

**SGX1000**  
RF Signal Generator



98409600B | Rev 20221115



# SGX1000 Series RF Signal Generator – PROGRAMMING REFERENCE

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Revision 20221115

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P/N 98409600B

This manual covers the SGX1000 Series RF Signal Generators, serial numbers: 17976 and higher.

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## **SAFETY SUMMARY**

The following general safety precautions must be observed during all phases of operation and maintenance 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. Boonton Electronics assumes no liability for the customer's failure to comply with these requirements.

### **DO NOT OPERATE THE INSTRUMENT IN AN EXPLOSIVE ATMOSPHERE**

Do not operate the instrument in the presence of flammable gases or fumes.

### **DO NOT OPERATE THE INSTRUMENT OUTSIDE**

This instrument is designed for indoor use only.

### **KEEP AWAY FROM LIVE CIRCUITS**

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions dangerous voltages may exist even though the power cable was removed, therefore; always disconnect power and discharge circuits before touching them.

### **DO NOT SERVICE OR ADJUST ALONE**

Service and adjustments should be performed only by qualified service personnel. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

### **DO NOT POSITION THE INSTRUMENT SO THAT IT IS DIFFICULT TO OPERATE THE DISCONNECTION DEVICE**

The main power disconnection switch is located on the rear panel.

### **DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT**

Do not install substitute parts or perform any unauthorized modifications on the instrument. Return the instrument to Boonton Electronics for repair to ensure that the safety features are maintained.

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## SGX1000 Series RF Signal Generator – PROGRAMMING REFERENCE

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### SAFETY SYMBOLS



This safety requirement symbol has been adopted by the International Electro-technical Commission, Document 66 (Central Office) 3, Paragraph 5.3, which directs that an instrument be so labeled if, for the correct use of the instrument, it is necessary to refer to the instruction manual. In this case it is recommended that reference be made to the instruction manual when connecting the instrument to the signal source and USB host.



The CAUTION symbol denotes a hazard. It calls attention to an operational procedure, practice or instruction that, if not followed, could result in damage to or destruction of part or all of the instrument and accessories. Do not proceed beyond a CAUTION symbol until its conditions are fully understood and met.



The NOTE symbol is used to mark information which should be read. This information can be very useful to the operator in dealing with the subjects covered in this section.



The HINT symbol is used to identify additional comments which are outside of the normal format of the manual and provide users additional information about the subject.

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# 1 Remote Operation

## 1.1 LAN Configuration

The SGX1000 LAN interface is configured using the *System > I/O Config > LAN* menu. The instrument may be set to automatically accept its IP address and associated information from a DHCP server, or the configuration data may be entered manually.

The SGX1000 communicates via the HiSLIP protocol for LAN control, which is a TCP/IP based format that allows GPIB operation to be emulated via the LAN. Once the LAN parameters have been configured, the controller can perform a broadcast and find all instruments on the subnet, or the instrument's IP address (whether manually or automatically assigned) may be used to assist the remote control software in locating and connecting to the SGX1000. Typically, the host will use VISA to provide the interface layer between the instrument and the remote-control software.

### Caution



The supplied Ethernet cable fitted with a ferrite core must be used for RF interference suppression. The end with the ferrite core should be connected to the SGX.

## 1.2 GPIB Configuration

GPIB remote control is enabled with option SGX-GPIB.

The SGX1000 GPIB interface is configured using the *System > I/O Config > GPIB* menu. The primary listen/talk address (MLTA) can be set to any value from 1 to 30 inclusive. The value assigned must be unique to each GPIB device. Secondary address is not implemented.

ASCII talk and listen terminators are not required or supported – the SGX1000 supports the industry standard EOI method of terminating strings send to and from the instrument. The talking device must assert the EOI bus signal on the GPIB bus when transmitting the final character of the message. This function is performed automatically by most GPIB controllers. If a CR and/or LF is present at the end of an incoming GPIB message, it will simply be ignored by the SGX1000.

## 1.3 SCPI Language

SGX1000 instruments may be remotely controlled using commands that follow the industry-standard SCPI programming conventions

All the functions of the SGX1000 are accessible remotely via SCPI commands.

### 1.3.1 SCPI Structure

The SCPI instrument model defines a hierarchical command structure based on “command nodes”. Each node may contain commands or names of a next-level command node. Each command is formed of a series of keywords joined together and delimited by a colon “:” character. The command begins with a colon at the “root node”, and traverses downwards through the command tree to form a specific command. This structure is very similar to a DOS file system, where the file system begins at the root level (“:”), and each directory (SCPI subsystem) may contain a list of files (SCPI commands) and lower-level directories. To execute an individual command, the entire command name (—path) must generally be specified, although there are several shortcuts available to reduce the command string length.

SCPI subsystems or command groups are usually aligned with instrument functions, and the standard provides a number of pre-defined subsystems that can be used for most instrument types. For example, the top-level SOURce subsystem groups commands that are related to source signals (frequency, amplitude, sweep point count...), while the OUTPut subsystem contains commands that control output functions of the instrument (RF ON or OFF).

### 1.3.2 Long and Short Form Keywords

Each command or subsystem may be represented by either its full keyword, or a short form of that keyword. The short form is typically the first several characters of the full name, although this is not necessarily the case. The short form of each keyword is identified in this manual by the keyword characters shown in UPPERCASE, while the long form will be shown in mixed case. For example, the short form of “SOURce” is “SOUR”, while the long form is “SOURce”. Long form and short form commands may be used interchangeably, but only the exact forms are permitted – intermediate length commands will not be recognized. Sending “SOURc” will cause an error.

Note that not all keywords have long forms – in this case, the entire keyword will be shown in uppercase.

While uppercase and lowercase text is used to identify keywords, SCPI is generally case-insensitive, so it is acceptable to send uppercase, lowercase, or mixed case keywords to the instrument. The only exception is when a command accepts a literal string argument. In this case, quotes may be used to delimit a string of user-defined case.

### 1.3.3 Colon Keyword Separators

The colon (“:”) character is used similar to the way a slash or backslash is used in a filesystem. Prefixing a command string with a colon resets parsing at the root command level, and a colon must separate each keyword in the command. Beginning a new line always resets parsing to the root level, so the leading colon is optional if the command is the first command on a line.

### 1.3.4 Command Arguments and Queries

Many commands require arguments. In this case, the entire command string is sent, followed by the argument. A space is used to separate the command from the argument. For example,

“SOURce:FREQuency 1e9” sets frequency to 1 GHz. Arguments may be numeric, or alphanumeric. If a command requires more than one numeric argument, the arguments must be sent as a comma delimited list.

To read the current value of a particular parameter, the Query Form of its command may be used. A command query is formed by appending a question-mark (“?”) suffix to the command instead of an argument list. There should not be any whitespace between the command and the suffix. For example, “SOURce:FREQuency?” queries the frequency parameter and causes the instrument to return its current value.

### 1.3.5 Semicolon Command Separators

The semicolon (“;”) character is used to separate multiple commands on a single line. However, the parsing path is affected when more than one command is combined on a line. As noted previously, the first command of a line is always referenced to the root level whether, or not, the command is prefixed by a colon. However, for the second and succeeding commands, the parsing level is NOT reset to the root level, but rather referenced from the current node. This allows the parser to remain at the current node and execute other commands from that node without resending the entire node string. For example, the following multi-command strings are equivalent:

:SOURce:FREQuency 1e9; :SOURce:POWer 2.12;	(two full-path commands)
:SOURce:FREQuency 1e9; :POWer 2.12;	(second command referenced to SOURce node)
SOURce:FREQuency 1e9; :POWer 2.12;	(leading colon omitted from first command)

If a command does not belong to the same subsystem as the preceding command on the same line, then its full path must be specified, including the colon prefix.

### 1.3.6 Command Terminators

All SCPI command strings transmitted to the instrument must be terminated. For commands sent via the GPIB bus, any character with the IEEE488 EOI (End-Or-Identify) control line asserted may be used as a terminator. This may be the last letter of the command, query, or argument. Optionally, a CR (ASCII 13) and/or LF (ASCII 10) may be included. These are ignored by the parser, but if present, the EOI must be asserted on the last message character transmitted.

On USB and LAN messages, the packetized protocols provide automatic termination of each message. Again, CR and/or LF may be present, but must be the last message character(s) of the packet.

When the terminating condition is met (end of GPIB message or end of USB or LAN packet), the SCPI path is first reset to the root level, and the received message is then passed to the SCPI parser for evaluation.

### 1.3.7 SGX1000 SCPI Implementation

The SCPI implementation for the SGX1000 provides a SOURce sub-system to handle parameter settings. An OUTput sub-system provides control of the signal output state. DISPlay commands are used for

screen brightness. The SYSTem sub-system is used to change remote communications settings and turn on/off the audible beep for button presses.

Examples:

:SOURce:POWER 1.0	Set the output amplitude to 1.0 dbm
:OUTput:STATE ON	Turn on the RF output
:SOURce:POWER?	Query the output amplitude setting
:OUTput:STATE?	Query the state of the RF output

In the discussion and tables below, the following notation will be used:

Command name long and short form:	SOURce
Optional command name in brackets:	[SOURce]:FREQuency
Short Form:	SOUR:FREQ
Command which takes numeric argument:	SOURce:FREQuency <numeric_value>
Same command; query:	SOURce:FREQuency?
Command with literal text argument:	SOURce:SWEep:TRIGger:SOURce <character data>
Command with no query form:	*RST
Command with query form only:	SYSTem:COMMunicate:LAN:CONNection:STATE?

#### SYNTAX NOTES

*Square brackets [ ] are used to enclose the list of valid arguments for a command, or a list of command options separated by the vertical separator bar | character. This character is for syntax only and is not to be entered as part of the command.*

*A literal argument denoted by <character data> indicates a word or series of characters, which must exactly match one of the choices for the command. An argument denoted by <numeric\_value> requires a string which, when converted to a number, is within the range of valid arguments. Numerical values can generally be in any common form including decimal and scientific notation. <Boolean> indicates an argument which must be either true or false. Boolean arguments are represented by the values 0 or OFF for false, and 1 or ON for true. Queries of Boolean parameters always return 0 or 1.*

*Curly braces {} are used to enclose two or more possible choices for a mandatory entry, separated by the comma character. One of the enclosed options MUST be inserted into the command, and the braces are not to be entered as part of the command.*

### **1.3.8 Sending Out of Range Values**

If out of range values are sent to the SGX in SCPI commands, the instrument will be set to the maximum or minimum permitted value. For example, if the SGX is commanded to be set to a sweep point count of >65,532, it will be set to 65,532. Alternatively, if the SGX is commanded to be set to a sweep point count of 0 or 1, it will be set to 2. Some parameter limits, such as frequency are model dependent.

## 1.4 Basic Operation Information

The easiest way to generate a signal is by use of the OUTput:STATe command. Setting this to 1 or ON turns on the output of the device at the currently displayed settings.

For finer control over the output parameters, individual configuration and function commands should be used.

## 1.5 SCPI Command Reference

This section contains a list of all SCPI remote commands accepted by the SGX1000. The list is grouped by SCPI subsystem or IEEE488.2 function and includes a detailed description of each command.

### 1.5.1 IEEE 488.2 Commands

The purpose of IEEE488.2 commands is to provide management and data communication instructions for the system by defining a set of “\*xxx” commands (an asterisk followed by a three-character code). These commands allow device control and status monitoring and are the basis for some of the commands of the SCPI STATus subsystem (see Section 5.5.17).

#### **\*IDN?**

Description: Return the instrument identification string. This string contains the manufacturer, model number, serial number, and firmware version number.

Syntax: \*IDN?

Returns: < Mfgr, Model#, Serial#, Version# >

Valid Modes: Any

#### **\*RST**

Description: Set the instrument to a known default configuration. Set measurements to STOP. Set the sensor temperature offset flag to FALSE, set the SCPI file over-write permission to FALSE, turn the internal Calibrator output OFF and clear the error queues. System communication parameters are not changed. Instrument measurement functions are set their default values (Table 3-4, Initialized Parameters in the SGX1000 Instruction Manual).

Syntax: \*RST

Argument: None

Valid Modes: Any

### 1.5.2 DISPlay Subsystem

**DISPlay:BACKlight:BRIGhtness**

Description: Set or return the backlight brightness for the LCD display in percent. Zero percent turns the backlight off.

Syntax: DISPLAY:BACKlight:BRIGhtness <numeric\_value>

Argument: <numeric\_value> = 0 to 100

Valid Modes: Any

### 1.5.3 MEMory Subsystem

The MEMory group of commands is used to save and recall instrument operating configurations and CSV files for List Sweep mode operations.

#### MEMory:EXPort:LIST

Description: Store/save the current list as a .csv file to an external USB drive. If no drive is specified, the first one found will be used. This stores a file that describes the list frequency, amplitude, and dwell time for each point in the list and is used when operating in List Sweep mode. Use MEMory:MEDIa:NAMeS? to obtain a list of connected drives.

Syntax: MEMory:EXPort:LIST <character data>,<character data>

Argument: <character data>,<character data>= {CSV file name ending in .csv,USB drive name}.Valid Modes: Any

#### MEMory:IMPort:LIST

Description: Load/Recall a list stored in a named CSV file from an external USB drive. If no drive is specified, the first one found will be used.This loads a file that describes the list frequency, amplitude, and dwell time for each point in the list and is used when operating in List Sweep mode. Use MEMory:MEDIa:NAMeS? to obtain a list of connected drives. Use MEMory:MEDIa:FILEs? to obtain a list of available .csv files.

Syntax: MEMory:IMPort:LIST <character data>,<character data>

Argument: <character data> = {CSV file name ending in .csv,USB drive name}.

Valid Modes: Any

#### MEMory:INTErnal:DELeTe:LIST

Description: Delete/remove a list file from internal storage. If no file is specified, no files are deleted. Use MEMory:INTErnal:LIST:FILEs? to obtain a list of internal file names.

Syntax: MEMory:INTErnal:DELeTe:LIST <character data>

Argument: <character data>= {file name to delete from internal storage}.

Valid Modes: Any

#### MEMory:INTErnal:LIST:FILEs?

Description: Returns a comma separated list of internally stored list file names for use in List Sweep mode. If no files are found, it returns a single comma.

Syntax: MEMory:INTErnal:LIST:FILEs?

Returns: <character data1>,<character data2>,...<character datax> = {file names from internal storage}.

Valid Modes: Any

### **MEMory:INTernal:LOAD:LIST**

Description: Load/Recall a list from internal storage. If no file is specified, no file is loaded. This loads a file for use in List Sweep mode. Use MEMory:INTernal:LIST:FILES? to obtain a list of internal file names.

Syntax: MEMory:INTernal:LOAD:LIST <character data>

Argument: <character data> = { name of file from internal storage to load}.

Valid Modes: Any

### **MEMory:INTernal:STORE:LIST**

Description: Store/save the current list to internal storage. If no file name is provided, nothing is stored. This stores a file that can be used in List Sweep mode. Refer to MEMory:INTernal:LOAD:LIST. Use MEMory:INTernal:LIST:FILES? to obtain a list of currently stored files.

Syntax: MEMory:INTernal:STORE:LIST <character data>

Argument: <character data> = {list file name to store}.

Valid Modes: Any

### **MEMory:MEDIA:EJECT**

Description: Eject a removable USB drive. If a drive is not specified, the first one found will be used. Use MEMory:MEDIA:NAMES? to obtain a list of connected drives.

Syntax: MEMory:MEDIA:EJECT <drive name>

Argument: <drive name> = {USB drive name}

Valid Modes: Any

### **MEMory:MEDIA:FILES?**

Description: Returns a comma delimited list of .csv file names found in a USB drive. If no files are found, it returns a single comma. If no drive name is provided it will use the first one found. Use MEMory:MEDIA:NAMES? to obtain a list of connected drives.

Syntax: MEMory:MEDIA:FILES? <drive name> = {USB drive name}

Argument: <drive name> = {USB drive name}

Valid Modes: Any

### **MEMory:MEDIA:NAMES?**

Description: Returns a comma delimited list of removable media drive names. If none are found, it returns a single comma.

Syntax: MEMory:MEDIA:NAMES?

Argument: None

Valid Modes: Any

#### 1.5.4 OUTput Subsystem

The OUTput group of the command subsystem is used to toggle the output of the SGX1000.

##### [OUTput:]BLANKing

Description: Sets or returns the state of RF Blanking between step or list points during List Sweep and Step Sweep mode operations.

Syntax: [OUTput:]BLANKing <Boolean>

Argument: <Boolean> = {0, 1, OFF, ON}, accepts all, returns 0, 1

Valid Modes: Any

##### [OUTput:]STATe

Description: Sets or returns the state of the RF Output.

Syntax: [OUTput:]STATe <Boolean>

Argument: <Boolean> = {0, 1, OFF, ON}, accepts all, returns 0, 1

Valid Modes: Any

#### 1.5.5 SOURce Subsystem

The SOURce group of the command subsystem is used to configure parameters and change modes.

##### [SOURce:]FREQuency

Description: Set or return the CW frequency to generate. This is the frequency of the CW RF signal generated when used in the CW operating mode.

Syntax: [SOURce:]FREQuency <numeric\_value>

Argument: <numeric\_value> = 4.9e+6 to 20.48e+9 Hz. Limits are model dependent.

Valid Modes: Any

##### [SOURce:]FREQuency:MAXimum?

Description: Returns the maximum limit of the CW frequency setting that can be used with the [SOURce:]FREQuency command for the SGX1000 model in use.

Syntax: [SOURce:]FREQuency:MAXimum?

Returns: <numeric value>

Valid Modes: Any

##### [SOURce:]FREQuency:MINimum?

Description: Returns the minimum limit of the CW frequency setting that can be used with the [SOURce:]FREQuency command for the SGX1000 model in use.

Syntax: [SOURce:]FREQuency:MINimum?

Returns: <numeric value>

Valid Modes: Any

##### [SOURce:]FREQuency:START



Description: Set or return the sweep start frequency to generate. This is the starting point of a frequency sweep when the SGX1000 is operated in Step Sweep mode.

Syntax: [SOURCE:]FREQUENCY:START <numeric\_value>

Argument: <numeric\_value> = 4.9e+6 to 20.48e+9 Hz. Limits are model dependent.

Valid Modes: Any

#### **[SOURCE:]FREQUENCY:STOP**

Description: Set or return the sweep stop frequency to generate. This is the ending point of a frequency sweep when the SGX1000 is operated in the Step Sweep mode. If [SOURCE:]SWEep:TRIGger:SOURce is set to Free Run, the sweep will loop continuously while the Sweep/Run slider is set to Run.

Syntax: [SOURCE:]FREQUENCY:STOP <numeric\_value>

Argument: <numeric\_value> = 4.9e+6 to 20.48e+9 Hz. Limits are model dependent.

Valid Modes: Any

#### **[SOURCE:]LEVEL:START**

Description: Set or return the sweep start level. This is the power level in dBm at the start of a sweep when the SGX1000 is operated in the Step Sweep mode.

Syntax: [SOURCE:]LIST:POINTS <numeric\_value>

Argument: <numeric\_value> = -70 to +25 dBm. Limits are model dependent.

Valid Modes: Any

#### **[SOURCE:]LEVEL:STOP**

Description: Set or return the sweep stop level. This is the power level in dBm at the end of a sweep when the SGX1000 is operated in the Step Sweep mode.

Syntax: [SOURCE:]LIST:POINTS <numeric\_value>

Argument: <numeric\_value> = -70 to +25 dBm. Limits are model dependent.

Valid Modes: Any

#### **[SOURCE:]LIST:DEFAULT:FREQUENCY**

Description: Set or return the default frequency for the list sweep. This is the default frequency to use for a list entry when the SGX1000 is operated in List Sweep mode.

Syntax: [SOURCE:]LIST:DEFAULT:FREQUENCY <numeric\_value>

Argument: <numeric\_value> = 4.9e+6 to 20.48e+9 Hz. Limits are model dependent.

Valid Modes: Any

#### **[SOURCE:]LIST:DEFAULT:LEVEL**

Description: Set or return the default power level for the list sweep. This is the default power level to use for a list when the SGX1000 is operated in List Sweep mode.

Syntax: [SOURCE:]LIST:DEFAULT:LEVEL <numeric\_value>

Argument: <numeric\_value> = 4.9e+6 to 20.48e+9 Hz. Limits are model dependent.

Valid Modes: Any

#### **[SOURCE:]LIST:DEFAULT:DWELL**

Description: Set or return the default list dwell or point timer period in seconds. This is the time to remain at each list point when the SGX1000 is operated in List Sweep Mode. It does not include switching time. See "SWEep:DWELL" for Step Sweep mode operation.

Syntax: [SOURce:]LIST:DWELL <numeric\_value>

Argument: <numeric\_value> = 100e-6 to 10.0 s

Valid Modes: Any

#### **[SOURce:]LIST#:DELeTe**

Description: Delete a list point entry at the given index. This will delete the point specified and reduce the list point count when the SGX1000 is operated in List Sweep Mode. "#" is the index of the list point to delete.

Syntax: [SOURce:]LIST#:DELeTe

Argument(s): # = index of list entry to delete

Valid Modes: Any

#### **[SOURce:]LIST:DWELL:MAXimum?**

Description: Returns the maximum limit of the List Dwell setting that can be used with the [SOURce:]LIST:DWELL command. This is the maximum time for a list point when the SGX1000 is operated in List Sweep Mode. See "SWEep:DWELL:MAXimum" for Step Sweep mode operation.

Syntax: [SOURce:]LIST:DWELL:MAXimum?

Returns: <numeric value>

Valid Modes: Any

#### **[SOURce:]LIST:DWELL:MINimum?**

Description: Returns the minimum limit of the List Dwell setting that can be used with the [SOURce:]LIST:DWELL command. This is the minimum time for a list point when the SGX1000 is operated in List Sweep Mode. See "SWEep:DWELL:MINimum" for Step Sweep mode operation.

Syntax: [SOURce:]LIST:DWELL:MINimum?

Returns: <numeric value>

Valid Modes: Any

#### **[SOURce:]LIST#:INSert**

Description: Insert a new list point at the given index. This will create and insert a new list point at the index specified and increase the list point count when the SGX is operated in List Sweep Mode. "#" is the index to insert the new list point.

Syntax: [SOURce:]LIST#:INSert <numeric\_1>,<numeric\_2>,<numeric\_3>

Argument(s): # = index of list entry, <numeric\_1> = Frequency in Hz, <numeric\_2> = Power in dBm, <numeric\_3> = Dwell in Seconds. Limits are model dependent.

Valid Modes: Any

### **[SOURce:]LIST:POINTs**

Description: Set or return the number of points for the list sweep. This is the number of steps in a list when the SGX1000 is operated in List Sweep mode.

Syntax: [SOURce:]LIST:POINTs <numeric\_value>

Argument: <numeric\_value> = 2 to 2560.

Valid Modes: Any

### **[SOURce:]LIST:POINTs:MAXimum?**

Description: Returns the maximum limit of the List Point Count setting that can be used with the [SOURce:]LIST:POINTs command.

Syntax: [SOURce:]SWEep:POINTs:MAXimum?

Returns: <numeric value>

Valid Modes: Any

### **[SOURce:]LIST:POINTs:Minimum?**

Description: Returns the minimum limit of the List Point Count setting that can be used with the [SOURce:]LIST:POINTs command.

Syntax: [SOURce:]SWEep:POINTs:MINimum?

Returns: <numeric value>

Valid Modes: Any

### **[SOURce:]LIST#:VALue**

Description: Set or return a comma delimited entry for a single list point. “#” is the index of the list point to set or return. This is the frequency, power, and dwell time for a single list entry when the SGX1000 is operated in List Sweep mode.

Syntax: [SOURce:]LIST#:VALue <numeric\_1>,<numeric\_2>,<numeric\_3>

Argument(s): # = index of list entry, <numeric\_1> = Frequency in Hz, <numeric\_2> = Power in dBm, <numeric\_3> = Dwell in Seconds. Limits are model dependent.

Valid Modes: Any

### **[SOURce:]LIST:VALues:ALL?**

Description: Returns a comma delimited list of each entry within a List. Each entry contains frequency, power, dwell. This is the List currently displayed when the SGX1000 is operated in List Sweep mode.

Syntax: [SOURce:]LIST:VALues:ALL?

Returns: <entry\_1>,<entry\_2>,<entry\_3>,...>. <entry\_x> = Frequency in Hz, Power in dBm, Dwell in Seconds. Refer to the [SOURce:]LIST#:VALue command for more detail. Limits are model dependent.

Valid Modes: Any

### **[SOURce:]POWER**

Description: Set or return the RF power level for the output when [OUTput]:STATe is ON.

Syntax: [SOURce:]POWER <numeric\_value>

Argument: <numeric\_value> = -70.00 to +25.00 dBm. Limits are model dependent.

Valid Modes: Any

### **[SOURce:]POWer:MAXimum?**

Description: Returns the maximum limit of the Amplitude setting that can be used with the [SOURce:]POWer command for the SGX1000 model in use.

Syntax: [SOURce:]POWer:MAXimum?

Returns: <numeric value>

Valid Modes: Any

### **[SOURce:]POWer:MINimum?**

Description: Returns the minimum limit of the Amplitude setting that can be used with the [SOURce:]POWer command for the SGX1000 model in use.

Syntax: [SOURce:]POWer:MINimum?

Returns: <numeric value>

Valid Modes: Any

### **[SOURce:]ROSCillator:EXTernal:FREQuency**

Description: Set or return the external reference frequency. This is the frequency of the external reference signal when [SOURce:]ROSCillator:SOURce is set to EXTernal.

Syntax: [SOURce:]ROSCillator:EXTernal:FREQuency <character data>

Argument: <character data> = {10MHz, 100MHz}.

Valid Modes: Any

Restrictions: Internal reference is 100MHz only.

### **[SOURce:]ROSCillator:SOURce**

Description: Set or return the reference source. This is used to choose between the external and internal reference source.

Syntax: [SOURce:]ROSCillator:SOURce<character data>

Argument: <character data> = { INTernal, EXTernal }.

Valid Modes: Any

### **[SOURce:]SWEep:CPOINT**

Description: Set or return the current sweep point index.

Syntax: [SOURce:]SWEep:CPOINT <numeric\_value>

Argument: <numeric value> = 2 to 65535.

Valid Modes: Any

### **[SOURce:]SWEep:DIRection**

Description: Set or return the sweep direction. This setting controls the direction of the sweep once started when used in the Step Sweep and List Sweep operating modes.

Syntax: [SOURce:]SWEep:DIRection <character data>

Argument: <character data> = {FORward, REVerse}.

Valid Modes: Any

### **[SOURce:]SWEep:DWELl**

Description: Set or return the sweep default dwell or point timer period in seconds. This is the time at each sweep point when used in the Step Sweep operating mode. It does not include switching time.

Syntax: [SOURce:]SWEep:DWELl <numeric\_value>

Argument: <numeric\_value> = 100e-6 to 10.0 s.

Valid Modes: Any

### **[SOURce:]SWEep:DWELl:MAXimum?**

Description: Returns the maximum limit of the Sweep Dwell setting that can be used with the [SOURce:]SWEep:DWELl command. This is the maximum time for a list point when the SGX1000 is operated in Step Sweep Mode.

Syntax: [SOURce:]SWEep:DWELl:MAXimum?

Returns: <numeric value>

Valid Modes: Any

### **[SOURce:]SWEep:DWELl:MINimum?**

Description: Returns the minimum limit of the Sweep Dwell setting that can be used with the [SOURce:]SWEep:DWELl command. This is the minimum time for a list point when the SGX1000 is operated in Step Sweep Mode.

Syntax: [SOURce:]SWEep:DWELl:MINimum?

Returns: <numeric value>

Valid Modes: Any

### **[SOURce:]SWEep:ENABle**

Description: Sets or returns the sweep enabled state when the SGX1000 is operated in Step Sweep and List Sweep modes.

Syntax: [SOURce:]SWEep:ENABle <Boolean>

Argument: <Boolean> = {0, 1, OFF, ON}, accepts all, returns 0, 1

Valid Modes: Any

### **[SOURce:]SWEep:MODE**

Description: Set or return the sweep mode.

Syntax: [SOURce:]SWEep:MODE <character data>

Argument: <character data> = {LIST, FREQuency, AMPlitude, FREQAMP}.

Valid Modes: Any

### **[SOURce:]SWEep:POINts**

Description: Set or return the Sweep Point Count. This is the number of steps from start to stop frequency in the sweep.

Syntax: [SOURce:]SWEep:POINts<numeric\_value>  
Argument: <numeric\_value> = 2 to 65535.  
Valid Modes: Any

#### **[SOURce:]SWEep:POINts:MAXimum?**

Description: Returns the maximum limit of the Sweep Point Count setting.  
Syntax: [SOURce:]SWEep:POINts:MAXimum?  
Returns: <numeric value>  
Valid Modes: Any

#### **[SOURce:]SWEep:POINts:MINimum?**

Description: Returns the minimum limit of the Sweep Point Count setting.  
Syntax: [SOURce:]SWEep:POINts:Minimum?  
Returns: <numeric value>  
Valid Modes: Any

#### **[SOURce:]SWEep:RETRace**

Description: Sets or returns the sweep retrace enabled state.  
Syntax: [SOURce:]SWEep:RETRace <Boolean>  
Argument: <Boolean> = {0, 1, OFF, ON}, accepts all, returns 0, 1  
Valid Modes: Any

#### **[SOURce:]SWEep:STATus?**

Description: Returns the sweep state status when the SGX1000 is operated in Step Sweep or List Sweep mode.  
Syntax: [SOURce:]SWEep:STATus?  
Returns: <character data> = {ARMED, RUNNING, STOPPED}.  
Valid Modes: Any

#### **[SOURce:]TEMPerature?**

Description: Returns the current internal temperature of the SGX1000 in degrees C.  
Syntax: [SOURce:]TEMPerature?  
Returns: <numeric value>  
Valid Modes: Any

#### **[SOURce:]TRIGger:INPut:SLOPe**

Description: Set or return the external trigger input polarity when the SGX1000 is operated in Step Sweep or List Sweep mode.  
Syntax: [SOURce:]TRIGger:INPut:SLOPe <character data>  
Argument: <character data> = {POSitive,NEGative}.  
Valid Modes: Any

### **[SOURCE:]TRIGGER:MODE**

Description: Set or return the trigger mode used when the SGX1000 is operated in Step Sweep or List Sweep mode.

Syntax: [SOURCE:]TRIGGER:MODE <character data>

Argument: <character data> = {SWEEP, FREERUN, POINT}.

Valid Modes: Any

### **[SOURCE:]TRIGGER:OUTPUT:MODE**

Description: Set or return the trigger output mode when the SGX1000 is operated in Step Sweep or List Sweep mode.

Syntax: [SOURCE:]TRIGGER:OUTPUT:MODE <character data>

Argument: <character data> = {OFF, SETTLED, SWEEPING, DONE, START}.

Valid Modes: Any

### **[SOURCE:]TRIGGER:OUTPUT:SLOPE**

Description: Set or return the trigger output polarity when the SGX1000 is operated in Step Sweep or List Sweep mode.

Syntax: [SOURCE:]TRIGGER:OUTPUT:SLOPE <character data>

Argument: <character data> = {POSITIVE, NEGATIVE}.

Valid Modes: Any

### **[SOURCE:]TRIGGER:SOURCE**

Description: Set or return the trigger source when the SGX1000 is operated in Step Sweep or List Sweep mode.

Syntax: [SOURCE:]TRIGGER:SOURCE <character data>

Argument: <character data> = {BUS, IMMEDIATE, EXTERNAL, KEY}.

Valid Modes: Any

### **[SOURCE:]TRIGGER:TIMER:ENABLED**

Description: Sets or returns the point timer enabled state when the SGX1000 is operated in Step Sweep or List Sweep mode.

Syntax: [SOURCE:]TRIGGER:TIMER:ENABLED <Boolean>

Argument: <Boolean> = {0, 1, OFF, ON}, accepts all, returns 0, 1

Valid Modes: Any

## **1.5.6 SYSTEM Subsystem**

The SYSTEM group of commands is used to control system-level functions not directly related to instrument performance. SYSTEM commands are used to configure key beep and communication parameters for the GPIB and LAN interfaces.

### **SYSTEM:COMMUNICATE:GPIB:ADDRESS**

Description: Set or return the GPIB bus address.  
 Syntax: SYSTem:COMMunicate:GPIB:ADDRes <numeric\_value>  
 Argument: <numeric\_value> = 1 to 30  
 Valid Modes: Any

**SYSTem:COMMunicate:LAN:ADDRes**

Description: Set or return the IP address for the Ethernet port.  
 Syntax: SYSTem:COMMunicate:LAN:ADDRes <character data>  
 Argument: <character data> = instrument IP address in nnn.nnn.nnn.nnn (dot decimal) format  
 Valid Modes: Any for queries. DHCP/AutoIP must be disabled (OFF) to set the instrument IP address.

**SYSTem:COMMunicate:LAN:SMASK**

Description: Set or return the subnet mask for the Ethernet port.  
 Syntax: SYSTem:COMMunicate:LAN:SMASk <character data>  
 Argument: <character data> = subnet mask in nnn.nnn.nnn.nnn (dot decimal) format  
 Valid Modes: Any for queries. DHCP/AutoIP must be disabled (OFF) to set the subnet mask.

**SYSTem:COMMunicate:LAN:DHCP**

Description: Set or return the state of DHCP/AutoIP system for the Ethernet port.  
 If DHCP/AutoIP is enabled (1 | ON), the instrument will attempt to obtain its IP Address, Subnet Mask, and Default Gateway from a DHCP (dynamic host configuration protocol) server on the network. If no DHCP server is found, the instrument will select its own IP Address, Subnet Mask, and Default Gateway values using the “AutoIP” protocol.  
 If DHCP/AutoIP is disabled (0 | OFF), the instrument will use the IP Address, Subnet Mask, and Default Gateway values that have been entered by the user.  
 Syntax: SYSTem:COMMunicate:LAN:DHCP[:STATe] <Boolean>  
 Argument: <Boolean> = {0, 1, OFF, ON}  
 Valid Modes: Any

**1.5.7 SCPI Command Summary**

**Table 1-1 SCPI COMMAND SUMMARY**

*IDN?	Identification Query
*RST?	Recall factory default settings.
DISPlay:BACKlight:BRIGhtness	Set/return backlight brightness.
MEMory:EXPort:LIST	Store/Save a list stored in a named CSV file.
MEMory:IMPort:LIST	Load/Recall a list stored in a named CSV file.
MEMory:INTernal:DELete:LIST	Delete a file from internal storage
MEMory:INTernal:LIST:FILEs?	Return a list of files from internal storage
MEMory:INTernal:LOAD:LIST	Load a list file from internal storage
MEMory:INTernal:STORE:LIST	Store/save a file to internal storage
MEMory:MEDia:EJECT	Eject a removeable drive



MEMory:MEDEia:FILEs?	Returns a comma delimited list of available CSV files.
MEMory:MEDEia:NAMES?	Returns a comma delimited list of removable media drives.
[OUTput:]BLANKing	Set/return RF Blanking state ON/OFF
[OUTput:]STATe	Set/return RF Output state ON/OFF.
[SOURce:]FREQuency	Set/return frequency in Hz.
[SOURce:]FREQuency:MAXimum?	Query maximum frequency in Hz
[SOURce:]FREQuency:MINimum?	Query minimum frequency in Hz
[SOURce:]FREQuency:START	Set or return the sweep stop frequency
[SOURce:]FREQuency:STOP	Set or return the sweep stop frequency
[SOURce:]LEVel:START	Set or return the sweep start level
[SOURce:]LEVel:STOP	Set or return the sweep stop level
[SOURce:]LIST:DEFault:FREQueny	Set or return the default frequency for the list sweep.
[SOURce:]LIST:DEFault:LEVel	Set or return the default power level for the list sweep
[SOURce:]LIST#:DELete	Delete a list point at a given index
[SOURce:]LIST:DWELI	Set or return the list dwell or point timer period in seconds
[SOURce:]LIST:DWELI:MAXimum?	Returns the maximum limit of the List Dwell setting
[SOURce:]LIST:DWELI:MINimum?	Returns the minimum limit of the List Dwell setting
[SOURce:]LIST#:INSert	Insert a list point at a given index
[SOURce:]LIST:POINTs	Set or return the number of points for the list sweep
[SOURce:]LIST:POINTs:MAXimum?	Returns the maximum limit of the List Point Count setting
[SOURce:]LIST:POINTs:Minimum?	Returns the minimum limit of the List Point Count setting
[SOURce:]LIST#:VALue	Set or return a comma delimited entry for a single list point.
SOURce:]LIST:VALues:ALL?	Returns a comma delimited list of each entry within a List
[SOURce:]POWer	Set/return power in dBm.
[SOURce:]POWer:MAXimum?	Query maximum power in dBm.
[SOURce:]PHASe:MINimum?	Query minimum power in dBm.
[SOURce:]ROSCillator:EXTernal:FREQuency	Set/return external reference frequency in Hz.
[SOURce:]ROSCillator:SOURce]	Set/return reference oscillator source.
[SOURce:]SWEep:CPOINT	Set or return the current sweep point index
[SOURce:]SWEep:DIRection	Set or return the sweep direction
SOURce:]SWEep:DWELI	Set or return the sweep dwell or point timer period in seconds
[SOURce:]SWEep:DWELI:MAXimum?	Query the maximum sweep dwell time in S
[SOURce:]SWEep:DWELI:MINimum?	Query the minimum sweep dwell time in S
[SOURce:]SWEep:ENABLE	Sets or returns the sweep enabled state.
[SOURce:]SWEep:MODE	Set or return the sweep mode
[SOURce:]SWEep:POINTs	Set/return the number of sweep points.
[SOURce:]SWEep:POINTs:MAXimum?	Returns the maximum limit of the Sweep Point Count setting
[SOURce:]SWEep:POINTs:MINimum?	Returns the minimum limit of the Sweep Point Count setting
[SOURce:]SWEep:RETRace	Sets or returns the sweep retrace enabled state.
[SOURce:]SWEep:STATus?	Returns the sweep state status
[SOURce:]TEMPerature?	Query the current internal temperature in degrees C.
[SOURce:]TRIGger:INPut:SLOPe	Set or return the external trigger input polarity
[SOURce:]TRIGger:MODE	Set or return the trigger mode
[SOURce:]TRIGger:OUTput:MODE	Set or return the trigger output mode
[SOURce:]TRIGger:OUTput:SLOPe	Set or return the trigger output polarity.
[SOURce:]TRIGger:SOURce	Set or return the trigger source
[SOURce:]TRIGger:TImeR:ENABled	Sets or returns the point timer enabled state
SYSTem:COMMunicate:GPIB:ADDReSS	Set/return the GPIB bus address.<numeric_value> = 1 to 30
SYSTem:COMMunicate:LAN:ADDReSS	Set/return the IP address for the Ethernet port. <character data> = instrument IP address in nnn.nnn.nnn.nnn (dot decimal) format
SYSTem:COMMunicate:LAN:SMASK	Set/return the subnet mask for the Ethernet port. <character data> = subnet mask in nnn.nnn.nnn.nnn (dot decimal) format
SYSTem:COMMunicate:LAN:DHCP	Set/return the state of DHCP/AutoIP system for the Ethernet port. <Boolean> = 0, 1, OFF, ON

# END OF SGX1000 RF SIGNAL GENERATOR Programming Reference