

# Model 4200A-SCS Parameter Analyzer

## Declassification and Security Instructions

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### Introduction

If you have data security concerns, this document tells you how to clear or sanitize the Model 4200A-SCS Parameter Analyzer's memory devices. It also explains how to declassify an instrument that is not functioning.

The procedures in this document are written to meet the requirements specified in:

- NISPOM, DoD 5220.22-M, chapter 8
- ISFO Process Manual for Certification and Accreditation of Classified Systems under NISPOM

### Contact information

If you have any questions after you review the information in this documentation, please contact your local Keithley Instruments office, sales partner, or distributor, or call Keithley Instruments corporate headquarters (toll-free inside the U.S. and Canada only) at 1-800-935-5595, or from outside the U.S. at +1-440-248-0400. For worldwide contact numbers, visit the [Keithley Instruments website](http://www.tektronix.com/keithley) (<http://www.tektronix.com/keithley>).

### Products

This document contains procedures for the following Keithley Instruments models:

- 4200A-SCS Parameter Analyzer
- 4200-SMU Medium Power Source-Measure Unit
- 4210-SMU High Power Source-Measure Unit
- 4210-CVU 4210 Capacitance Voltage Unit
- 4220-PGU Pulse-Generator Unit
- 4225-PMU Pulse-Measure Unit
- 4200-PA Remote Preamplifier
- 4225-RPM Remote Amplifier/Switch Module
- 4200A-CVIV Multi-Switch

### Terminology

The following terms may be used in this document:

- **Clear:** Removes data on media or in memory before reusing it in a secured area. Clears all reusable memory to deny access to previously unsecured information.
- **Demo setups:** Demonstration modules that come loaded on the instrument; you cannot modify them.
- **Direct method of modification:** You can modify data directly.
- **Erase:** Equivalent to clear (see above).
- **Indirect method of modification:** The instrument system resources modify the data; you cannot modify it.



- **Instrument declassification:** Procedures that must be completed before an instrument can be removed from a secure environment. Declassification procedures include memory sanitization and memory removal.
- **Media storage and data export device:** Devices that can be used to store or export data from the instrument, such as a USB port.
- **Nonvolatile memory:** Data is retained when the instrument power is turned off.
- **Protected user data area:** Contains data that is protected by a password.
- **Remove:** Clears instrument data by physically removing the memory device from the instrument.
- **Sanitize:** Eradicates instrument data from media and memory so it cannot be recovered by other means or technology. This is typically used when the device will be moved (temporarily or permanently) from a secured area to a non-secured area.
- **Scrub:** Directly retrieve and clear the contents of the memory device.
- **SSD:** Solid state drive. This is usually the main permanent storage device for a piece of computing equipment. Solid state drives are a replacement for conventional rotating magnetic disks and instead consist of an array of NAND flash memory devices connected to the computing equipment through a specialized controller and may or may not have on-board cache RAM.
- **User accessible:** You can directly retrieve the contents of the memory device.
- **User data:** Measurement data that represents signals that you connect to the instrument.
- **User-modifiable:** You can write to the memory device during normal instrument operation using the front-panel interface or remote control.
- **User settings:** Instrument settings that you can change.
- **Volatile memory:** Temporary memory; data is lost when the instrument is turned off.

## Description of memory

Model 4200A-SCS instruments and accessories use various volatile and nonvolatile memory components. The [Memory devices](#) section gives detailed instructions specific to each product listed in the [Products](#) section above.

The following list of products that can be found installed in the 4200A-SCS system or shipped as accessories with the 4200A-SCS system contain volatile and nonvolatile memory individually listed for each product.

**4200A-SCS SINGLE BOARD COMPUTER:** Contains nonvolatile and volatile memory devices used for the main computer.

- (1) BIOS nonvolatile flash device (BIOS1 – SPI U1)
- (1) BIOS settings volatile battery-backed RAM device (BIOS1 – SPI U1)
- (1) Intel CPU with volatile cache RAM installed in main CPU socket (CN1)
- (2) 2 GB volatile DDR3 RAM SO-DIMM modules installed in sockets SODIMM\_A1 and SODIMM\_B1

**4200A-SCS SOLID STATE DRIVE:** Contains files and data for Windows® 7 operating system. Contains programs, files, and data for the 4200A-SCS Clarius+ software factory- and user-created projects and tests. Contains calibration data, readings, and other data.

- (1) 256 GB nonvolatile solid state drive (SSD)

**TRIGGER UTILITY MODULE:** Contains triggering logic.

- (1) 16 MB nonvolatile NOR flash memory (U101)

**4200-SMU and 4210-SMU products:** Contains instrument logic, calibration data, readings, and other data.

- (1) 512 KB nonvolatile flash memory (U22)
- (1) 16 KB nonvolatile EEPROM (U17)
- (2) 128 KB volatile static RAM (U12 and U14)
- (2) 256 KB nonvolatile flash memory (U15 and U16)

**4200-CVU and 4210-CVU products:** Contains instrument logic, calibration data, readings, and other data.

- (1) 512 KB nonvolatile flash memory (U119)
- (1) 4 MB nonvolatile flash memory (U116)
- (1) 8 MB volatile SDRAM memory (U114)
- (4) 512 KB volatile static RAM memory (U910, U911, U912, U913)

**4220-PGU and 4225-PMU products:** Contains instrument logic, calibration data, readings, and other data.

- (1) 512 KB nonvolatile flash memory (U22) on 4220-PGU board
- (1) 4 MB nonvolatile flash memory (U116) on 4220-PGU board
- (1) 8 MB volatile SDRAM memory (U114) on 4220-PGU board
- (2) 512 KB volatile static RAM memory (U714, U715) on 4220-PGU board

**The following parts are only found on the 4225-PMU product:**

- (2) 1 GB volatile DDR2 SO-DIMM memory modules (installed in sockets U951 and U952) on 4225-PMU board

**4200-PA product:** Contains instrument logic and calibration data.

- (1) Microcontroller with 16 KB nonvolatile flash memory, 768 bytes volatile static RAM memory, and 256 bytes nonvolatile EEPROM memory (U1)

**4225-RPM product:** Contains instrument logic, calibration data, readings, and other data.

- (1) Microcontroller with 64 KB nonvolatile flash memory and 16 KB of volatile static RAM memory (U500)

**4200A-CVIV MULTI-SWITCH product:** Contains instrument logic, calibration data, readings and other data.

- (1) Microcontroller with 256 KB nonvolatile flash memory and 64 KB of volatile static RAM memory (U800)
- (4) Microcontroller with 16 KB nonvolatile flash memory, 768 bytes volatile static RAM memory, and 256 bytes nonvolatile EEPROM memory (U100, U200, U300, U400)

## Memory devices

The following tables list the volatile and nonvolatile memory devices in the standard instrument and listed options.

### Volatile memory devices

The following tables list 4200A-SCS system, instrument, and accessory volatile memory devices and relevant memory-related information.

#### 4200A-SCS single board computer

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
BIOS settings volatile battery-backed RAM device	Battery-backed temporary memory used to store BIOS settings for proper computer operation in the product.	Yes	BIOS setup	BIOS1 – SPI U1	Use BIOS setup to restore factory defaults or remove coin cell battery from its socket	Remove coin cell battery from its socket
Intel CPU with volatile cache RAM	Temporary memory used by the Intel microprocessor to run the operating system and application software	Yes	Use of operating system and included application software	CN1	Turn instrument power off	Turn instrument power off
2 GB volatile DDR3 RAM SO-DIMM modules	Temporary memory used by the Intel microprocessor to run the operating system and application software	Yes	Use of operating system and included application software	SODIMM_A1 and SODIMM_B1	Turn instrument power off	Turn instrument power off

#### 4200-SMU and 4210-SMU instrument cards

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
128 KB volatile static RAM	Temporary memory used by the microprocessor controller for internal processor operations (on the microprocessor chip)	No	None	U12 and U14	Turn instrument power off	Turn instrument power off

**4200-CVU and 4210-CVU instrument cards**

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
8 MB volatile SDRAM memory	Temporary memory used by the microprocessor controller for internal processor operations (on the microprocessor chip)	No	None	U114	Turn instrument power off	Turn instrument power off
512 KB volatile static RAM memory	Temporary memory used by the instrument logic to facilitate instrument sourcing and measuring capabilities	No	None	U910, U911, U912, U913	Turn instrument power off	Turn instrument power off

**4220-PGU instrument card**

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
8 MB volatile SDRAM memory	Temporary memory used by the microprocessor controller for internal processor operations (on the microprocessor chip)	No	None	U114	Turn instrument power off	Turn instrument power off
512 KB volatile static RAM memory	Temporary memory used by the instrument logic to facilitate instrument sourcing and measuring capabilities	No	None	U714, U715	Turn instrument power off	Turn instrument power off

**4225-PMU instrument card**

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
8 MB volatile SDRAM memory	Temporary memory used by the microprocessor controller for internal processor operations (on the microprocessor chip)	No	None	U114 on 4220-PGU board	Turn instrument power off	Turn instrument power off
512 KB volatile static RAM memory	Temporary memory used by the instrument logic to facilitate instrument sourcing and measuring capabilities	No	None	U714, U715 on 4220-PGU board	Turn instrument power off	Turn instrument power off
1 GB volatile DDR2 SO-DIMM memory modules	Temporary memory used by the instrument logic to facilitate instrument sourcing and measuring capabilities	No	None	Installed in sockets U951 and U952 on 4225-PMU board	Turn instrument power off	Turn instrument power off

**4200-PA accessory**

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
Microcontroller internal 768 bytes volatile static RAM	Temporary memory used by the microprocessor controller for internal processor operations (on the microprocessor chip)	No	None	U1	Turn instrument power off	Turn instrument power off

### 4225-RPM accessory

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
Microcontroller internal 16 KB static RAM	Temporary memory used by the microprocessor controller for internal processor operations (on the microprocessor chip)	No	None	U500	Turn instrument power off	Turn instrument power off

### 4200A-CVIV Multi-Switch accessory

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
Microcontroller internal 64 KB of volatile Static RAM memory	Temporary memory used by the microprocessor controller for internal processor operations (on the microprocessor chip)	No	None	U800	Turn instrument power off by unplugging USB cable	Turn instrument power off by unplugging USB cable
Microcontroller internal 768 bytes volatile Static RAM memory	Temporary memory used by the microprocessor controller for internal processor operations (on the microprocessor chip)	No	None	U100, U200, U300, U400	Turn instrument power off by unplugging USB cable	Turn instrument power off by unplugging USB cable

## Nonvolatile memory devices

The following table lists nonvolatile memory devices and relevant memory-related information for all products listed in the [Products](#) section. If the table indicates that a device can be cleared by the user, see the detailed instructions in [Clearing Data](#).

### 4200A-SCS single board computer

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
BIOS nonvolatile flash device	Contains BIOS boot program	No	n/a	BIOS1 – SPI U1	Not clearable via any methods available to customer or vendor	Remove chip

### 4200A-SCS solid state drive

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
256 GB nonvolatile Solid State Drive (SSD)	Contains calibration data and user settings	Yes	Normal use of embedded computer via Operating System or application software	Vertically mounted on internal bulkhead wall opposite the front panel integrated LCD.	Follow the <a href="#">Clearing Data</a> procedures	Follow the <a href="#">Sanitizing data</a> procedures

### Trigger utility module

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
16 MB nonvolatile NOR flash memory	Contains trigger logic	No	n/a	U101 on 878111701 board	Not clearable via any methods available to customer or vendor	Remove chip

**4200-SMU and 4210-SMU instrument cards**

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
512 KB nonvolatile flash memory	Contains instrument logic	Yes	n/a	U22	Requires Xilinx IMPACT programming tool and JTAG connection to J8 on 4220-PGU board	Remove chip
16 KB nonvolatile EEPROM	Contains instrument logic	No	n/a	U17	Not clearable via any methods available to customer or vendor	Remove chip
256 KB nonvolatile flash memory	Contains calibration data	Yes		U15 and U16	Not clearable via any methods available to customer or vendor	Remove chip

**4200-CVU and 4210-CVU instrument cards**

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
512 KB nonvolatile flash memory	Contains instrument logic	No	n/a	U119	Requires Xilinx IMPACT programming tool and JTAG connection to J8 on 4220-PGU board	Remove chip
4 MB nonvolatile flash memory	Contains calibration data	Yes	n/a	U116	Not clearable via any methods available to customer or vendor	Remove chip

**4220-PGU instrument card**

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
512 KB nonvolatile flash memory	Contains instrument logic	Yes	n/a	U22	Requires Xilinx IMPACT programming tool and JTAG connection to J8 on 4220-PGU board	Remove chip
4 MB nonvolatile flash memory	Contains calibration data	Yes	n/a	U116	Not clearable via any methods available to customer or vendor	Remove chip

**4225-PMU instrument card**

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
512 KB nonvolatile flash memory	Contains instrument logic	Yes	n/a	U22	Requires Xilinx IMPACT programming tool and JTAG connection to J8 on 4220-PGU board	Remove chip
4 MB nonvolatile flash memory	Contains calibration data	Yes	n/a	U116	Not clearable via any methods available to customer or vendor	Remove chip

### 4200-PA accessory

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
Microcontroller internal 16 KB nonvolatile flash memory	Contains calibration data	No	n/a	U1	Not clearable via any methods available to customer or vendor	Remove chip
Microcontroller internal 256 bytes nonvolatile EEPROM memory	Contains calibration data	No	n/a	U1	Not clearable via any methods available to customer or vendor	Remove chip

### 4225-RPM accessory

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
Microcontroller internal 64 KB nonvolatile flash memory	Contains calibration data	No	n/a	U500	Not clearable via any methods available to customer or vendor	Remove chip

### 4200A-CVIV Multi-Switch accessory

Type and minimum size	Function	User modifiable	Data input method	Location	To clear	To sanitize
Microcontroller internal 256 KB nonvolatile flash memory	Contains calibration data	No	n/a	U800	Not clearable via any methods available to customer or vendor	Remove chip
Microcontroller internal 16 KB nonvolatile flash memory	Contains switching logic	No	n/a	U100, U200, U300, U400	Not clearable via any methods available to customer or vendor	Remove chip
Microcontroller internal 256 bytes nonvolatile EEPROM memory	Contains switching logic	No	n/a	U100, U200, U300, U400	Not clearable via any methods available to customer or vendor	Remove chip

## Clearing data

### Clearing data on the 4200A-SCS solid state drive

Follow clearing instructions found in NISPOM, DoD 5220.22-M, chapter 8.

## Sanitizing data

The following subsections indicate how to clear data from the various individual nonvolatile storage devices found in the 4200A-SCS system, its instrument cards, and accessories.

### Sanitizing data on the 4200A-SCS solid state drive

Follow sanitization instructions found in NISPOM, DoD 5220.22-M, chapter 8.



## **Sanitizing data on a nonfunctional system**

To sanitize a nonfunctional instrument, remove all of the following items from the system and return it to Keithley Instruments for installation of replacement boards.

- Instrument cards plugged into main backplane PCI slots
- Single board computer mounted inside the chassis
- Trigger utility module card plugged into main backplane ISA slot
- Solid state drive