

Keysight J7201A/B/C Attenuation Control Unit

Notices

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CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

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A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

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Keysight Technologies certifies that this product met its published specifications at the time of shipment from the factory. Keysight Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (NIST, formerly NBS), to the extent allowed by the Institute's calibration facility, and to the calibration facilities of the other International Standards Organization members.

Safety Considerations

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability for the customer's failure to comply with these requirements.

WARNING

BEFORE APPLYING POWER

- Verify that the correct fuse is installed.
 - Ensure the mains supply voltage fluctuation do not exceed $\pm 10\%$ of the nominal supply voltage.
-

WARNING

GROUND THE INSTRUMENT

This product is a Safety Class I instrument (provided with a protective earth terminal). To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The instrument must be connected to the AC power supply mains through a three-conductor power cable, with the third wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury. If the instrument is to be energized via an external autotransformer for voltage reduction, be certain that the autotransformer common terminal is connected to the neutral (earthed pole) of the AC power lines (supply mains).

WARNING

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE OR WET ENVIRONMENTS

Do not operate the device around flammable gases or fumes, vapor, or wet environments.

WARNING

DO NOT OPERATE DAMAGED OR DEFECTIVE INSTRUMENTS

Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

WARNING

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the instrument. Return the instrument to a Keysight Technologies Sales and Service Office for service and repair to ensure that safety features are maintained.

WARNING

USE THE POWER CORD PROVIDED

Use the device with the power cord provided with the shipment.

WARNING**USE THE DEVICE AS SPECIFIED**






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

CAUTION**CLEAN WITH SLIGHTLY DAMPENED CLOTH**






Clean the outside of the instrument with a soft, lint-free, slightly dampened cloth. Do not use detergent, volatile liquids, or chemical solvents.

Safety Symbols

The following symbols on the instrument and in the documentation indicate precautions which must be taken to maintain safe operation of the instrument.

	When you see this symbol on your instrument, you should refer to the instrument's instruction manual for important information.		This symbol indicates that the instrument requires alternating current (ac) input.
	This symbol indicates the protective earth (ground) terminal.		This symbol indicates that the instrument is electrostatic sensitive.
	This symbol indicates the Fuse.		

Regulatory Markings

	The CE mark is a registered trademark of the European Community. If it is accompanied by a year, it indicates the year the design was proven.		The CSA mark is a registered trademark of the Canadian Standards Association.
ISM 1-A	This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 4).	ICES/NMB-001	ICES/NMB-001 indicates that this ISM device complies with the Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada.
	The RCM mark is a registered trademark of the Australian Communications and Media Authority.		This symbol indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.
	This symbol is a South Korean Class A EMC Declaration. This equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home.		
R-R-Kst-WN19610	이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.		

South Korean Class A EMC Declaration

Information to the user:

This instrument has been conformity assessed for use in business environments. In a residential environment, this equipment may cause radio interference.

This EMC statement applies to the equipment only for use in business environment.

사용자 안내문

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

사용자 안내문은 "업무용 방송통신기자재"에만 적용한다.

Safety and EMC Requirements

This instrument is designed to comply with the following safety and EMC (Electromagnetic Compatibility) requirements:

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU

Waste Electrical and Electronic Equipment (WEEE) Directive

This instrument complies with the WEEE Directive marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.

Product category:

With reference to the equipment types in the WEEE directive Annex 1, this instrument is classified as a "Monitoring and Control Instrument" product.

The affixed product label is as shown below.



Do not dispose in domestic household waste.

To return this unwanted instrument, contact your nearest Keysight Service Center, or visit

<http://about.keysight.com/en/companyinfo/environment/takeback.shtml> for more information.

Sales and Technical Support

To contact Keysight for sales and technical support, refer to the support links on the following Keysight websites:

- www.keysight.com/find/J7201
(product-specific information and support, software and documentation updates)
- www.keysight.com/find/assist
(worldwide contact information for repair and service)

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1 Introduction

Key Features	16
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This chapter provides you the overview of Keysight J7201A/B/C attenuation control unit that covers the key features of this instrument and also the physical appearances for different models.

Key Features

The J7201A/B/C attenuation control units are standalone portable instruments that offer a user-defined attenuation sweep function. This feature allows setting of desired attenuation range, step size, number of cycles and attenuation configuration based on user application's requirements.

J7201A/B/C are designed in a way which make them suitable for benchtop and ATE testing for applications such as base station transceivers (BTS) test, WLAN, WIMAX™, MIMO and WCDMA. Exceptional insertion loss repeatability and excellent attenuation accuracy and flatness over 5 million cycles operating life ensure precise measurements and reduce calibration intervals reducing cost of test.

The features and functions of attenuation control units are easily accessible via front panel using soft keys and the rotary knob. J7201A/B/C are LXI Class C compliant instruments which provides GPIB, USB and LAN connectivity for easy remote control and triggering through a full- featured graphical web interface. This attenuation control units also allow relative attenuation to any values by selecting relative attenuation step function. Calibration data is stored in the instrument's memory for fast, simple and easy retrieval.

Table 1-1 Key features

Key features
Automated corrected value
Attenuation sweep function
GPIB, USB, LAN (LXI Class C)
Relative attenuation step function
Keypads & rotary knob
Calibration data storage

Front and Rear Panels at a Glance

This section briefly explains the functions of front panel keys of J7201A/B/C.

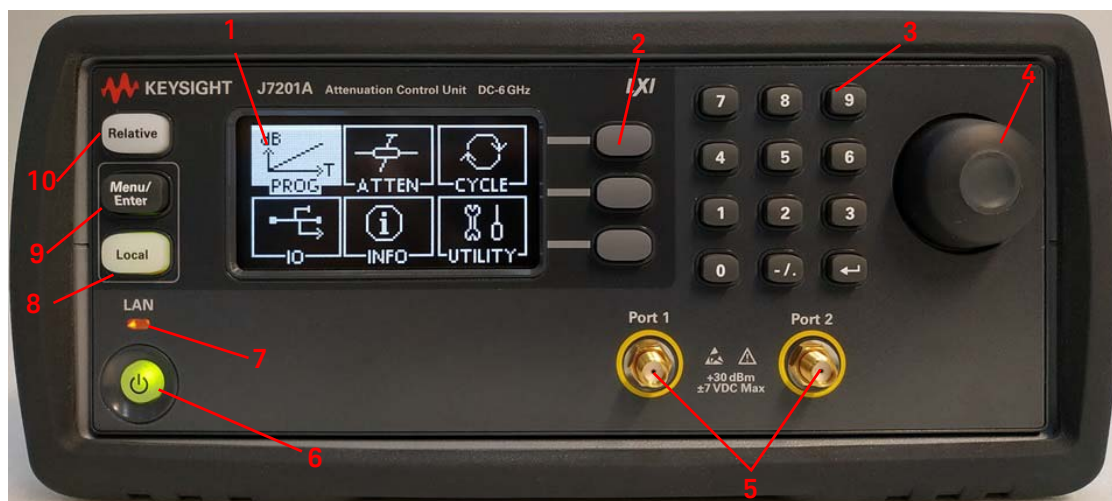


Figure 1-1 J7201A/B/C front panel features

- 1 LCD screen:** This is a window which shows operating selections for front panel operation.
- 2 Softkeys:** These unmarked keys are referred to by the text on display next to them.
- 3 Keypads:** These keys are used to enter numbers e.g. attenuation values, step size, number of cycles and dwell time.
- 4 Rotary knob:** Turn this knob to scroll between the submenus on display. This knob also serves as alternative option for keypads.
- 5 Connectors:** Type N (f)/SMA (f)/3.5 mm (f) connectors for connection to subsequent device under test or instruments. Refer J7201A/B/C's connectors for more details.
- 6 On/Stand by:** Press this key to switch between on and standby. When power is supplied, the background LED is red. Pressing the key once, boots up attenuation control unit and the background LED turns to green.
- 7 LAN:** This is an indicator which tells whether LAN connection is setup or otherwise. Green light means LAN connection is established.
- 8 Local:** Press this key to control the attenuation control unit from front panel when it is operating via remote interfaces. Green light means local operation is in used.
- 9 Menu/Enter:** Press this key to select the highlighted parameter or select the highlighted field or go back to main menu.
- 10 Relative:** Press this key to operate relative attenuation step function.

This section briefly describes the function of the rear panel connectors of J7201A/B/C.

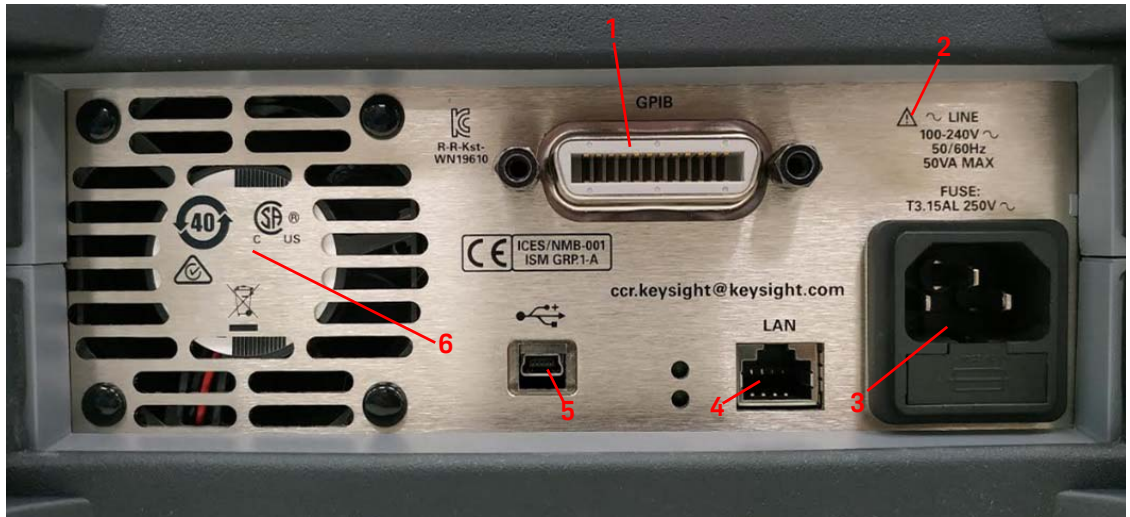


Figure 1-2 J7201A/B/C rear panel features

- 1 **GPIB connector:** The interface connector from a source device to a listening device for remote mode of operation.
- 2 **Alert symbol:** This symbol is used to point out a necessary reference for the user.
- 3 **Receptacle:** Matches transformer primary to line voltage via power cable.
- 4 **LAN connector:** The interface connector for LAN cable.
- 5 **USB connector:** The interface connector for Type mini B 5–pin USB cable.
- 6 **Instrument Markings.**

Types of RF connectors for J7201A/B/C

Below illustrations are the RF connectors' selections for J7201A/B/C.



Figure 1-3 Type N (f) connectors for J7201A/B only



Figure 1-4 SMA (f) connectors for J7201A/B only

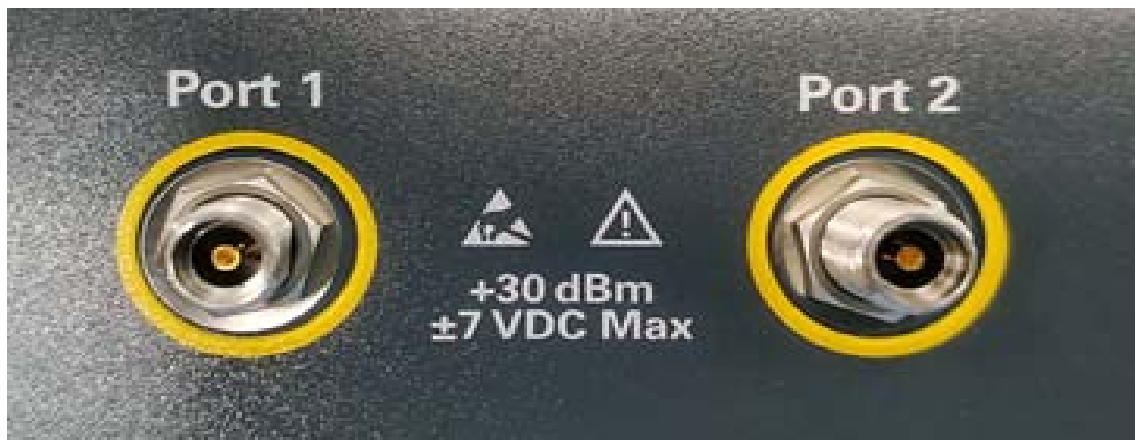


Figure 1-5 3.5 mm (f) connectors for J7201C only

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2 Specifications

Environmental Specifications [22](#)

This chapter provides the Environmental Specifications of the Keysight J7201A/B/C attenuation control unit.

Environmental Specifications

The J7201A/B/C instrument is designed to fully comply with Keysight Technologies' product environmental specifications as shown in [Table 2-1](#).

Table 2-1 Environmental specifications

Parameter	Specification
Temperature	
– Operating	0°C to +50°C
– Storage	-40°C to +70°C
Relative Humidity	
– Operating	95% RH at 40°C (non-condensing)
Mechanical Shock	
– End-use handling shock	Delta V, 1.6 m/s (60 in/s) +5% or -5%, Duration <3ms
– Transportation shock	50G Delta V, 8 m/s +10% or -10%
Vibration	
– Operating random vibration	0.21 Grms
– Survival random vibration	2.09 Grms
Altitude	
– Operating	<4,572 meters (15,000 feet)
ESD Immunity	
– Contact discharge	6 kV per IEC 61000-4-2
– Air discharge	15 kV per IEC 61000-4-2

3 Installation

Initial Inspection	24
Bench Operation	25

This chapter explains how to unpack and check your instrument. It also explains how to prepare your instrument for bench operation.

Initial Inspection

- 1** Unpack and inspect the shipping container and its contents thoroughly to ensure that nothing was damaged during shipment. If the shipping container or cushioning material is damaged, the contents should be checked both mechanically and electrically.
- 2** If the contents are damaged or defective, contact your nearest Keysight Technologies Service & Support Office. Refer to the Service and Support information in the front matter of this manual. Keysight Technologies will arrange for repair or replacement of the damaged or defective equipment. Keep the shipping materials for the carrier's inspection.
- 3** If you are returning your instrument for service, repackaging the attenuation control unit requires original shipping containers and materials or their equivalents. Keysight Technologies can provide packaging materials identical to the original materials. Refer to **“Sales and Technical Support”** on page 4 for the Keysight Technologies nearest to you.

Bench Operation

Pull the handle outwards, and adjust it into one of the two positions illustrated in [Figure 3-1](#).

- (Top) Handle placed underneath the instrument to assure self-alignment of the instruments when stacked
- (Bottom) Handle tilted to raise the front of the instrument for easier viewing of the front panel



Figure 3-1 Handle positioning for bench operation

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4 Verification

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This chapter provides you simple instructions to verify Keysight J7201A/B/C attenuation control unit's functionality in local operation.

Operator's Check for Local Operation

Recommended test equipment

Table 4-1 lists test equipment required for performance test verification and equipment troubleshooting. Equipment other than the recommended models can be used, provided minimum specifications are satisfied.

Table 4-1 Recommended test equipment

Instrument type	Option
N5222B PNA Microwave Network Analyzer, 900 Hz/10 MHz to 26.5 GHz	200
N4691B (3.5 mm ecal module 300 kHz to 26.5 GHz)	00F
83059B (3.5 mm through female to female)	
N4690B (Type-N 50 ohm ecal module 300 kHz to 18 GHz)	00F
1250-1472 (Type-N through female to female)	

Instrument Settings

In order to perform quick test verification, the operator needs to ensure that instrument's settings are following recommendation settings as stated below.

Table 4-2 Instrument settings

Product model	J7201A	J7201B	J7201C
Start frequency	50 MHz	50 MHz	50 MHz
Stop frequency	6 GHz	18 GHz	26.5 GHz
Number of points	120	360	530

Quick-Check Procedure



Figure 4-1 Quick-check configuration for J7201A/B/C

Procedure

- 1 Calibrate the network analyzer with full-2 port calibration using the appropriate electronic or mechanical calibration kit.
- 2 Turn on J7201A/B/C and select “ATTEN” by using rotary knob. Refer chapter 4 **ATTEN** menu for more details on setting attenuation values.
- 3 Set attenuation value for example 0 to 40 dB and power level to -15 dBm and IF BW is 30 Hz. For more details on N5222B’s settings, refer *Keysight PNA Microwave Network Analyzers datasheet (N5221-90003)*.
- 4 Measure S12, S21, S11 and S22 and compare result against specifications provided in the J7201A/B/C Data sheet on Keysight website.

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5 Local Operation

Getting Started with J7201A/B/C	32
Main Menu of J7201A/B/C	33

This local operation chapter explains some simple steps how to use the J7201A/B/C in local operations. Besides that, functionality of all menus are described to provide easy-to-use operations using J7201A/B/C.

Getting Started with J7201A/B/C

Keysight J7201A/B/C attenuator control unit can be easily configured to drive your DUTs via the front panel operations. This section will equip you with fundamental knowledge and guide you through the configuration of J7201A/B/C.

Turn on J7201A/B/C

- 1 Connect AC power supply to J7201A/B/C. You should observe:
 - the background LED of the power button is red which illustrates that J7201A/B/C is in standby mode.
- 2 Press once on power button to turn on the J7201A/B/C.
 - The power button will turn green and the backlight of LCD screen will turn on simultaneously.
 - The attenuators will undergo a self check mode. At this point you will hear a buzzing sound as a result of self- check in progress. Please note that this is not a defect.
 - Once the self check completes, the selection menu will be displayed on the LCD screen.



Figure 5-1 J7201A/B/C main menu

- 3 The **Local** button is lighted up and front panel operation is ready.
- 4 You may begin using the J7201A/B/C.

Main Menu of J7201A/B/C

The main menu comprises of six submenus, each with their own functionality and are described in this section. You can always return to the main menu as in [Figure 5-1](#) by pressing the **Menu/Enter** button.

PROG menu

This PROG menu offers a customized and flexible configuration for the user. The user is able to choose the start and stop values of attenuation including the step size attenuation. The user can also choose the number of points and dwell time for the attenuator.

The delay start is another feature for this attenuation control units as this feature is suitable when it is used in a production or testing environment where accurate timing is significantly required.

If the user requires a continuous cycling, J7201A/B/C provides this capability by selecting continuous sweeping with appropriate dwell's time.

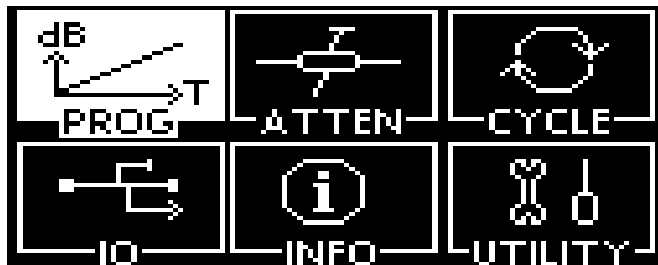
NOTE

For continuous cycling, the minimum sweep time is set to 1s.

Quick Configuration

To configure delay start; start/stop attenuation and step size; dwell's time and sweeping option:

- 1 Navigate to **PROG** icon and press **Menu/Enter** button once.



- 2 This screen shows 4 **Program set (0-3)** which enable user to store the specific configuration up to 4 sets of program. For example, the illustration shows that the configuration is saved to **Program set 0**.



- 3 Press **Quick configuration** softkey once.
- 4 This screen shows attenuation value (**0 dB**); delay start time (**0.0s**); start (**0 dB**); stop attenuation (**100 dB**) and step size (**10 dB**).

```

Attenuation: 0dB
Delay start: 0.0s (S0)
-----
Start  Step  Stop  Sweep
0dB   10dB 100dB R  Paus
Mode  dwells: Sweep
Forw  1.0  2    Back
-> (Enter a value.)

```

- 5 Scroll through the options using softkey **Edit Next**.
- 6 The illustration below shows that the J7201A/B/C is set to **1 dB** step size by pressing **Edit Next** softkey to highlight **Step** and key in the value through keypad or rotary knob.

```

Attenuation: 0dB
Delay start: 0.0s (S0)
-----
Start  Step  Stop  Sweep
0dB   1dB  100dB R  Paus
Mode  dwells: Sweep
Forw  1.0  2    Back
-> (Enter a value.)

```

- 7 You may also configure 2 kind of mode of operations: **Forw** and **F+Rev**. **Forw** allows this instrument to sweep up from start attenuation to stop attenuation to complete 1 cycle. Whereas for **F+Rev** (forward and reverse), it will sweep from start attenuation to stop attenuation and reverse from stop attenuation to start attenuation to complete 1 cycle.

```

Attenuation: 0dB
Delay start: 0.0s (S0)
-----
Start  Step  Stop  Sweep
0dB   1dB  100dB R  Paus
Mode  dwells: Sweep
F+Rev 1.0  2    Back
-> (Enter a value.)

```

- 8 Next setting option is dwell time which ranges from 0.1s to 10s. For example, Dwell time in the illustration below is set as 1.0s through keypad or rotary knob.

```

Attenuation: 0dB
Delay start: 0.0s (S0)
-----
Start  Step  Stop  Sweep
0dB   1dB  100dB R  Paus
Mode  dwells: Sweep
F+Rev 1.0  2    Back
-> (Enter a value.)

```

- 9 You may also choose manual dwell time, **Man**. To sweep attenuation manually, press **Trigger** softkey. For example, the illustration shows stop attenuation is set to **5dB** and current attenuation display **1dB** and trigger sweep manually by pressing on **Trigger** softkey.

10 To stop sweeping, press **Stop Sweep** once.

```

Attenuation = 1dB          Stop
Cycle count= 0           Sweep
-----
Start   Stop   Stop   Trigger
0dB    1dB   100dB
Mode   dwells Sweep
F+Rev  Man   --    Back
-> (Enter a value.)

```

11 Next setting option is number of sweeps. For example, the illustration below displays number of sweeps is **2**. To cycle the attenuator, click **Sweep** softkey once.

```

Attenuation: 0dB          Edit
Delay start: 0.0s (S0)   Next
-----
Start   Stop   Stop   Sweep
0dB    1dB   5dB   R paus
Mode   dwells Sweep
Forw  10.0  2     Back
-> (Enter a value.)

```

12 Now, the symbol **R** is highlighted which indicates that J7201A/B/C is running.

13 You can also pause instrument's cycling by selecting **paus**. Press **R** to continue cycling. To halt the cycling, press **Stop Sweep** softkey once.

```

Attenuation = 0dB          Stop
Cycle count= 0           Sweep
-----
Start   Stop   Stop   Sweep
0dB    1dB   5dB   R paus
Mode   dwells Sweep
Forw  10.0  2     Back
-> (Enter a value.)

```

14 **Back** softkey directs you back to the previous menu.

15 The information of the last operation remains as illustrated and saved in program set 0 (**S0**).

Advance Configuration

To configure delay start; start/stop attenuation and step size; dwell's time and sweeping option:

- 1 Maximum and minimum limits for **Delay start**, **sweep mode** and **sweep cycle** are set similar to quick configuration. Tune rotary knob to your desired values or enter value using keypad.

```

Advance config set: 0
-----
Delay start: 0.0s
Sweep mode: Forw
Sweep cycle: 2
Number of step: 0
-----
-> (Enter a value.)
Next Item
-----
Sweep
R Paus
-----
Back

```

- 2 Press **Next Item** softkey to scroll from top to bottom of the setting options.

```

Advance config set: 0
-----
Delay start: 0.0s
Sweep mode: Forw
Sweep cycle: 2
Number of step: 0
-----
-> (Enter a value.)
Next Item
-----
Sweep
R Paus
-----
Back

```

- 3 Initially, **Number of step** is set at 0. Press **Next Item** softkey once and observe that no step is set (**Atten** and **Dwell** is blank).

```

Step      Atten  Dwell
1).      ----  ----
-----
-> (Enter a value.)
Next Item
-----
Sweep
R Paus
-----
Back

```

- 4 Set **Number of step** to 2 by tuning the rotary knob or entering value via keypad. Observe that 2 steps appear.

```

Advance config set: 0
-----
Delay start: 0.0s
Sweep mode: Forw
Sweep cycle: 2
Number of step: 2
-----
-> (Enter a value.)
Next Item
-----
Sweep
R Paus
-----
Back

```

- 5 Set attenuation (**ATTEN**) and dwell time (**Dwell**) for the two steps. For example, set **100 dB** attenuation and dwell time of **2s** for **Step 1** while as set **20 dB** attenuation and dwell time of **0s** for **Step 2** as shown in the illustration.

Step	Atten	Dwell	Next Item
1).	100dB	2.0s	-----
2).	20dB	0.0s	Sweep
3).	----	----	R Paus

			Back

-> (Enter a value.)

NOTE

The maximum number of steps allowed is 20.

- 6 The Illustration displays setting of Step 1-4 with different attenuations and dwell times.

Step	Atten	Dwell	Next Item
1).	100dB	2.0s	-----
2).	20dB	0.0s	Sweep
3).	121dB	2.0s	R Paus
4).	9dB	10.0s	-----
5).	----	----	Back

-> (Enter a value.)

- 7 The cycling of the steps will trigger line by line and sweep until the defined sweep cycles. For this example, the step will sweep Step 1-4 for 2 cycles since **sweep cycle** is set as 2.

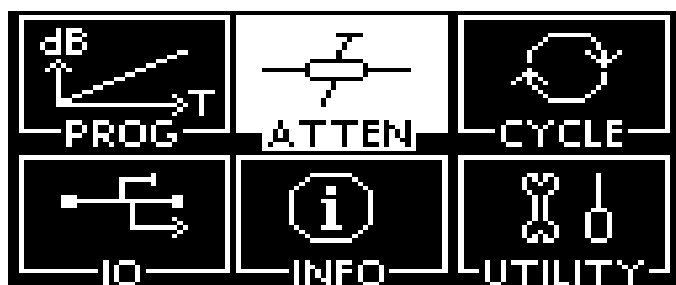
ATTEN menu

The main function of this submenu is to provide manual attenuation during measurement. You can always choose to use corrected values if accurate and precise attenuation at particular frequency point is required. Multiple options for attenuation steps are available such as 1, 5 and 10 steps for your own choice and application.

Display Uncorrected/Corrected Values

To display uncorrected and corrected values:

- 1 Navigate to the **ATTEN** icon using the navigation rotary encoder and press **Menu/Enter** button once.



- 2 In **Unc** screen, absolute attenuation value of 121dB is shown.



- 3 Press **Display** softkey once to change from **Unc** to **Cor** or vice-versa.
- 4 In **Cor** screen, it displays uncorrected (121 dB) and corrected attenuation (121.32 dB) value and frequency (0 GHz) which is variable and can be set.

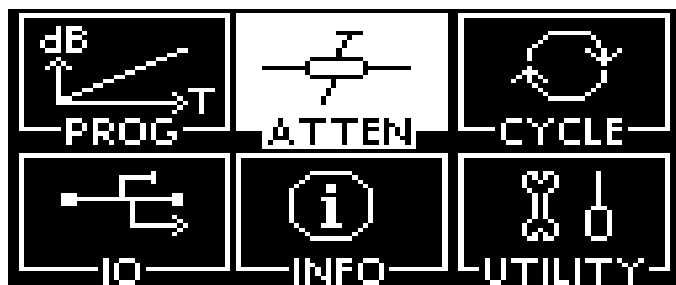


- 5 Press **Back** to return to previous main menu.

Display Auto Corrected Value

To display auto corrected value:

- 1 Navigate to the **ATTEN** icon using the navigation rotary encoder and press **Menu/Enter** button once.



- 2 Enter digit 50 manually using keypad to select attenuation of **50 dB**. Before setting 50 dB, ensure **dB** is selected by pressing the **Set** softkey.



- 3 Now, screen will show the setting of **50 dB** with **dB** highlighted.
- 4 Now, you observe attenuation accuracy is auto-corrected to 2 decimal places. For example, Auto Corrected value of **49.79 dB** in this case.



- 5 Press **Back** to return to previous main menu.

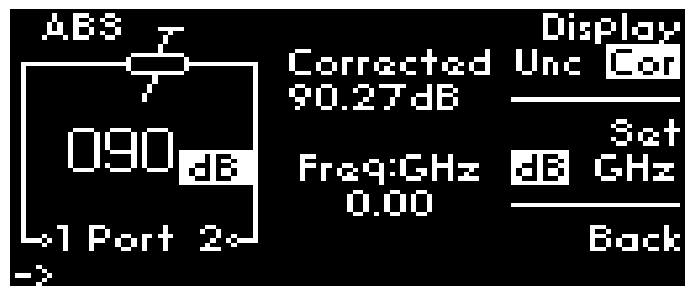
Select Frequencies and Attenuation Values

To navigate and select attenuation values:

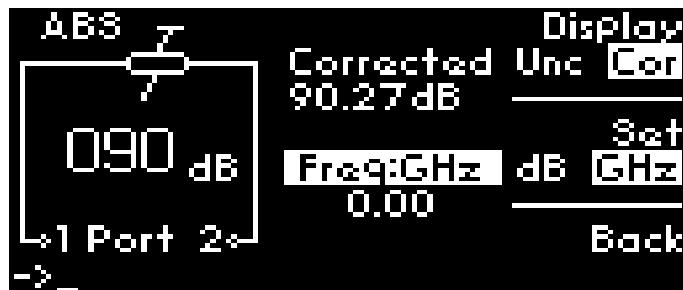
- 1 Select **Cor** under **Display** using softkey.
- 2 Now, you observe attenuation accuracy is corrected to 2 decimal places. For example, Corrected value of **121.32 dB** in this case.



- 3 Enter digit 90 manually using keypad to select attenuation of **90 dB**. Before setting 90 dB, ensure **dB** is selected by pressing the **Set** softkey.



- 4 Now, screen will show the setting of **90 dB** with **Cor** and **dB** highlighted.
- 5 Press **Set** softkey once, **GHz** is chosen. Enter required frequency using keypad or rotary knob. For example, enter **4.5 GHz**.



- 6 Now, 90 dB attenuation (shows 90.25 dB corrected value) and 4.5 GHz frequency are set.



Select Attenuation Step

To select attenuation step for suitable application:

- 1 Navigate to **Step** softkey, press once from **step 1** to **step 5**.



- 2 To follow the example shown, press twice to select **step 10**.
- 3 Then, turn rotary encoder anticlockwise once^[1] to see **111 dB** display as a result of 10 dB step down from **121 dB**.



[1] Turn anticlockwise accordingly to obtain step down of decremental 10 dB such as 111 dB, 101 dB, 91 dB, 81 dB and so forth. Maximum attenuation level for J7201C is 101 dB.

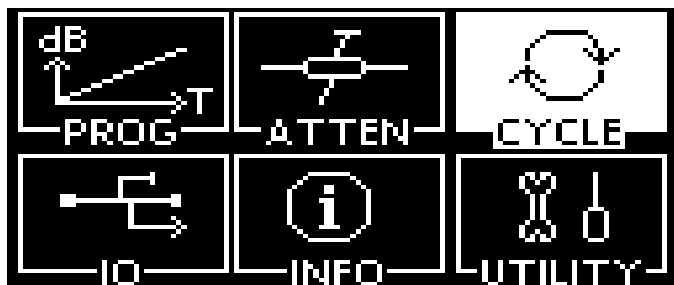
CYCLE menu

This sub menu will show total number of cycles for each section of attenuators incorporated in J7201A/B/C.

Display or Clear Cycles of Attenuators

To display number of cycles for specific attenuators in J7201A/B/C:

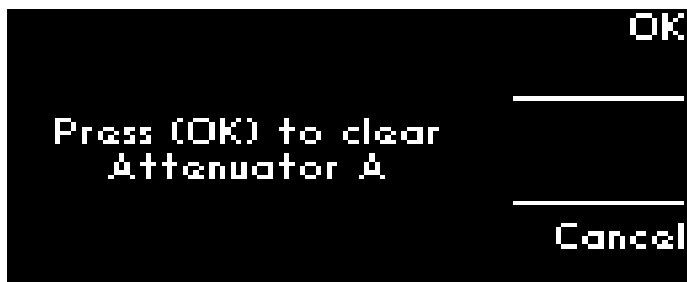
- 1 Navigate main menu to **CYCLE** menu and press once on **Menu/Enter** button.

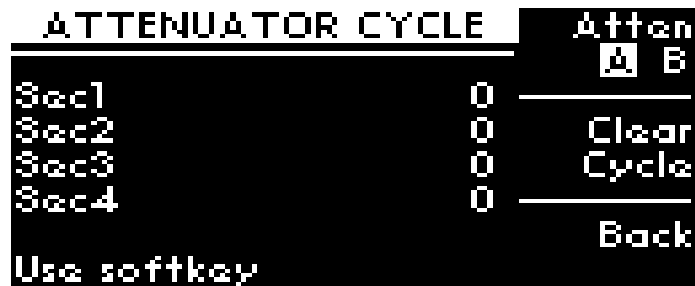


- 2 This screen **ATTENUATOR CYCLE** shows the cycles per section from **Sec1 - Sec4**.

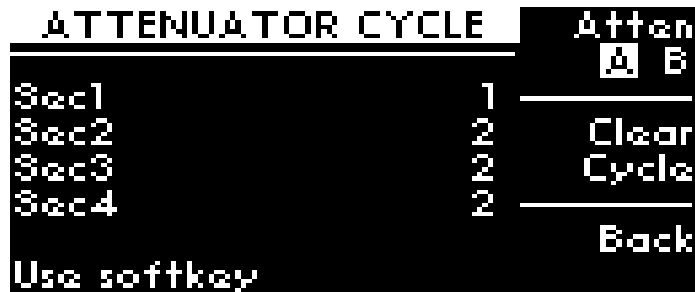


- 3 Illustrations display both attenuators such as **Atten A** and **Atten B**.
- 4 To delete all previous cycles count, click once on the **Clear Cycle** softkey.
- 5 A pop-up screen reminds you whether **Attenuator A** cycles needs to be clear.
- 6 Press **OK** softkey deletes all cycles count. All cycles noted as "0".





- 7 If **Cancel** is selected, original menu should prompt up as illustrated.



IO menu

Refer to [Chapter 6, "Remote Interface Configurations"](#).

INFO menu

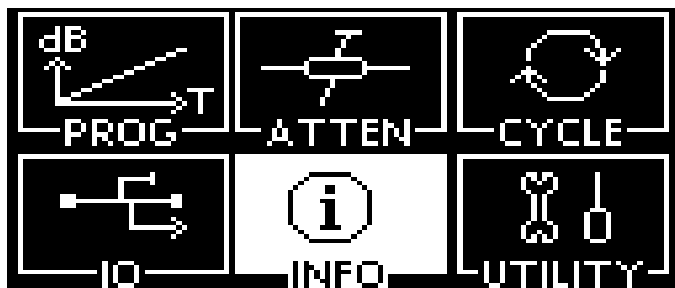
All the system information for J7201A/B/C is displayed on this menu. User may retrieve all necessary information from here.

Display J7201A/B/C Information

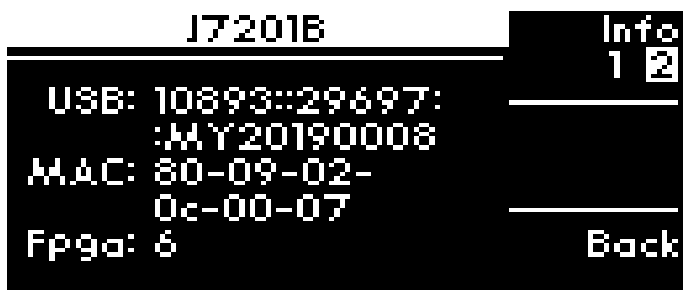
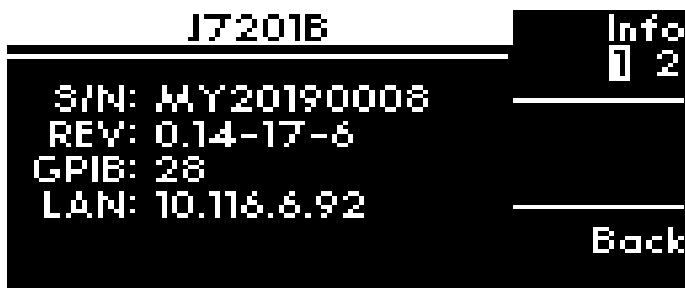
To display the following system information for J7201A/B/C:

- Model
- Serial number
- Firmware revision
- GPIB address
- LAN IP
- USB address
- MAC address
- FPGA revision

- 1 Press once on **Menu/Enter** button once **INFO** icon is selected as illustrated.



- There are 2 pages of information for J7201A/B/C. Press **Info** softkey once to move to page 2 or vice-versa.



- Press **Back** softkey to return to main menu.

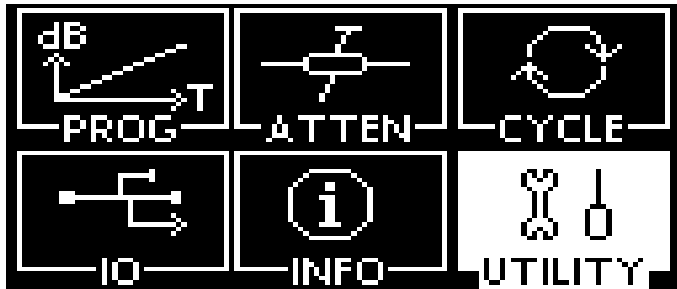
UTILITY menu

There are information such as beep volume, factory default, LAN reset and calibration menu in this UTILITY menu.

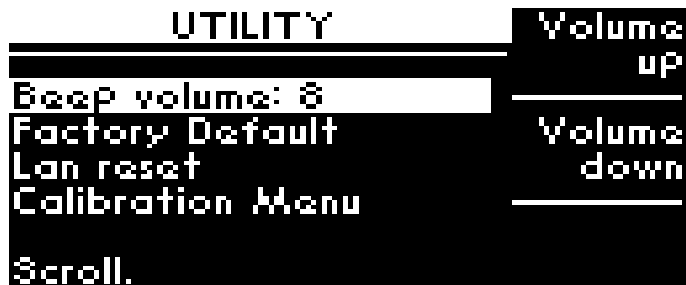
Display and Adjust Beep Volume

To display and adjust beep volume:

- 1 Navigate to **UTILITY** icon and press **Menu/Enter** button once.



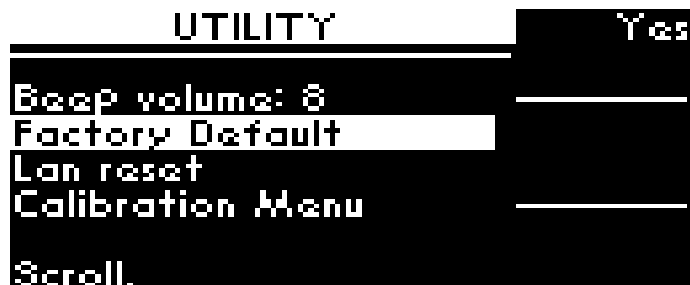
- 2 You can choose **Beep** volume to increase and lower the beep volume of the attenuation box by pressing the softkeys **Volume up** or **Volume down**.



Restore Factory Default Setting

To restore factory default setting for J7201A/B/C:

- 1 Scroll to highlight **Factory Default**. This option resets the J7201A/B/C to the default setting.



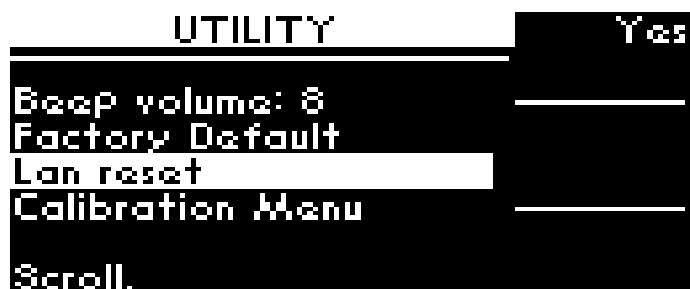
- 2 Press **Yes** softkey once and **OK** for restoring the instrument to the factory default. Otherwise, press **Cancel** softkey for cancellation.



Reset LAN Setting

To reset LAN setting for J7201A/B/C:

- 1 Scroll to **LAN reset**.



- 2 Press **Yes** softkey once and **OK** to reset the LAN setting of the instrument. Otherwise, press **Cancel** softkey for cancellation.



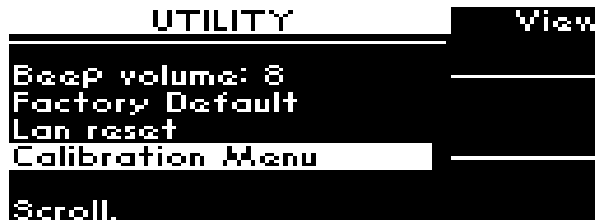
- 3 If **OK** is selected, a message "**LAN Default Done**" appears indicating that the LAN setting of the instrument has been reset. Press **BACK** to return to the initial menu page.



Display Calibration Data

To display calibration data for J7201A/B/C:

- 1 Scroll down to highlight **Calibration Menu** and press **Yes** softkey once.



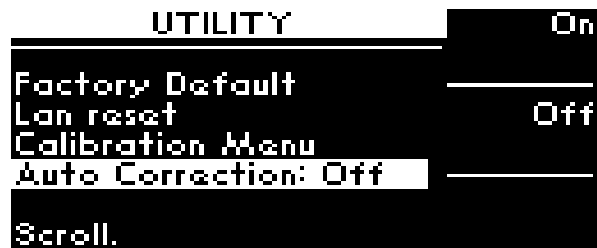
- 2 The screen displays all attenuation values at particular frequencies.
- 3 You can also flip by pressing **Next page**; **Previous page**; and **Back** to the main menu by using the softkeys.
- 4 The bottom of the screen shows which page you are at and total pages for calibration data.

Freq	Attenuation	Next
	0 dB	page
0.30GHz	0.28dB	Previous
0.35GHz	0.30dB	
0.40GHz	0.33dB	page
0.45GHz	0.35dB	Back
0.50GHz	0.36dB	
page 2 of 72		

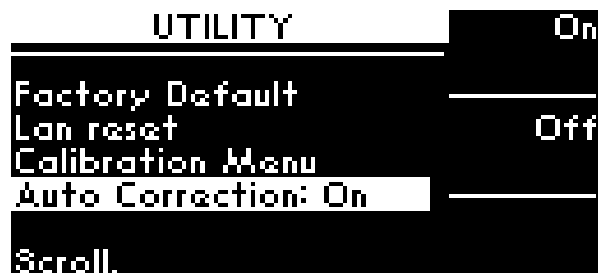
Turn On Auto Correction Setting

To turn on Auto Correction setting for J7201A/B/C:

- 1 Scroll to **Auto Correction**.



- 2 Press **On** softkey once to turn on Auto Correction setting of the instrument.



Relative menu

The relative function enables the user to set the attenuation values relative to the absolute attenuation for specific application. The currently displayed attenuation is used as a reference value when this feature is turned on and user may set positive or negative attenuation values from the reference value. When relative function is disabled, the display returns absolute value of attenuation setting.

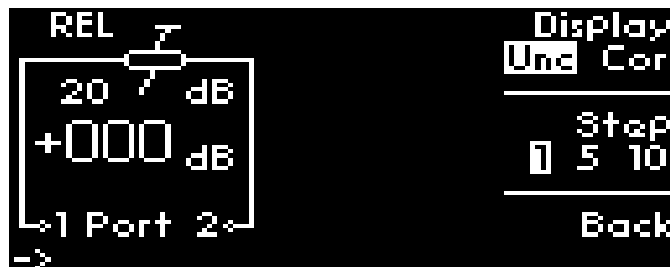
Set Relative Attenuation Value

To set relative attenuation value:

- 1 In **Atten**, set attenuation desire attenuation value using keypad.



- 2 Press **Relative** button once and button will turn green indicating that the relative feature is turned on.
- 3 Note that **REL** appears and value **20 dB** is set as the relative attenuation.



- 4 Tune rotary knob to adjust the desired attenuation which will be relative to **20 dB** attenuation value. For example, the absolute attenuation is set to **21 dB** in the illustration.



6 Remote Operations

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Remote interfaces allow you to operate J7201A/B/C from remote place which makes this attenuation control unit a portable device. By understanding and learning these configurations, you can be more familiar on operating J7201A/B/C remotely and assist in setting up remote operation. This chapter also provides the programming guide for J7201A/B/C in SCPI commands.

Configuring the Remote Interface

This section briefly describes how to configure the GPIB, USB and LAN remote interfaces.

NOTE

For detailed information on remote interface connectivity configuration refer to the Keysight Technologies USB/LAN GPIB Interfaces Connectivity Guide. If you have installed the IO Libraries Suite, you can access the Connectivity Guide via the Keysight IO Libraries Control icon. Alternatively, you can access the Connectivity Guide via the Web at:

www.keysight.com/find/connectivity.

NOTE

The latest version of Keysight IO Libraries Suite can be downloaded from

www.keysight.com/find/iosuitedownload. The Keysight Instrument Control DVD, with the above software, is no longer shipped with Keysight instruments. If you require a Keysight Instrument Control DVD, it can be ordered by contacting your local Keysight Customer Contact Center.

Interface selection

You can choose to control the J7201A/B/C remotely using either the GPIB, USB or LAN interfaces.

For information on selecting and configuring the remote interface manually from the instrument front panel or remotely via virtual front panel, refer to [Chapter 6, "Remote Operations"](#).

NOTE

It is expected that most users will use the front panel keys to set up the remote interfaces. The remote interface commands are provided for completeness (for front panel operation).

GPIB configuration

Each device on the GPIB (IEEE- 488) interface must have a unique address. You can set the J7201A/B/C address to any value between 0 and 30. The J7201A/B/C is shipped with a default address set to 28. The GPIB address is stored in non-volatile memory and does not change when the J7201A/B/C is switched off or after a remote interface reset.

For information on setting the GPIB address manually via front panel operation, refer to ["Connecting over GPIB"](#) on page 82.

USB configuration

The USB interface requires no front panel or remote configuration. The USB is fixed and can not be changed - it is set at the factory and is unique for each J7201A/B/C.

NOTE

For further information on USB configuration, refer to **“Connecting over USB”** on page 83.

NOTE

Before connecting the USB cable, make sure that I/O software is installed on your computer.

NOTE

For more information about Keysight I/O Libraries Suite software, refer to Connectivity Guide. If you have installed other I/O software refer to documentation that accompanies the software.

LAN configuration

The J7201A/B/C has three LAN operating modes:

- Dynamic mode (Dynamic Host Configuration Protocol or DHCP)
- Auto IP mode (Local PC Control or isolated LAN)
- Static mode (Manual mode)

Refer to **“Connecting over LAN”** on page 84 to configure the above LAN operating modes.

Programming Guide (SCPI)

SCPI command syntax

The following conventions are used for SCPI command syntax for remote interface programming.

- Square brackets ([]) indicate optional keywords or parameters
- Braces ({}) enclose parameter choices within a command string
- Angle brackets (<>) enclose parameters for which you must specify a value
- A vertical bar (|) separates multiple parameters

Commands relevant to J7201A/B/C

[INPut:]ATTenuation/INPut[:ATTenuation]

Sets or returns the attenuation level of the attenuation control unit.

[INPut:]ATTenuation <numeric>[, <float>]

Query?	Yes
Set?	Yes
Set/Return Parameters	Numeric representation format: Integer (for example, 8)
Minimum	0 - for both attenuation level and frequency 121 (J7201A/B) - for attenuation level 101 (J7201C) - for attenuation level
Maximum	6 GHz (J7201A) - for frequency 18 GHz (J7201B) - for frequency 26.5 GHz (J7201C) - for frequency
Units	dB, Hz

Examples

To set the attenuation level and frequency to 58 dB and 15 GHz:

:ATT 58dB, 15GHz

To query the set attenuation level:

[INPut:]ATTenuation?

Error Messages

If <numeric> is beyond the range specified, a return error value will be clipped to the minimum or maximum attenuation value. You may encounter the following two error messages if the value is not within the specified range:

- + 12, "Value clipped to Max"
- + 11, "Value clipped to Min"

Related Commands

[INPut:]ATTenuation:DECRement/INPut[:ATTenuation]:DECRement
 [INPut:]ATTenuation:INCRement/INPut[:ATTenuation]:INCRement
 [INPut:]ATTenuation:STEPsize/INPut[:ATTenuation]:STEPsize
 [INPut:]FREQuency?

NOTE

During auto correction mode, it is recommended that you enter both attenuation and frequency values. Both values are intercorrelated and important for selecting the correct attenuation level.

[INPut:]ATTenuation:DECRement/INPut[:ATTenuation]:DECRement

Decreases the attenuation value for the attenuation control unit. To decrease attenuation, <stepsize> value needs to be entered. If no <stepsize> value is stated, it sets the value to the current step size or 1 dB initial step size (when unit power is on).

[INPut:]ATTenuation:DECRement [<stepsize>]

Query?	No
Set?	Yes
Set Parameters	Numeric representation format: Integer (for example, 8)
Minimum	n/a
Maximum	n/a
Units	dB

Examples

To decrease the attenuation level by a step size of 2 dB:

:DECR 2

Error Messages

If <stepsize> is beyond the range specified, a return error value will be clipped to the minimum or maximum attenuation value. You may encounter the following two error messages if the value is not within the specified range:

- + 12, "Value clipped to Max"

- + 11, "Value clipped to Min"

Related Commands

[INPut:]ATTenuation/INPut[:ATTenuation]
 [INPut:]ATTenuation:INCRement/INPut[:ATTenuation]:INCRement
 [INPut:]ATTenuation:STEPsize/INPut[:ATTenuation]:STEPsize
 [INPut:]FREQuency?

[INPut:]ATTenuation:INCRement/INPut[:ATTenuation]:INCRement

Increases the attenuation value for the attenuation control unit. To increase attenuation, `<stepsize>` value needs to be entered. If no `<stepsize>` value is stated, it sets the value to the current step size or 1 dB initial step size (when unit power is on).

`[INPut:]ATTenuation:INCRement [<stepsize>]`

Query?	No
Set?	Yes
Set Parameters	Numeric representation format: Integer (for example, 8)
Minimum	n/a
Maximum	n/a
Units	dB

Examples

To increase the attenuation level by a step size of 4 dB:

`:INCR 4`

Error Messages

If `<stepsize>` is beyond the range specified, a return error value will be clipped to the minimum or maximum attenuation value. You may encounter the following two error messages if the value is not within the specified range:

- + 12, "Value clipped to Max"
- + 11, "Value clipped to Min"

Related Commands

`[INPut:]ATTenuation/INPut[:ATTenuation]`

`[INPut:]ATTenuation:DECRement/INPut[:ATTenuation]:DECRement`

`[INPut:]ATTenuation:STEPsize/INPut[:ATTenuation]:STEPsize`

`[INPut:]FREQuency?`

[INPut:]ATTenuation:STEPsize/INPut[:ATTenuation]:STEPsize

Sets the step size for the attenuation control unit. The initial step size is set to 1 dB when the unit is powered on. If step size is set to some other value, for example, 10 dB, increase or decrease attenuation level is following 10 dB step size.

`[INPut:]ATTenuation:STEPsize <numeric>`

Query?	Yes
Set?	Yes
Set/Return Parameters	Numeric representation format: Integer (for example, 8)
Minimum	n/a

Maximum	n/a
Units	dB

Examples

To set the step size to 4 dB:

:STEP 4

To query the set attenuation step size:

[INPut:]ATTenuation:STEPsize?

Related Commands

[INPut:]ATTenuation/INPut[:ATTenuation]

[INPut:]ATTenuation:DECRement/INPut[:ATTenuation]:DECRement

[INPut:]ATTenuation:INCRement/INPut[:ATTenuation]:INCRement

[INPut:]FREQuency?

[INPut:]ATTenuation:RELative[:STATe]/INPut[:ATTenuation]:RELative[:STATe]

Enables the relative attenuation function.

[INPut:]ATTenuation:RELative[:STATe] <bool>

Query?	Yes
Set?	Yes
Set/Return Parameters	Boolean Data: 0 1 OFF ON
Minimum	n/a
Maximum	n/a
Units	n/a

Examples

To enable the relative attenuation function:

:REL 1

To disable the relative attenuation function:

:REL 0

To query the state of the relative attenuation function:

[INPut:]ATTenuation:RELative[:STATe]?

Related Commands

[INPut:]ATTenuation:REFerence/INPut[:ATTenuation]:REFerence

[INPut:]ATTenuation:RELative:LEVel/INPut[:ATTenuation]:RELative:LEVel

[INPut:]FREQuency?

[INPut:]ATTenuation:REFErence/INPut[:ATTenuation]:REFErence

Sets the reference attenuation for the attenuation control unit in relative attenuation mode. If integer value is not given, it automatically references to current attenuation as reference level.

[INPut:]ATTenuation:REFErence [**<numeric>**]

Query?	No
Set?	Yes
Set Parameters	Numeric representation format: Integer (for example, 8)
Minimum	n/a
Maximum	n/a
Units	n/a

Examples

To set the reference attenuation to 12:

:REF 12

Related Commands

[INPut:]ATTenuation:RELative[:STATe]/INPut[:ATTenuation]:RELative[:STATe]

[INPut:]ATTenuation:RELative:LEVEl/INPut[:ATTenuation]:RELative:LEVEl

[INPut:]FREQuency?

[INPut:]ATTenuation:RELative:LEVEl/INPut[:ATTenuation]:RELative:LEVEl

Sets user desired relative attenuation. This relative attenuation level will be referenced to reference attenuation level set earlier.

[INPut:]ATTenuation:RELative:LEVEl **<numeric>**

Query?	Yes
Set?	Yes
Set/Return Parameters	Numeric representation format: Integer (for example, 8)
Minimum	n/a
Maximum	n/a
Units	None

Examples

To set the relative attenuation to 28:

:REL:LEV 28

To query the set relative attenuation:

[INPut:]ATTenuation:RELative:LEVEl?

Error Messages

If <numeric> is beyond the range specified, a return error value will be clipped to minimum or maximum attenuation value. You may also encounter 2 error messages if value is not within range specified. If relative is not turned on, it will return error +13.

- + 12, "Value clipped to Max"

- + 11, "Value clipped to Min"

- + 13, "Not in relative mode"

Related Commands

[INPut:]ATTenuation:RELative[:STATe]/INPut[:ATTenuation]:RELative[:STATe]

[INPut:]ATTenuation:REFerence/INPut[:ATTenuation]:REFerence

[INPut:]FREQuency?

[INPut:]FREQuency

Set the instrument frequency. The return value is in MHz.

[INPut:]FREQuency <float64>

Query?	Yes
Set?	Yes
Set/Return Parameters	Numeric representation format: This parameter is a number that can be expressed as an integer (for example, 8) or a real number (for example, 23.6)
Minimum	0 Hz
Maximum	6 GHz (J7201A) 18 GHz (J7201B) 26.5 GHz (J7201C)
Units	Hz

Examples

To set the frequency to 25.5 GHz:

FREQ 25.5GHz

To query the set frequency:

[INPut:]FREQuency?

Related Commands

[INPut:][ATTenuation:]RELative[:STATe]

[INPut:][ATTenuation:]REFerence

ROUTE:CLOSe

Closes the switching path(s). The first parameter specifies the Channels in the form of 'bcc' where b = bank number (0-n, range model dependent) and cc = channel number (00-nn, range model dependent). For example: 103 or 104 or 108. A list of channels may be specified in several forms: a comma separated list of channels as in: 101,103,105,108;

a colon separated range of channels as in: 101:107; a combination of channels and ranges as in: 102,103,104:107.

ROUTE:CLoSe <channel_list>

Query?	Yes
Set?	Yes
Set/Return Parameters	Numeric representation format: Integer (for example, 8)
Minimum	101
Maximum	108
Units	None

Examples

To close the channel number 106:

ROUTE:CLoSe (@106)

To query the closed list of channels:

ROUTE:CLoSe? <channel_list>

Related Commands

ROUTE:OPEn

ROUTE:CLoSe:ALL

ROUTE:OPEn:ALL

ROUTE:OPEn

Opens the switching path(s). The first parameter specifies the Channels in the form of 'bcc' where b = bank number (0-n, range model dependent) and cc = channel number (00-nn, range model dependent). For example: 103 or 104 or 108. A list of channels may be specified in several forms: a comma separated list of channels as in: 101,103,105,108; a colon separated range of channels as in: 101:107; a combination of channels and ranges as in: 102,103,104:107.

ROUTE:OPEn <channel_list>

Query?	Yes
Set?	Yes
Set/Return Parameters	Numeric representation format: Integer (for example, 8)
Minimum	101
Maximum	108
Units	None

Examples

To open the channel number 103:

```
ROUTe:OPEn (@103)
```

To query the open list of channels:

```
ROUTe:OPEn? <channel_list>
```

Related Commands

```
ROUTe:CLOSe
```

```
ROUTe:CLOSe:ALL
```

```
ROUTe:OPEn:ALL
```

ROUTe:CLOSe:ALL

Closes all switching paths.

```
ROUTe:CLOSe:ALL
```

Query?	No
Set?	Yes
Set Parameters	Numeric representation format: Integer (for example, 8)
Minimum	n/a
Maximum	n/a
Units	None

Examples

To close all channels:

```
ROUTe:CLOSe:ALL
```

Related Commands

```
ROUTe:CLOSe
```

```
ROUTe:OPEn
```

```
ROUTe:OPEn:ALL
```

ROUTe:OPEn:ALL

Opens all switching paths.

```
ROUTe:OPEn:ALL
```

Query?	No
Set?	Yes
Set Parameters	Numeric representation format: Integer (for example, 8)
Minimum	n/a

Maximum	n/a
Units	None

Examples

To open all channels:

`ROUTE:OPEn:ALL`

Related Commands

`ROUTE:CLOSe`

`ROUTE:OPEn`

`ROUTE:CLOSe:ALL`

NOTE

`ROUTE:CLOSe`, `ROUTE:OPEn`, `ROUTE:CLOSe:ALL` and `ROUTE:OPEn:ALL` SCPI commands are not supported in Auto correction mode.

DIAGnostic:RELAy:CYCLes?

Checks number of cycles for individual section. The first command checks number of cycles for individual section. The second command shows number of cycles for all sections. The following table lists numbers (1 - 8) representing each section of the attenuators.

Table 6-1 Sections of attenuators

Attenuator A		Attenuator B	
Sec 1	1	Sec 1	5
Sec 2	2	Sec 2	6
Sec 3	3	Sec 3	7
Sec 4	4	Sec 4	8

NOTE

The first command above returns number of cycles for Sec 1 for attenuator A and Sec 4 for attenuator B. Number of cycles for all sections will be displayed when second command is send.

`DIAGnostic:RELAy:CYCLes? <channel_list>`

Query?	Yes, query only
Set?	No
Return Parameters	Numeric representation format: Integer (for example, 8)
Minimum	101

Maximum	108
Units	None

Examples

To query the number of cycles:

```
DIAGnostic:RELAY:CYCLes? (@1:8)
```

[INPut:]ATTenuation:AUTOcorrected/INPut[:ATTenuation]:AUTOcorrected

Sets the instrument operating mode: 0 for normal mode, 1 for auto mode.

```
[INPut:]ATTenuation:AUTOcorrected <bool>
```

Query?	Yes
Set?	Yes
Set/Return Parameters	Boolean Data: 0 1
Minimum	n/a
Maximum	n/a
Units	n/a

Examples

To set the instrument operating mode to auto mode:

```
[INPut:]ATTenuation:AUTOcorrected 1
```

To query the set instrument operating mode:

```
[INPut:]ATTenuation:AUTOcorrected?
```

Related Commands

[CORRection?](#)

[CORRection:AUTO?](#)

CORRection?

Enables you to query the corrected value. The first parameter specifies the attenuation level. The second parameter is the frequency. If no parameter passed in, then the current corrected value will be returned.

```
CORRection? [<atten_level>][<suffix>],[<frequency>][<suffix>]
```

Query?	Yes, query only
Set?	No
Return Parameters	Numeric representation format: Double Digit Integer (for example, 8)
Minimum	0 dB – for attenuation level 0 Hz – for frequency

	121dB (J7201A/B) – attenuation level
	101dB (J7201C) – attenuation level
Maximum	6 GHz (J7201A) – for frequency
	18 GHz (J7201B) – for frequency
	26.5 GHz (J7201C) – for frequency
Units	dB, Hz

Examples

To query the corrected value:

```
CORRection? 25dB,6GHz
```

Related Commands

```
CORRection:AUTO?
```

```
[INPut:]ATTenuation:AUTOcorrected/INPut[:ATTenuation]:AUTOcorrected
```

CORRection:AUTO?

Reads the corrected value in auto mode.

```
CORRection:AUTO?
```

Query?	Yes, query only
Set?	No
Return Parameters (Optional)	Numeric representation format: This parameter is a number that can be expressed as an integer (e.g., 8) or a real number (e.g., 23.6)
Minimum	n/a
Maximum	n/a
Units	None

Examples

To query the corrected value:

```
CORRection:AUTO?
```

Related Commands

```
CORRection?
```

```
[INPut:]ATTenuation:AUTOcorrected/INPut[:ATTenuation]:AUTOcorrected
```

DISPlay:ATTenuation

Turns the front panel display to the ATTEN page.

```
DISPlay:ATTenuation
```

Query?	No
Set?	Yes

Set Parameters	n/a
Minimum	n/a
Maximum	n/a
Units	None

Examples

DISP:ATT

Related Commands

DISPlay:IO

DISPlay:PROGram

DISPlay:CYCLE

DISPlay:INFormation

DISPlay:UTILity

HCOpy:SDUMp:DATA?

DISPlay:IO

Turns the front panel display to the IO page.

DISPlay:IO

Query?	No
Set?	Yes
Set Parameters	n/a
Minimum	n/a
Maximum	n/a
Units	None

Examples

DISP:IO

Related Commands

DISPlay:ATTenuation

DISPlay:PROGram

DISPlay:CYCLE

DISPlay:INFormation

DISPlay:UTILity

HCOpy:SDUMp:DATA?

DISPlay:PROGram

Turns the front panel display to the PROG page.

DISPlay:PROGram

Query?	No
Set?	Yes
Set Parameters	n/a
Minimum	n/a
Maximum	n/a
Units	None

Examples

DISP:PROG

Related Commands

DISPlay:ATTenuation

DISPlay:IO

DISPlay:CYCLe

DISPlay:INFormation

DISPlay:UTILity

HCOPY:SDUMp:DATA?

DISPlay:CYCLe

Turns the front panel display to the CYCLE page.

DISPlay:CYCLe

Query?	No
Set?	Yes
Set Parameters	n/a
Minimum	n/a
Maximum	n/a
Units	None

Examples

DISP:CYCL

Related Commands

DISPlay:ATTenuation

DISPlay:IO

DISPlay:PROGram

DISPlay:INFormation

DISPlay:UTILity

HCOPY:SDUMp:DATA?

DISPlay:INFormation

Turns the front panel display to the INFO page.

`DISPlay:INFormation`

Query?	No
Set?	Yes
Set Parameters	n/a
Minimum	n/a
Maximum	n/a
Units	None

Examples

`DISP:INF`

Related Commands

`DISPlay:ATTenuation`

`DISPlay:IO`

`DISPlay:PROGram`

`DISPlay:CYCLE`

`DISPlay:UTILity`

`HCOPY:SDUMP:DATA?`

DISPlay:UTILity

Turns the front panel display to the UTILITY page.

`DISPlay:UTILity`

Query?	No
Set?	Yes
Set Parameters	n/a
Minimum	n/a
Maximum	n/a
Units	None

Examples

`DISP:UTIL`

Related Commands

`DISPlay:ATTenuation`

`DISPlay:IO`

`DISPlay:PROGram`

`DISPlay:CYCLE`

[DISPlay:INFormation](#)[HCOpy:SDUMp:DATA?](#)

HCOpy:SDUMp:DATA?

Provides screen shots of the front panel display. Returns an image of the display in .bmp format.

[HCOpy:SDUMp:DATA?](#)

Query?	Yes, query only
Set?	No
Return Parameters	Binary Data
Minimum	n/a
Maximum	n/a
Units	None

Examples

[HCOP:SDUM:DATA?](#)

Related Commands

[DISPlay:ATTenuation](#)[DISPlay:IO](#)[DISPlay:PROGram](#)[DISPlay:CYCLE](#)[DISPlay:INFormation](#)[DISPlay:UTILity](#)

SYSTem:ERRor?

Returns the next error number followed by its corresponding error message string from the remote programming error queue. The queue is FIFO (first-in, first-out) buffer that stores errors as they occur. As it is read, each error is removed from the queue. When all errors have been read, the query returns "0,No Error". If more errors are accumulated than the queue can hold, the last error in the queue is "-350,Too Many Errors".

[SYSTem:ERRor?](#)

Query?	Yes, query only
Set?	No
Return Parameters	Integer, String
Minimum	n/a
Maximum	n/a
Units	None

Examples

To query the next error from the queue:

`SYST:ERR?`

Related Commands

`SYSTem:PREset`

`SYSTem:REMOte`

`SYSTem:COMMunicate:TCPip:CONTRol?`

SYSTem:PREset

Presets the attenuation control unit to the following factory-defined states:

- :ATT 121 (For J7201A/B)

- :ATT 101 (For J7201C)

`SYSTem:PREset`

Query?	No
Set?	Yes
Set Parameters	n/a
Minimum	n/a
Maximum	n/a
Units	None

Examples

To preset the attenuation control unit:

`SYSTem:PREset`

Related Commands

`SYSTem:ERRor?`

`SYSTem:REMOte`

`SYSTem:COMMunicate:TCPip:CONTRol?`

SYSTem:REMOte

Sets the interface in the Remote state, which disables all front panel controls except the Local key. Pressing the Local key while in the Remote state returns the front panel to the Local state.

`SYSTem:REMOte`

Query?	No
Set?	Yes
Set Parameters	n/a
Minimum	n/a

Maximum	n/a
Units	None

Examples

To set the interface in the Remote state:

`SYST:REM`

Related Commands

`SYSTem:ERRor?`

`SYSTem:PREset`

`SYSTem:COMMunicate:TCPip:CONTrol?`

SYSTem:COMMunicate:TCPip:CONTrol?

Reads the initial control connection port number for Sockets communications. This connection is used to send and receive commands and queries.

- Use the Control socket connection to send a Device Clear (DCL) to the instrument or to detect pending Service Request (SRQ) events.

`SYSTem:COMMunicate:TCPip:CONTrol?`

Query?	Yes, query only.
Set?	No
Return Parameters	Integer
Minimum	n/a
Maximum	n/a
Units	None

Examples

To query the initial control connection port number for Sockets communications:

`SYST:COMM:TCP:CONT?`

Related Commands

`SYSTem:ERRor?`

`SYSTem:PREset`

`SYSTem:REMOte`

SYSTem:PERSONa:MANufacturer

Sets the manufacturer string returned by `*IDN?` Query.

`SYSTem:PERSONa:MANufacturer <quoted string>`

Query?	Yes
Set?	Yes
Set/Return Parameters	String

Minimum	n/a
Maximum	n/a
Units	None

Examples

To set the manufacturer string to “Keysight Technologies”:

```
SYST:PERS:MAN "Keysight Technologies"
```

To query the set manufacturer string:

```
SYSTem:PERS:MAN?
```

Related Commands

```
SYSTem:PERSONa:MANUFACTURer:DEFault
```

SYSTem:PERSONa:MANUFACTURer:DEFault

Sets the manufacturer string to default (Keysight Technologies).

```
SYSTem:PERSONa:MANUFACTURer:DEFault
```

Query?	Yes
Set?	Yes
Set/Return Parameters	String
Minimum	n/a
Maximum	n/a
Units	None

Examples

To set the manufacturer string to default:

```
SYST:PERS:MAN:DEF
```

To query the default manufacturer string:

```
SYSTem:PERSONa:MANUFACTURer:DEFault?
```

Related Commands

```
SYSTem:PERSONa:MANUFACTURer
```

SYSTem:PERSONa:MODEl

Sets the model string returned by *IDN? Query.

```
SYSTem:PERSONa:MODEl <quoted string>
```

Query?	Yes
Set?	Yes
Set/Return Parameters	String
Minimum	n/a

Maximum	n/a
Units	None

Examples

To set the model string to “J7201C”:

```
SYST: PERS: MOD "J7201C"
```

To query the set model string:

```
SYSTem: PERSona: MODe1?
```

Related Commands

```
SYSTem: PERSona: MODe1: DEFault
```

SYSTem: PERSona: MODe1: DEFault

Sets the model string to default (depends on the model).

```
SYSTem: PERSona: MODe1: DEFault
```

Query?	Yes
Set?	Yes
Set/Return Parameters	String
Minimum	n/a
Maximum	n/a
Units	None

Examples

To set the model string to default:

```
SYST: PERS: MOD: DEF
```

To query the default model string:

```
SYSTem: PERSona: MODe1: DEFault?
```

Related Commands

```
SYSTem: PERSona: MODe1
```

SYSTem: SET

Sets up the instrument as defined by the data in the binary block of data from the computer.

- A binary block of data, consisting of bytes of setup information. The number of bytes is a dynamic number that is read and allocated by the instrument's firmware.

- SYSTem: SET query operates the same as the *LRN? query

```
SYSTem: SET <Binary Block>
```

Query?	Yes
Set?	Yes
Set/Return Parameters	Binary Data
Minimum	n/a
Maximum	n/a
Units	None

Examples

To define the setup information:

```
SYST:SET #516384.....
```

To query the setup information:

```
SYSTem:SET?
```

Related Commands

*LRN?

*CLS

Clears the following registers:

- Standard Event Status
- Operation Status Event
- Questionable Status Event
- Status Byte
- Error Queue

*CLS

Query?	No
Set?	Yes
Set Parameters	n/a
Minimum	n/a
Maximum	n/a
Units	None

Examples

To clear the registers:

```
*CLS
```

Related Commands***IDN?*****OPC?*****RST*****TST?*****WAI*****ESE**

Programs the Standard Event Status Enable register bits. The programming determines which events of the Standard Event Status Event register (refer to “*ESR?”) are allowed to set the ESB (Event Summary Bit) of the Status Byte register. A “1” in the bit position enables the corresponding event. All of the enabled events of the Standard Event Status Event Register are logically ORed to cause the Event Summary Bit (ESB) of the Status Byte Register to be set.

The query reads the Standard Event Status Enable register.

Table 6-2 Bit configuration of Standard Event Status Enable register

Bit Position	7	6	5	4	3	2	1	0
Bit Name	PON	n.u.	CME	EXE	DDE	QYE	n.u.	OPC
Bit Weight	128		32	16	8	4		1

n.u. - Not Used

PON- Power On

CME - Command Error

EXE - Execution Error

DDE - Device-dependent Error

QYE - Query Error

OPC - Operation Complete

***ESE <Integer>**

Query?	Yes
Set?	Yes
Set/Return Parameters	Integer (register value)
Minimum	0
Maximum	255
Units	None

Examples

To set the bit in the enable register part of the standard event status register to 129:

***ESE 129**

To query the enable register part of the standard event status register:

*ESE?

Related Commands

*ESR?

*SRE

*STB?

*ESR?

Reads and clears the Standard Event Status Event register. The bit configuration of this register is the same as the Standard Event Status Enable register (refer to “*ESE”).

*ESR?

Query?	Yes, query only
Set?	No
Return Parameters	Integer (register value)
Minimum	n/a
Maximum	n/a
Units	None

Examples

To query the Standard Event Status Event register:

*ESR?

Related Commands

*ESE

*SRE

*STB?

*IDN?

Requests the attenuation control unit to identify itself. It returns the data in four fields separated by commas. For example, Keysight Technologies, J7201A, MY00000000, A.00.01.

Field	Description
Keysight Technologies	Manufacturer
J7201x	Model number
MYxxxxxxx	Serial number
A.xx.xx	Firmware revision

*IDN?

Query?	Yes, query only
Set?	No
Return Parameters	String
Minimum	n/a
Maximum	n/a
Units	None

Examples

To query identification information of the device:

`*IDN?`

Related Commands

`*CLS`

`*OPC?`

`*RST`

`*TST?`

`*WAI`

*OPC?

Sets the standard event status register to monitor the completion of all commands. The OPC command query returns the ASCII character 1 in the Standard Event Status Register to indicate completion of all pending operations.

`*OPC?`

Query?	Yes, query only
Set?	No
Return Parameters	Integer, 0 1
Minimum	n/a
Maximum	n/a
Units	None

Examples

To query the Standard Event Status Register:

`*OPC?`

Related Commands

`*CLS`

`*IDN?`

`*RST`

`*TST?`

`*WAI`

***RST**

Resets the attenuation control unit to the following factory-defined states:

- :ATT 121 (For J7201A/B)
- :ATT 101 (For J7201C)

***RST**

Query?	No
Set?	Yes
Set Parameters	n/a
Minimum	n/a
Maximum	n/a
Units	None

Examples

To reset the instrument:

***RST**

Related Commands

***CLS**

***IDN?**

***OPC?**

***TST?**

***WAI**

***SRE**

Enables the bits in the status byte enable register. The selected enabled bits are summarized in the “Master Status Summary” (MSS) bit (bit 6) of the Status Byte register. If any of the selected bit condition changes from 0 to 1, a service request is generated. Table below shows the contents of this register.

The query returns the current contents of the status byte enable register. The format of the return is in the range of 0 to 255.

Table 6-3 Bit configuration of Status Byte Enable register

Bit Position	7	6	5	4	3	2-0
Bit Name	OPER	MSS RQS	ESB	MAV	QUES	n.u.

Bit Weight	128	64	32	16	8
n.u. - Not Used					
OPER - Operation Status Summary					
MSS - Master Status Summary					
RQS - Request for Service					
ESB - Event Status Byte Summary					
MAV - Message Available					
QUES - Questionable Status Summary					

*SRE <Integer>

Query?	Yes
Set?	Yes
Set/Return Parameters	Integer (register binary value)
Minimum	0
Maximum	255
Units	None

Examples

To set the bit in the status byte enable register to 128:

*SRE 128

To query the status byte enable register:

*SRE?

Related Commands

*ESE

*ESR?

*STB?

*STB?

Reads the condition register of the status byte register and returns a decimal value which corresponds to the binary-weighted sum of all bits set in the register.

*STB?

Query?	Yes
Set?	No
Return Parameters	Integer (register value)
Minimum	n/a
Maximum	n/a
Units	None

Examples

To query the condition register of the status byte register:

*STB?

Related Commands

*ESE

*ESR?

*SRE

***TST?**

Runs hardware self-test and reports any errors.

*TST?

Query?	Yes
Set?	No
Return Parameters	Integer 0 Indicates the unit has passed self-test. Value other than 1 indicates an error code.
Minimum	n/a
Maximum	n/a
Units	None

Examples

To perform self-test:

*TST?

Related Commands

*CLS

*IDN?

*OPC?

*RST

*WAI

***WAI**

Instructs the unit not to process any further commands until all pending operations are completed. Pending operations are complete when:

-All commands sent before *WAI have been executed. This includes overlapped commands. Most commands are sequential and are completed before the next command is executed. Overlapped commands are executed in parallel with other commands. The *WAI command prevents subsequent commands from being executed before any overlapped commands have been completed.

*WAI

Query?	No
Set?	Yes
Set Parameters	n/a
Minimum	n/a
Maximum	n/a
Units	None

Examples

To instruct the unit not to process any further commands:

***WAI**

Related Commands

***CLS**

***IDN?**

***OPC?**

***RST**

***TST?**

*LRN?

Returns a binary string of all the saved EEPROM values required to set the instrument to its current state.

The return string includes “SYSTEM:SET” command header that can be used directly, provided the receiver accepts binary data.

***LRN?**

Query?	Yes, query only
Set?	No
Return Parameters (Optional)	Binary Data
Minimum	n/a
Maximum	n/a
Units	None

Examples

To return all the saved EEPROM values:

***LRN?**

Related Commands

***CLS**

***IDN?**

*OPC?
*RST
*TST?
SYSTem:SET

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7 Remote Interface Configurations

- Connecting the Remote Interface [82](#)
- Exploring the J7201A/B/C Web Interface Over LAN [88](#)

This chapter provides information and steps to achieve remote operations of Keysight J7201A/B/C attenuation control unit via GPIB, USB and LAN. It will also introduces J7201A/B/C web interface over LAN.

Connecting the Remote Interface

NOTE

To easily connect the J7201A/B/C to your PC, configure and verify your connection, you can use the Keysight IO Libraries Suite, the Keysight IO Libraries for Windows, or an equivalent.

- You can find information and install this application via the Web at www.keysight.com/find/iolib.

NOTE

The procedures in this section are referring to the *Keysight Technologies USB/LAN/GPIB Interfaces Connectivity Guide*. If you have installed the IO Libraries Suite, you can access the Connectivity Guide via the Keysight IO Libraries Control icon. Alternatively, you can access the Connectivity Guide via the Web at www.keysight.com/find/connectivity.

Connecting over GPIB

- 1 Make sure you have installed the required I/O software on your computer.
- 2 Follow the instructions included with your GPIB interface card to install the GPIB hardware in your computer.
- 3 Connect the GPIB cable (*not provided*) between the computer and the J7201A/B/C.
- 4 Make sure power is applied to your computer and verify that the operating system is fully booted. Then, apply power to J7201A/B/C.
- 5 Configure your GPIB hardware as instructed by the documentation provided by the hardware vendor.
- 6 Use the *Connection Expert* utility of the Keysight IO Libraries Suite to add the J7201A/B/C and verify a connection.
- 7 The J7201A/B/C is shipped from factory with a default GPIB address of 28.

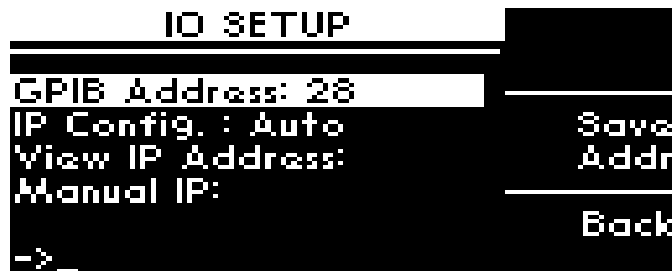
NOTE

If you have installed any other I/O software, refer to documentation included with that software.

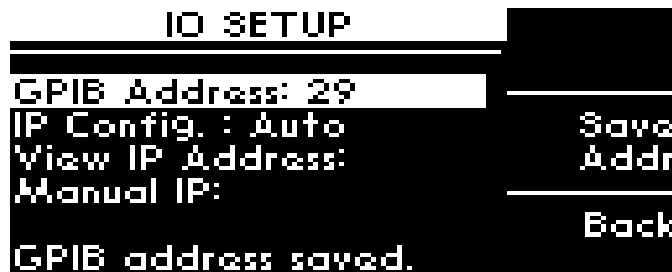
To change GPIB address

Changing GPIB address (integer between 0 to 30):

- 1 Navigate using rotary knob to **IO icon** as illustrated and press once on **Menu/Enter** button to select.
- 2 Default address of **28** appears once you are at **GPIB ADDRESS** screen.



- 3 Scroll to change address by using rotary knob and press once on **Save Addr** softkey to save changes.
- 4 Once saved, sentence of "**GPIB address saved**" appears on the bottom of the screen.



- 5 **Back** softkey brings you back to the previous menu screen.

Connecting over USB

The USB interface requires no front panel configuration.

NOTE

Before connecting the USB cable, make sure that I/O software is installed on your computer. See "Connecting the J7201A/B/C to Your Computer" on page 66 for more information on installing the Keysight I/O Libraries software.

- 1 After I/O software is installed on your computer, connect a J7201A/B/C to your computer using a Type Mini B 5-pin USB cable.
- 2 Make sure power is applied to your computer and verify that the operating system is fully booted. Then, apply power to the J7201A/B/C.
- 3 The *Found New Hardware Wizard* will automatically start and guide you through configuring the J7201A/B/C as a USB device. To install the software automatically, accept all defaults.

NOTE

If you have installed the Keysight IO Libraries Software, this also install the required low-level software drivers. Therefore you do not need to insert the CD when the *Found New Hardware Wizard* instructs you to do so.

NOTE

If you have installed any other I/O interface software, refer to documentation included in that software.

- 4 Use the Connectivity Expert utility of the Keysight I/O Libraries Suite to verify that the J7201A/B/C is displayed under the USB interface.
- 5 Now you can use various programming environments to control the J7201A/B/C. For an overview on programming instructions via USB, refer to the *Connectivity Guide*.

Connecting over LAN

The J7201A/B/C has two LAN operating modes:

- Auto mode
- Manual mode

Selecting the LAN network type

You can connect and configure your J7201A/B/C for site LAN or isolated (non-site) LAN operation.

- A *Site LAN* network is defined as a local area network (LAN) in which computers and LAN-enabled instruments are connected to a site LAN (workgroup LAN, Intranet, or enterprise LAN) via optional routers, hubs, and/or switches.
- A *Isolated LAN* network is defined as a local area network (LAN) in which computers and LAN-enabled instruments are **NOT** connected to site LAN.

Auto mode

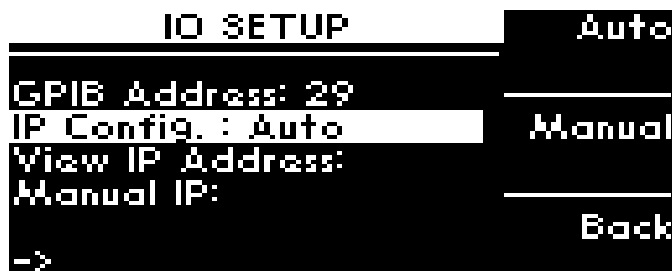
This mode is used when you are connecting J7201A/B/C via site LAN. In auto mode, the IP address, Subnet Mask, and Default Gateway values are obtained from the DHCP server or automatically assigned and the values can not be configured from the front panel.

- 1 Firstly, connect your computer and J7201A/B/C to LAN outlets using standard LAN cable.
- 2 Make sure power is applied to your computer and verify that the operating system is fully booted.
- 3 Apply power to J7201A/B/C and background LED color turns red, indicating standby mode.
- 4 Press once on the ON button and LED color turns from red to green.
- 5 After several minutes, LAN indicator will turn green which means LAN connection is established.
- 6 Then, the LCD screen displays 6 submenus.

To prepare J7201A/B/C for auto mode

Select J7201A/B/C for auto mode

- 1 IP Config is set default as **Auto**.



- 2 Check and confirm again the auto mode setting in **View IP Address**.
- 3 To check current LAN status, click once on **LAN Status** softkey.
- 4 **Restart Netw.** is use for you to start again on the network.

CURRENT IP ADDRESS	LAN
10.118.8.92	Status
CURRENT SUBNET	Restart
255.255.254.0	Netw.
CURRENT GATEWAY	Back
10.118.8.1	
LAN STATUS	
NORMAL	

Now you can use the J7201A/B/C Web Browser Interface to access and control the instrument. See [“Exploring the J7201A/B/C Web Interface Over LAN”](#) on page 88.

If you plan to program the instrument over LAN or use such programs, make sure you have installed the required I/O software on your computer.

Use the Connectivity Expert utility of the Keysight IO Libraries Suite to add the J7201A/B/C and verify a connection. When identifying the instrument, it is easiest if you use the IP address noted in above table.

NOTE

If you have installed any other I/O software, refer to documentation included in that software.

Now you can use various programming environments to control the J7201A/B/C. For an overview on programming instructions via USB, refer to the *Connectivity Guide*.

Manual mode

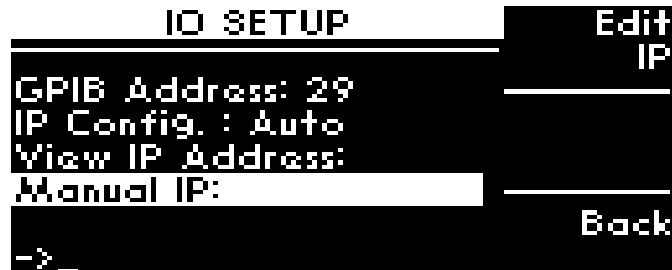
In a manual mode, you must set up the IP Address, Subnet Mask and Default Gateway that is compatible with your network infrastructure. If it is not correctly setup, J7201A/B/C will not be visible on your network.

- 1 Firstly, connect your computer to J7201A/B/C using LAN cable.
- 2 Make sure power is applied to your computer and verify that the operating system is fully booted.
- 3 Apply power to J7201A/B/C and background LED color turns red, indicating standby mode.
- 4 Press once on the ON button and LED color turns from red to green.
- 5 After several minutes, LAN indicator will turns green which means LAN connection is established.
- 6 Then, the LCD screen displays 6 submenus.

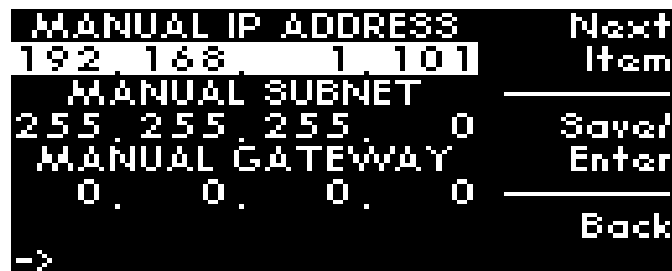
To prepare J7201A/B/C for manual mode

Select J7201A/B/C for manual mode:

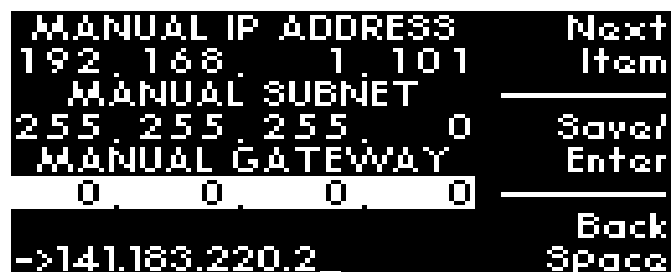
- 1 Navigate to **IO** icon and scroll to **Manual IP** for manual configuration.



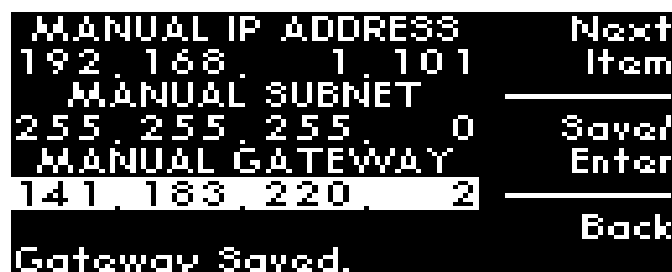
- 2 Press **Edit IP** softkey once and now, you should enter **MANUAL IP ADDRESS**, **MANUAL SUBNET** and **MANUAL GATEWAY**.



- 3 To scroll from one row to another, press **Next item** once.
- 4 You are only able to key in by typing the whole address and click **Save/Enter** once before proceeds to another row.
- 5 Press **Back Space** if you make an error while typing the address, subnet or gateway.



- 6 Bottom of the screen will always show once it has been saved.



Now you can use the J7201A/B/C Web Browser Interface to access and control the instrument. See “[Exploring the J7201A/B/C Web Interface Over LAN](#)” on page 88.

If you plan to program the instrument over LAN or use such programs, make sure you have installed the required I/O software on your computer.

Use the Connectivity Expert utility of the Keysight IO Libraries Suite to add the J7201A/B/C and verify a connection. When identifying the instrument, it is easiest if you use the IP address noted in above table.

NOTE

If you have installed any other I/O software, refer to documentation included with that software.

Now you can use various programming environments to control the J7201A/B/C. For an overview on programming instructions via USB, refer to the *Connectivity Guide*.

Exploring the J7201A/B/C Web Interface Over LAN

You can use the J7201A/B/C Web Browser Interface for remote access and control of the instrument via Java™ - enabled Web browser, such as Microsoft® Internet Explorer. Using the Web Interface, you can configure, monitor and troubleshoot your system remotely. This section provides an overview of the J7201A/B/C Web Interface.

NOTE

The following tasks assume you have configured the J7201A/B/C for LAN communication and have verified connection to a LAN network.

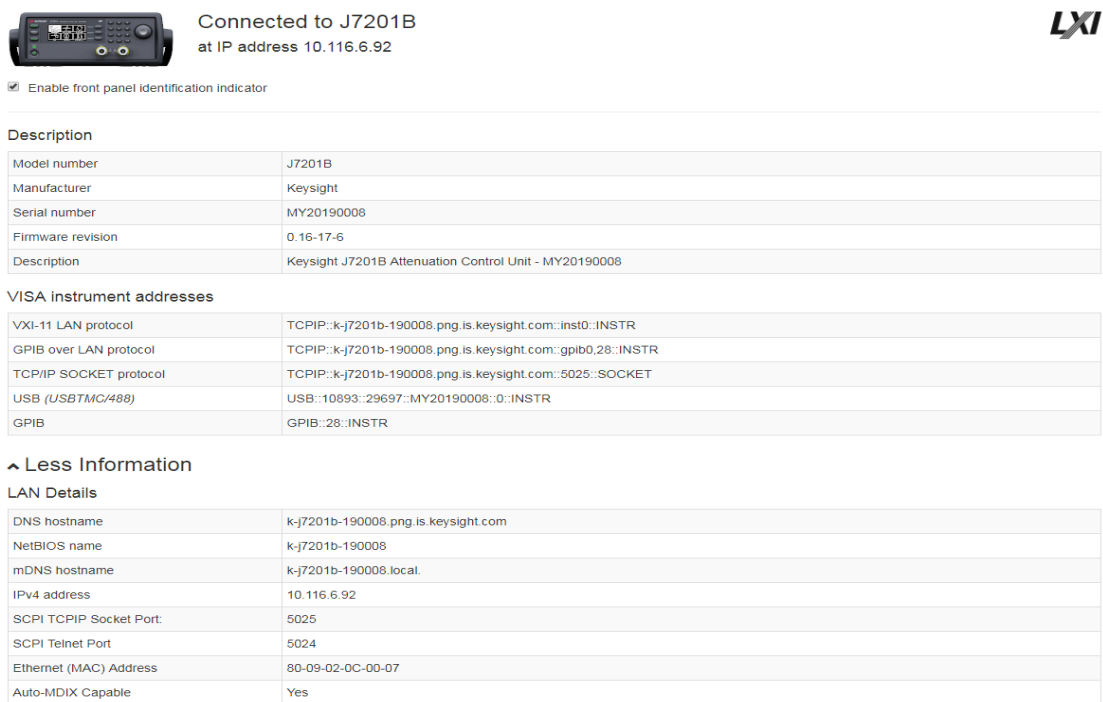
See “[Connecting over LAN](#)” on page 84 for more information.

Launching the web interface

- 1 Open your Internet browser from your computer.
- 2 From the **Tools > Internet Options** menu, navigate to **Connections** (exact navigation depends on your browser), and then select **LAN Settings**.
- 3 From **LAN Settings** dialog, select/activate **Bypass proxy server for local addresses** (exact terminology depends on your browser).
- 4 Exit the **Options** window.
- 5 Enter the IP address of the J7201A/B/C in the Address Field and press return result icon. Use the J7201A/B/C’s front panel utility menu to read the IP address.
- 6 After entering the respective IP address, the J7201A/B/C Web Interface’s Home window appears.

NOTE

The procedures in this section will help you understand tasks commonly performed using the J7201A/B/C Web Interface. For additional help on using the interface, click Help with the Page tab on the lower-left corner of the Web Interface window.



Connected to J7201B
at IP address 10.116.6.92

Enable front panel identification indicator

Description

Model number	J7201B
Manufacturer	Keysight
Serial number	MY20190008
Firmware revision	0.16-17-6
Description	Keysight J7201B Attenuation Control Unit - MY20190008

VISA instrument addresses

VXI-11 LAN protocol	TCPIP::k-j7201b-190008.png.is.keysight.com::inst0::INSTR
GPIB over LAN protocol	TCPIP::k-j7201b-190008.png.is.keysight.com::gpib0.28::INSTR
TCP/IP SOCKET protocol	TCPIP::k-j7201b-190008.png.is.keysight.com::5025::SOCKET
USB (USBTMC/488)	USB::10893::29697::MY20190008::0::INSTR
GPIB	GPIB::28::INSTR

^ Less Information

LAN Details

DNS hostname	k-j7201b-190008.png.is.keysight.com
NetBIOS name	k-j7201b-190008
mDNS hostname	k-j7201b-190008.local
IPv4 address	10.116.6.92
SCPI TCP/IP Socket Port	5025
SCPI Telnet Port	5024
Ethernet (MAC) Address	80-09-02-0C-00-07
Auto-MDIX Capable	Yes

Figure 7-1 J7201A/B/C web interface's home window

Navigation bar

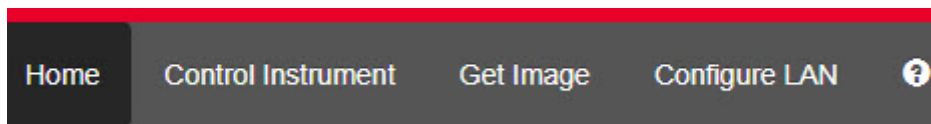


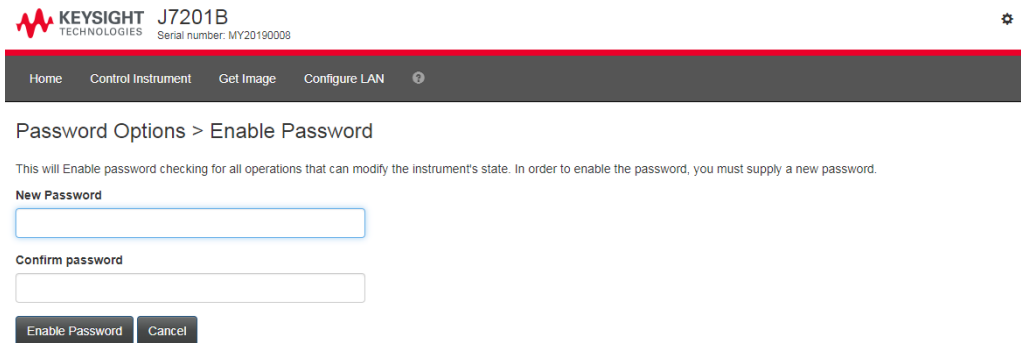
Figure 7-2 Navigation bar

- Home: Displays various setting information.
- Control Instrument: Virtual front panel.
- Get Image: Receives image.
- Configure LAN: Displays and modifies LAN settings.
- Help icon: Displays the Help file.

Displaying the browser web control page

- 1** In the Home window, click **Control Instrument** on the top bar of the window.
- 2** You can view the virtual front panel of J7201A/B/C.
- 3** Now, you can control this device remotely, similar to the front panel of the actual instrument.

- 4 Click the **Settings** icon on the top left corner of the window to open the **Password Options** window.



- 5 Enter a new password and click **Enable Password** if you wish to enable password for controlling the instrument.

8 Servicing the Attenuation Control Unit

Preparing a Static-Safe Workstation 92

Maintenance and Adjustments 93

This chapter will guide you on preparing a static-safe workstation and how to maintain your instrument in good condition.

Preparing a Static-Safe Workstation

Electrostatic discharge (ESD) can damage or destroy electronic components. All works performed on assemblies consisting of electronic components should be done at a static-safe workstation.

An example of a static-safe workstation is shown below using two types of ESD protection:

- conductive table mat and wrist strap combination, and
- conductive floor mat and heel strap combination

The methods may be used together or separately.

Reducing ESD damage

- To help reduce the amount of ESD damage that occurs during installation, testing, or servicing instruments use the following guidelines:
- Be sure that all instruments are properly earth-grounded to prevent buildup of static charge.
- Personnel should be grounded with a resistor- isolated wrist- strap before touching the center pin of any connector and before removing any assembly from the instrument.
- Before connecting any coaxial cable to an instrument connector for the first time each day, momentarily ground the center and outer conductor of the cable.
- Handle all PC board assemblies and electronic components only at static-safe workstations.
- Store or transport PC board assemblies and electronics components only in static-shielding containers.
- PC board assembly edge-connector contacts may be cleaned by using a lintfree cloth with a solution of 80% electronics-grade isopropyl alcohol and 20% deionized water. This should be performed at a static-safe workstation.

Maintenance and Adjustments

Fuse removal/replacement

User maintenance is limited to replacement of the rear panel fuse. The main ac line fuse is located on the rear panel in the line power module.

Please ensure that the fuse is 250V, T3.15A.

Use the following procedure to replace fuse.

- 1 Remove fuse holder using a tweezer.
- 2 You will see two fuses - the one on the left is the active fuse and the other is backup.



Figure 8-1 Fuse removal/replacement

- 3 Remove fuse and replace with one of the correct rating and type for your selected input ac line voltage.

NOTE

Be sure to select the correct fuse rating for the selected line voltage. Do not use repaired fuses or short circuited fuse-holders. To do so could cause a shock or fire hazard.

Adjustment

The J7201A/B/C attenuation control unit has no internal electrical or mechanical adjustments.

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This information is subject to change without notice. Always refer to the Keysight website for the latest revision.

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