configuration

GPIB interfacing

> *WARNING*   **Before configuring and using the 4200-SCS with IC-CAP, make sure that the unit is properly interfaced to the GPIB interface of the workstation using a shielded IEEE-488 cable such as the Keithley Model 7007. Refer to Section 9 of the 4200-SCS Reference Manual for details.**
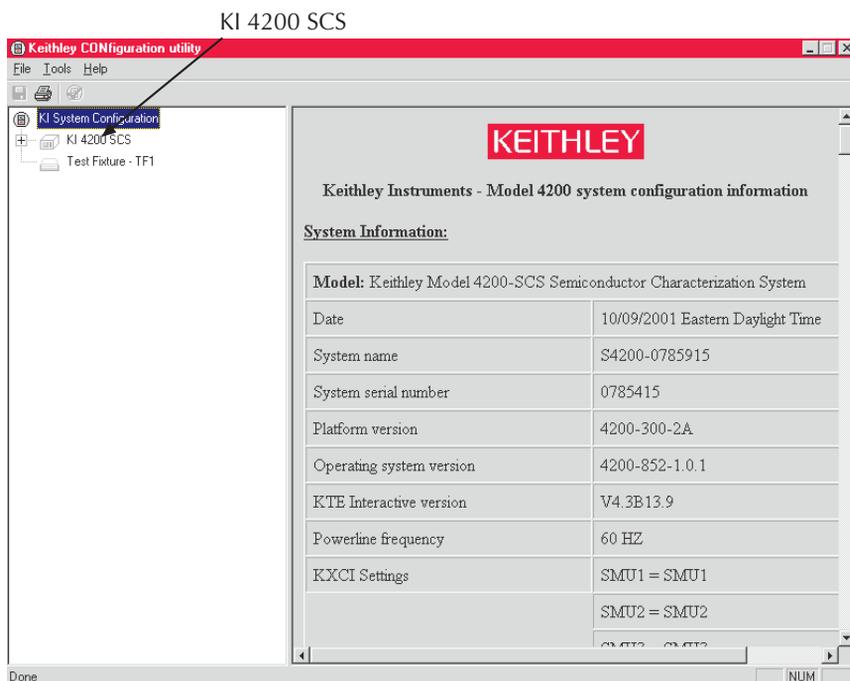
Software configuration

KXCI configuration
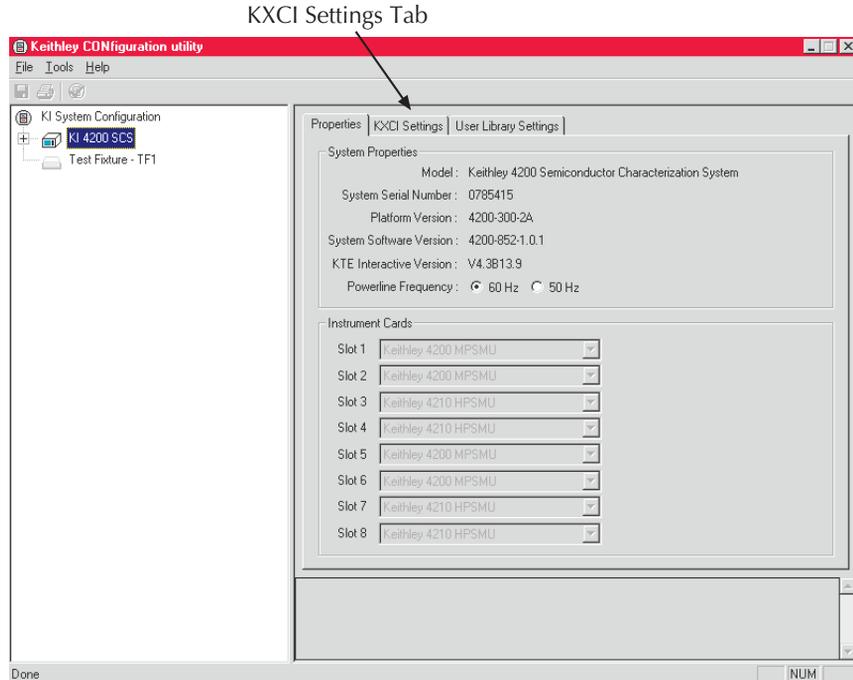
Follow these steps to configure 4200-SCS KXCI using KCON:

1. Double-click on the KCON icon. The main KCON screen shown in Figure 2-1 will be displayed.
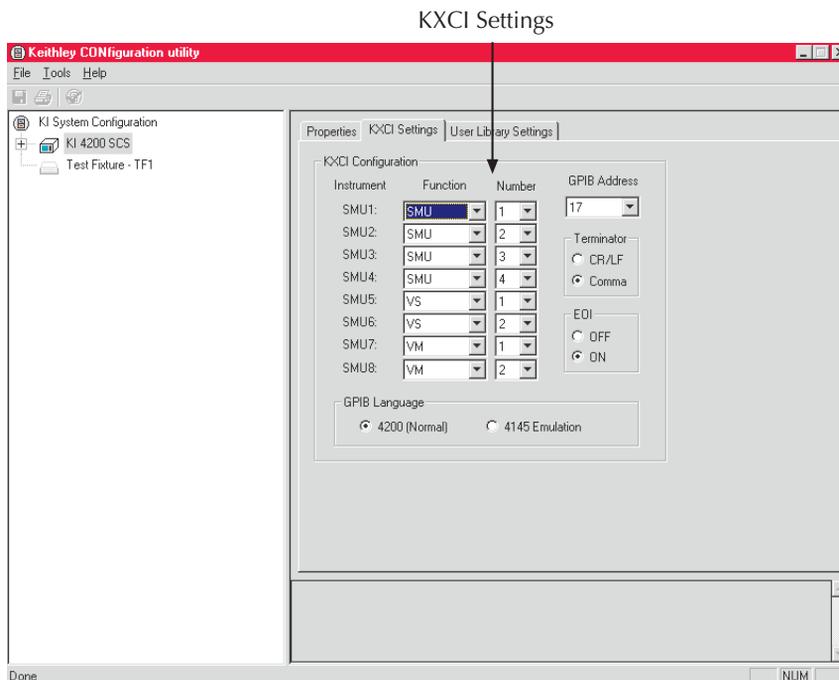
Figure 2-1
Main KCON screen

2. Click on **KI 4200 SCS** in **KI System Configuration**. The workspace will display the System Configuration screen shown in Figure 2-2.

Figure 2-2
System Configuration screen

3. Click on the **KXCI Settings** tab. The Workspace will display KXCI Settings, as shown in Figure 2-3.

Figure 2-3
KXCI Settings screen

4. Set KXCI Settings as follows:
    GPIB Address: 0-30
    GPIB Language: 4200 (Normal)
    Terminator: Comma
    EOI: ON
    Instrument Functions (SMU, VS, VM): system defaults

NOTE *If 4145 emulation is selected, IC-CAP will use the 4145 driver, not the 4200-SCS driver.*

If you change Instrument Function names after configuring IC-CAP, you must re-configure IC-CAP using the procedure in "IC-CAP configuration" on page 2-9.

5. Select **File → Save** to save the modified KCON configuration, then exit KCON.

IC-CAP configuration

After setting up KXCI with KCON, configure IC-CAP for use with the 4200-SCS as follows:

1. First, double-click the KXCI icon on the 4200-SCS to open the KXCI screen.
2. Run IC-CAP on the workstation.
3. Once in IC-CAP, select the **Tools → Hardware Setup** menu. The main **Hardware Setup** screen shown in Figure 2-4 will be displayed.

Figure 2-4
**IC-CAP Hardware Setup screen**
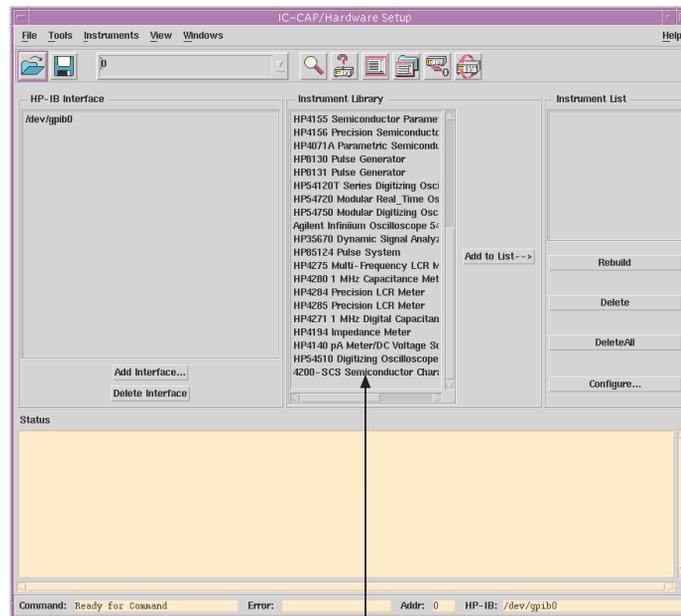
4200-SCS Semiconductor
Characterization System

4. If no interface is shown in the **HP-IB Interface** window, click **Add Interface**, type in the name (usually "gpib0" for WIN32 and "/dev/gpib0" for SOLARIS), then click **OK.**
5. Verify that **4200-SCS Semiconductor System** is shown in the **Instrument Library** list (see Figure 2-4). If not, reinstall the driver as covered in "Installation" on page 2-4.

6. Under **Instrument List**, click **Rebuild**. IC-CAP will then rebuild the instrument list, a process that will take some time. During the process, any error messages shown on the 4200-SCS KXCI screen are normal.

7. After rebuilding, **KI4200** should appear in the **Instrument List** window (refer to Figure 2-5). If not, check your driver installation, then repeat steps 2 through 6.

Figure 2-5
Hardware Setup screen after rebuild
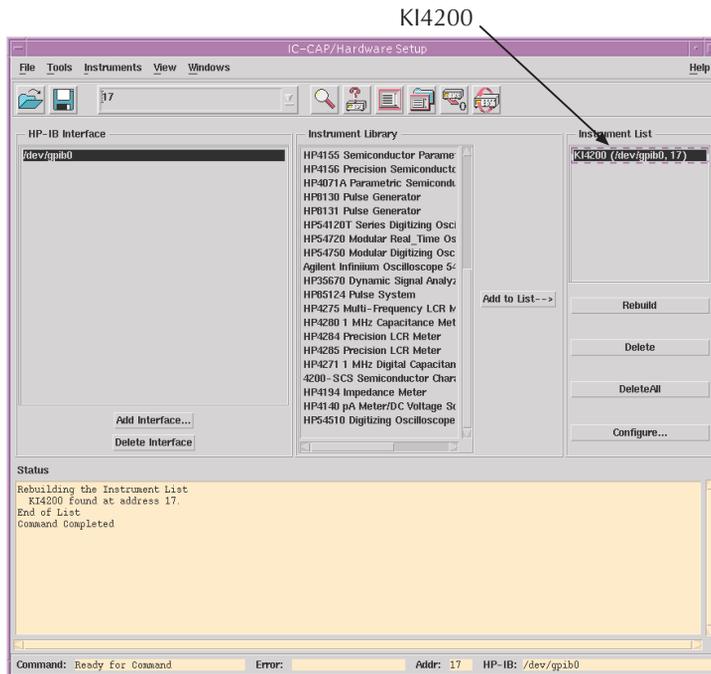
8.   Click on **KI4200** in the **Instrument List** dialog box, then select the **Instruments** → **Self Test** menu. IC-CAP will display the warning shown in Figure 2-6.
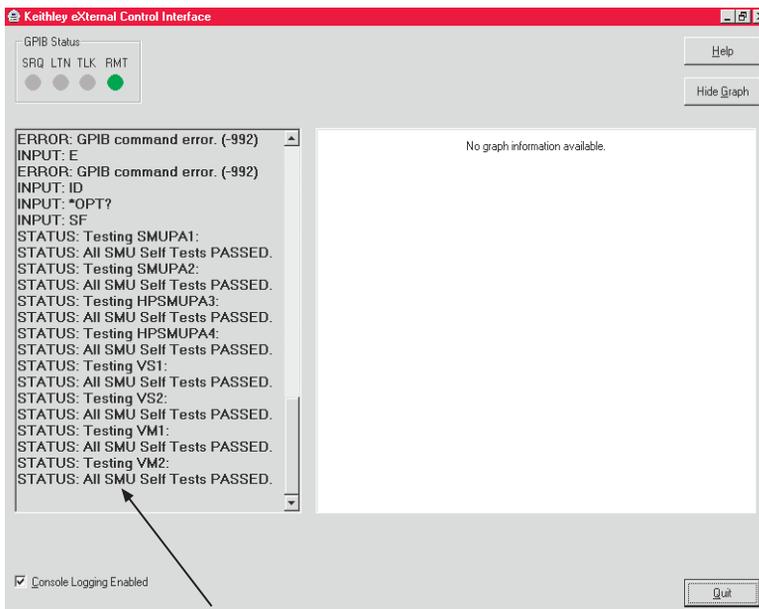
Figure 2-6
IC-CAP self test warning
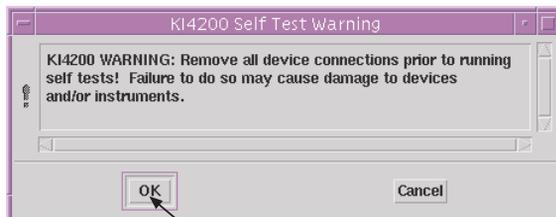
Click OK only after
disconnecting all devices

CAUTION   **Remove all device connections prior to performing the self test, or instrument damage may occur.**

9.   After disconnecting all devices, click **OK** to test the system, which will take a few minutes. During the process, the 4200-SCS will display test status. Figure 2-7 shows a typical KXCI display screen after successful completion of the test.

Figure 2-7
*KXCI message screen after successful self test*

Self test display messages

10. IC-CAP is now ready to use with the 4200-SCS. If desired, you can view or modify 4200-SCS configuration by clicking **Configure** in the IC-CAP **Hardware Setup** screen. Figure 2-8 shows typical hardware configuration.

NOTE   If you change 4200-SCS KXCI Settings, you must rebuild in IC-CAP using the above procedure.

Figure 2-8
IC-CAP KI4200 configuration screen
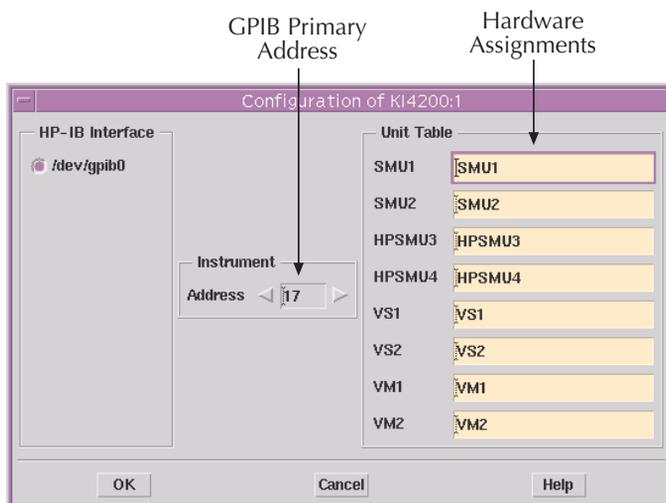
Limitations and exclusions

Conditions that cause switch to user sweep mode

- More than 4096 total data points in VAR1 internal sweep.
- First order LOG sweep with other than 10, 25, or 50 points per decade, or specified with points per octave.
- SYNC sweep with master sweep not sweep order 1.
- LIST or SEG sweep with sweep order 1.
- No first order sweep on KI4200.

Conditions that cause measurement to abort with error

- Any GPIB communications error.
- Mode other than V or I for SMU.
- Mode other than V for VS/VM.
- Invalid sweep type (valid types are CON, LIN, LOG, SYNC, LIST, SEG).
- Single-point LIN or LOG sweeps.
- Sweep limits out of range for unit.
- Invalid compliance setting for sweep conditions.
- SYNC sweep different mode than master sweep.
- SYNC sweep ratio greater than 10.
- SYNC sweep offset out of range.
  (V mode: 100, I mode: 1.0 for HPSMU, 0.1 for SMU).
- SYNC sweep invalid master sweep type (valid types are LIN, LOG, LIST, SEG).
- SYNC sweep limits out of range (sync sweep limits are based on master sweep range, with offset and ratio applied).
- SMU used in output (measuring) without being used in an input (sourcing)
- Measurement timeout.

Other error conditions

- GPIB error getting unit information.
- GPIB error setting instrument options.
- Self test failure.
- Self test timeout.

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3

Using the 4200-SCS
IC-CAP Driver Source Code

Introduction

This section contains information on installing, configuring, and testing the 4200-SCS IC-CAP driver source code.

Installation

NOTE   Check the software release notes for any changes to the installation procedure.

Supplied files

The 4200-SCS IC-CAP Driver CD contains compiled driver source code. Table 3-1 summarizes supplied files.

Table 3-1
Supplied files

IC-CAP VERSION	IC-CAP OS	4200-SCS IC-CAP DRIVER MAKEFILE	4200-SCS IC-CAP DRIVER SOURCE CODE FILE	AGILENT RECOMMENED COMPLIER
2002	Solaris	Makefile	Solaris\src\user_meas_ki.cxx	Sun Workshop 3.0 (compiler 4.2)
2004	Solaris	Makefile	Solaris\src\user_meas_ki.cxx	Sun Studio 11
2006	Solaris	(As of March 2006, Agilent had not yet released IC-CAP 2006 for Solaris)		
2002	WIN32	Makefile.2002	Win32\src\user_meas_ki.cxx	MS DevStudio V6.0
2004	WIN32	Makefile.2004	Win32\src\user_meas_ki.cxx	MS DevStudio V6.0
2006	WIN32	Makefile.2006	Win32\src\user_meas_ki.cxx	MS DevStudio .NET 2003
			Note The 4200-SCS IC-CAP driver cannot be built for ICCAP 2002 and 2004 with Developer Studio versions newer than .NET 2002 (this includes .NET 2003 and .NET 2005). ICCAP 2006 supports the newer Microsoft Compiliers.	

Building from source code

To build icusercxx.so from SOLARIS source files:

NOTE   <ICCAP_ROOT> refers to the directory where you installed IC-CAP. The default is /opt/iccap2002 or /opt/iccap2004.

1. Close IC-CAP if it is running.
2. Copy all source files from the source media for the 4200 driver to the new <ICCAP_ROOT>\src directory. These files are:

    > ki4200.cxx
    > ki4200.hxx
    > build_4200.cxx
    > user_meas_ki.cxx
    > Makefile

3. Change directory to the $(ICCAP_ROOT>/src directory.
4. Set the ICCAP_ROOT environment variable appropriately. This is usually /opt/iccap2002.
5. Edit user_meas.cxx to add the lines from user_meas_ki.cxx to the add_users_drivers() function. This enables the 4200 driver in IC-CAP.

    For reference, the lines to add are:

    > extern instr* make_new_ki4200 (const char* name);
    > add_user_driver ("KI4200", make_new_ki4200);

    The user_meas_ki.cxx file is a copy of the Agilent-supplied user_meas.cxx with the appropriate changes already made.

6. Save user_meas.cxx.
7. Run **make**. This will build the libicusercxx.so file.
8. Copy libicusercxx.so to $(ICCAP_ROOT)\bin.
9. Start IC-CAP and 'Rebuild' the instrument list.
    -   Under **Instrument List**, click **Rebuild**. IC-CAP will then rebuild the instrument list, a process that will take some time. During the process, any error messages shown on the 4200-SCS KXCI screen are normal.
10. You are now ready to use the 4200-SCS through IC-CAP.

To build icusercxx.dll from WIN32 source files:

NOTE   <ICCAP_ROOT> refers to the directory where you installed IC-CAP. The default is C:\Agilent\ICCAP_2002 or C:\Agilent\ICCAP_2004 or C:\Agilent\ICCAP_2006.

1. Close IC-CAP if it is running.
2. Copy all source files from the source media for the 4200 driver to the new <ICCAP_ROOT>\src directory. These files are:

    ki4200.cxx
    ki4200.hxx
    build_4200.cxx
    user_meas_ki.cxx

AND the appropriate makefile based on the ICCAP version you are running:

ICCAP	Correct Makefile	Agilent Recommended Compiler
2002	Makefile.2002	MS DevStudio V6.0
2004	Makefile.2004	MS DevStudio V6.0
2006	Makefile.2006	MS DevStudio .NET 2003

NOTE   The ki4200 driver cannot be built for ICCAP 2002 and 2004 with Developer Studio versions past .NET 2002 (this includes .NET 2003 and .NET 2005). ICCAP 2006 supports the newer Microsoft compilers.

Rename the makefile that you copied to **Makefile**.

3. Change directory to the <ICCAP_ROOT>\src directory.
4. Edit the file icbuild.bat to set ICCAP_ROOT to the value of your ICCAP_ROOT environment variable.

NOTE   You must use forward slashes ("/") in the name. You only need to modify the PATH, INCLUDE, and LIB variables if you plan to build the DLL with a version of DevStudio newer than that in the table above.

5. Edit user_meas.cxx to add the lines from user_meas_ki.cxx to the add_users_drivers() function. This enables the 4200 driver in IC-CAP.

    For reference, the lines to add are:

    extern instr* make_new_ki4200(const char* name);
    add_user_driver("KI4200", make_new_ki4200);

    The user_meas_ki.cxx file is a copy of the Agilent supplied user_meas.cxx with the appropriate changes already made.

6. Save user_meas.cxx.
7. Run **icbuild**. This will build the icusercxx(6n).dll file.

8. If you are running ICCAP2002, copy icusercxx.dll to <ICCAP_ROOT>\bin.

    If you are running ICCAP2004, copy icusercxx62.dll to <ICCAP_ROOT>\bin.

    If you are running ICCAP2006, copy icusercxx63.dll to <ICCAP_ROOT>\bin.

9. Start IC-CAP and **Rebuild** the instrument list.

    •   Under **Instrument List**, click **Rebuild**. IC-CAP will then rebuild the instrument list, a process that will take some time. During the process, any error messages shown on the 4200-SCS KXCI screen are normal.

10. You are now ready to use the 4200-SCS through IC-CAP.

System configuration

After compiling and building from source code, the system must be configured and tested as described in "System configuration" on page 2-6

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Service Form

Model No. _____ **Serial No.**_____**Date** _____

Name and Telephone No. _____

Company _____

List all control settings, describe problem and check boxes that apply to problem. _____

_____

❏ Intermittent ❏ Analog output follows display ❏ Particular range or function bad; specify

_____

❏ IEEE failure ❏ Obvious problem on power-up ❏ Batteries and fuses are OK

❏ Front panel operational ❏ All ranges or functions are bad ❏ Checked all cables

Display or output (check one)

❏ Drifts ❏ Unable to zero ❏ Unstable

❏ Overload ❏ Will not read applied input

❏ Calibration only ❏ Certificate of calibration required ❏ Data required

(attach any additional sheets as necessary)

Show a block diagram of your measurement including all instruments connected (whether power is turned on or not). Also, describe signal source.

Where is the measurement being performed? (factory, controlled laboratory, out-of-doors, etc.)_____

_____

What power line voltage is used?_____ Ambient temperature?_____ °F

Relative humidity? _____Other?_____

Any additional information. (If special modifications have been made by the user, please describe.)

_____

_____

Be sure to include your name and phone number on this service form.

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12/04