SG 5010
PROGRAMMABLE
160 kHz
OSCILLATOR

REFERENCE GUIDE
Section 1

Operating Instructions

Introduction
SG 5010-Operating Instructions

At power-up, the instrument performs a self-test and assumes the settings in use when previously powered-down, with the exception that the output is in off, the readout displays amplitude, and certain interrupt functions are disabled. Instrument functions can be set to ten user-definable configurations stored in memory. Rear interface connections provide access to versions of all front panel signals except the main output.

For more detailed information on functions and specifications, see the Operating Instructions in the SG 5010 Instruction manual. Also refer to the warning and caution statements in the Instruction manual.

Fig. 1-1. SG 5010 front panel controls.
SG 5010-Operating Instructions

2. PARAMETER

The primary parameters (shown above buttons) set the value and units of the amplitude and frequency for the selected function signal; the secondary parameters (shown to right of buttons) control sweep operation. Value and units of any parameter are displayed when the parameter is selected. Press parameter button to select a primary parameter; press PARAMETER SHIFT button, and then parameter button to select secondary parameter. While a parameter is selected, its value or units can be changed, using numeric keypad and pressing ENTER, or by adjusting DEC/INC control. Note that none of the sweep parameters can be changed during the operation of a sweep with the exception of STEPTIME. Secondary parameters are described with the associated primary parameter. Units for frequency parameters are Hz or kHz.

Vrms (START VOLT)  
dBm (STOP VOLT)

Sets amplitude of output signal in volts rms, open circuit; or dBm into an assumed 600 ohm load. The dBm display compensates for source impedance other than 600 ohms. Units are V or mV rms (mV/kHz button), or dBm.

START VOLT sets starting amplitude in Vrms for amplitude sweep; STOP VOLT sets final amplitude.

FREQ (START FREQ)

Sets main frequency of output signal except EXT.

START FREQ sets frequency at which frequency sweep begins.
Variables of selected parameters:

DE/CNC

- Amplifier or frequency sweep
- Seconds: 0.1 increments, AMP/FREQ selected
- STEP TIME: set time for each sweep step (0.1 to 25.0)

-gain by assertion of BURST GATE input signal
- Selecting 9999 enables single burst operation (NG)
- Selecting 0 enables repetitive burst operation
- Selecting [3.0] enables repetitive burst operation
- Selecting 1 selects burst signal is asserted: GC
- Selecting 2 selects burst signal is asserted: GE
- Selecting 3 selects burst signal is asserted: GG
- Selecting 4 selects burst signal is asserted: GG
- Select: number of on cycles for the burst function (t)

OFF CYCLES (STEP TIME, AMP/FREQ)

- Initial sweep type
- Loop to end of sweep, LIN/LOG selects linear or log
- N STEPS sets number of steps (1 to 99) from begin

65393
- Select: number of on cycles for burst function (t)

ON CYCLES (N STEPS, LIN/LOG)

- Sweep ends
- STOP FREQ sets frequency at which sweep ends

value

125.250 to 500 Hz, entry is rounded to nearest legal

OFF CYCLES (STOP FREQ)

- IN FREQ range (STOP FREQ)

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SG 5010: Operating Instructions

4) SETUPS
   STORE
Stores current settings in specified storage location (0 through 9). All settings are stored except DT, RQS, USEREQ, PLI, and CLI. Stored settings are retained in memory when the instrument is powered down.

RECALL
Recalls instrument settings from a specified storage location (0 through 9) and configures the instrument to those settings. If location is undefined, instrument is set to the INIT command front panel settings. INIT settings are recalled by pressing RECALL and decimal point button.

5) SWEEP
   PARAMETER SHIFT
Enables selection of a secondary parameter.

RUN
Starts a frequency or amplitude sweep. Momentarily pressing RUN button starts a single sweep; if held in for more than 1 second, sweep repeats. Pressing button during a sweep stops the sweep. Button illuminates while sweep is in progress; blinks at start of each sweep for repetitive sweeps.
1-7

(impedance or frequency)

While STEPMANE is selected, elements sweep type

my

Arehert with or drum amplitude parameter (V or

my kHz, A or MHz)

STOP: OR CLI address.

AAMETER: A SOURCE: sweep type (linear or log).

Used to enter a numeric value for the selected PA:

0 — 9, decimal point = (LIN/LOG)

7

(1) Numeric Pushbuttons

1 Enter during ground operation.

ON/OFF

2 Select ground or floating output. Button lighted.

2ND/FRG

3 Enter during balanced operation.

BAL/UNBAL

Set source impedance (50, 150, or 600 ohms). Button

A SOURCE

6 OUTPUT

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SG 5010-Operating Instructions

CLEAR
Used before ENTER is pressed to cancel a numeric entry and to reset the display. After ENTER is pressed, used to clear a settings entry error and reset the display to the last legal value. Also used after STORE or RECALL to cancel the STORE or RECALL operation and reset the display.

ENTER
Enters a valid numeric entry into the current operating setup. Pressing ENTER is not required when selecting a source impedance, or when STOREng or RECALLing settings.

8 INST ID
Displays the SG 5010 GPIB address, and if USER REQUEST and RQS commands are enabled, generates a service request (SRQ) over the GPIB. Also used with RECALL button to change the GPIB address.

9 CONNECTORS
BURST GATE
Input connector for TTL trigger signal to start burst output (in BURST trigger mode), or to gate the output signal (in BURST gated mode). See OFFCYCLES.

RAMP OUT
Outputs a staircase ramp voltage that corresponds to the sweep steps, when a sweep is in progress. Ramp begins at 0 V and ends at 10 V. The number of steps between 0 and 10 V equals the selected number of sweep steps.
Pull to remove plug-in from power module.

**Release Latch**

Chassis Ground connector

Chassis Ground

In the unblanked mode, the – OUTPUT connector and + OUTPUT connector are connected to the CT in the bal.

COM connector provides access to the CT in the bal.

Enable panel connectors that carry the output signal

+ OUTPUT, COM

is selected.

and output attenuation circuits when the EXT function

differential input which is connected to internal gain

EXT INPUT source

of the output signal;

where wave, or the IM, FREQ, envelope, or the envelope;

Output a TTL signal at the frequency of the sine.

SYNC OUT

Output 8 TTL signals that go during frequency

PEN LIFT

SG 2010-Operating Instructions
Section 2

Programming

SG 5010 Reference Guide
### Table 2-1
IEEE 488 INTERFACE FUNCTION SUBSETS

<table>
<thead>
<tr>
<th>Function</th>
<th>Subset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Handshake</td>
<td>SH1</td>
</tr>
<tr>
<td>Acceptor Handshake</td>
<td>AH1</td>
</tr>
<tr>
<td>Basic Talker</td>
<td>T6</td>
</tr>
<tr>
<td>Basic Listener</td>
<td>L4</td>
</tr>
<tr>
<td>Service Request</td>
<td>SR1</td>
</tr>
<tr>
<td>Remote-Local Function</td>
<td>RL1</td>
</tr>
<tr>
<td>Parallel Poll</td>
<td>PP0</td>
</tr>
<tr>
<td>Device Clear</td>
<td>DC1</td>
</tr>
<tr>
<td>Device Trigger</td>
<td>DT1</td>
</tr>
<tr>
<td>Controller Function</td>
<td>C0</td>
</tr>
<tr>
<td>Electrical Interface</td>
<td>E2</td>
</tr>
</tbody>
</table>

The SG 5010 responds to query commands when in either the local or remote state. The SG 5010 responds to all other listed commands only when in the remote state.
Fig. 2-1b. Commands by function.
SG 5010-Programming

GPIB Address and Terminator Setting

The SG 5010 GPIB address is stored in memory and maintained at power-down. It responds to one of two possible message terminators (LF and EOI, or EOI ONLY). Pressing INST ID displays the SG 5010 GPIB address and the instrument firmware version. The right-hand decimal point also illuminates if the selected message terminator is LF/EOI. Both the message terminator and GPIB address are selected, as follows:

Press RECALL

Press INST ID

Press the numeric buttons to display the desired primary address, most significant digit first. To select the LF/EOI terminator, press the decimal point; the EOI ONLY terminator is assumed, otherwise.

Press ENTER

The GPIB address can be set to any number in the series 0 through 31. Address 31 effectively removes the SG 5010 from the bus. The address and message terminator may be changed at any time except when the instrument is in the Local Lockout state. The SG 5010 is shipped with its GPIB address set to 25 and message terminator set to EOI ONLY. Refer to the Programming section of the SG 5010 Instruction manual for additional information about message terminators.
A query response.

The SG 5010 sends an integer followed by a decimal.

Examples: +1.0E-2, -1.0E-2, 0.01E+0.

Numbers expressed in scientific notation. Ex.

Signed decimals are interpreted to be positive.

Signed or unsigned decimal numbers. l-

Signed or unsigned integers, including zero.

The SG 5010 expects the following kinds of numbers:

Argument Format

Every action and operation mark the header. Each command must be sent within a space.

The address between the header and the argument,

Colon commands must be sent within a space.

All commands except query commands should be

Example:

SET
ON
FRG 1000

By itself or numeric argument.

Each command consists of a header, usually followed

SG 5010 Programming
SG 5010-Programming

Delimiters
The following message delimiters are used to punctuate commands to the SG 5010:

<table>
<thead>
<tr>
<th>Delimiter</th>
<th>Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;space&gt;</td>
<td>After header (except query commands)</td>
</tr>
<tr>
<td>&lt;comma&gt;</td>
<td>Between multiple arguments</td>
</tr>
<tr>
<td>&lt;semicolon&gt;</td>
<td>After message unit (command)</td>
</tr>
<tr>
<td>&lt;colon&gt;</td>
<td>Between argument and link argument</td>
</tr>
</tbody>
</table>

Examples:

FUN BURST:10;
STOR 3,7;
ROS?;
OUT OF:SET?;
Function Commands

FUNCTION EXTEND

FUNCTION BUSY [: READY]

FUNCTION COIL

FUNCTION SHIFTE [: RECO]

Function Commands

INSTRUMENT COMMANDS

NOTE

COMMAND LIST

Table 2-2

SG 5010-Programmable
SG 5010-Programming

Table 2-2 (cont)

Frequency Commands
- FRequency <num>
- FRequency?
- IMfreq <num>
- IM?

Burst Control Commands
- NBurst <num>
- ONCycles <num>
- ONCycles?
- OFFCycles <num>
- OFFCycles?

Sweep Control Commands
- STARTFreq <num>
- STARTFreq?
- STOPFreq <num>
- STOPFreq?
- STARTVolts <num>
- STARTVolts?
- STOPVolts <num>
- STOPVolts?
- NSteps <num> [,<type,>]
- NSteps?
- STEPtime <num> [,<mode>]
- STEPtime?
- TYpe Lin
- TYpe LOg
- TYpe?
Display Control Commands

Label
Laser
Real
Pause
Stop
Stop
Stop
Stop
Stop
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Stop
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Stop
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### Table 2-2 (cont)

#### OUTPUT COMMANDS

- Output ON
- Output Off
- OUT?
- BALance [ON]
- BALance OFF
- BAI?
- UNbalance
- GRound [ON] or GNd [ON]
- GRound OFF or GNd OFF
- GRound? or GNd?
- FL0at or FLt
- RSource <num> or RSrc <num>
- RSource? or RSrc?

#### SYSTEM COMMANDS

- DT Set
- DT Trig
- DT Gate
- DT SWEEP
- DT Off
- DT?
- ERRMsg?
- ERRor? or EVent?
- HELP?
- IDentify?
- INIt
- SETrings?
- TEst?
**Table 2-3**

**SG 5010 COMMANDS AND DESCRIPTIONS**

[] = Optional, <> = Defined

<table>
<thead>
<tr>
<th>Header</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMplitude</td>
<td>&lt;num&gt;</td>
<td>Sets amplitude and units of output signal.</td>
</tr>
<tr>
<td></td>
<td>[:&lt;units&gt;]</td>
<td>Units: VPP, VRMS, DBM, or DBU. If undefined, the units are VRms. If previously set to Vp-p, VRms, or DBU, otherwise &lt;units&gt; are dBm.</td>
</tr>
<tr>
<td>AMplitude?</td>
<td></td>
<td>Returns amplitude and units.</td>
</tr>
<tr>
<td>BAalance</td>
<td>[ON]</td>
<td>Selects balanced output.</td>
</tr>
<tr>
<td>BAalance</td>
<td>OFF</td>
<td>Selects unbalanced output.</td>
</tr>
<tr>
<td>BA?</td>
<td></td>
<td>Response indicates signal output is balanced or unbalanced.</td>
</tr>
<tr>
<td>CLI</td>
<td>ON</td>
<td>Enables assertion of SRQ when instrument goes into or out of current limit.</td>
</tr>
</tbody>
</table>

2-14
Table 2.3 (cont)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Limit</th>
<th>Display</th>
<th>Red</th>
<th>Dm</th>
<th>DBU</th>
<th>DBM</th>
<th>Specified Dm Value</th>
<th>Specified Amplitude to Dm Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Frequency Setting</td>
<td>Device Frequency Setting in Dm</td>
<td>Device Frequency Setting in Dm</td>
<td>Dm</td>
<td>Red</td>
<td>DBU</td>
<td>DBM</td>
<td>Specified Dm Value</td>
<td>Specified Amplitude to Dm Value</td>
</tr>
</tbody>
</table>

**SG 5010 Programming**
### Table 2-3 (cont)

<table>
<thead>
<tr>
<th>Display</th>
<th>Nsteps</th>
<th>Displays number of steps set for sweep.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>ONcycles</td>
<td>Displays number of on cycles for burst.</td>
</tr>
<tr>
<td>Display</td>
<td>OFcycles</td>
<td>Displays number of off cycles for burst.</td>
</tr>
<tr>
<td>Display</td>
<td>RSource</td>
<td>Displays source impedance setting.</td>
</tr>
<tr>
<td>Display</td>
<td>RSrc</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>STARTFreq</td>
<td>Displays sweep mode setting for stop frequency.</td>
</tr>
<tr>
<td>Display</td>
<td>STARTVolts</td>
<td>Displays starting sweep amplitude in Vrms.</td>
</tr>
<tr>
<td>Display</td>
<td>STEpTime</td>
<td>Displays time per sweep step.</td>
</tr>
<tr>
<td>Display</td>
<td>STOPFreq</td>
<td>Displays sweep mode setting for stop frequency.</td>
</tr>
<tr>
<td>Display</td>
<td>STOPVolts</td>
<td>Displays stopping sweep amplitude in Vrms.</td>
</tr>
<tr>
<td>Display</td>
<td>Vrms</td>
<td>Displays amplitude setting in Vrms.</td>
</tr>
</tbody>
</table>
### Table 2-3 (cont)

<table>
<thead>
<tr>
<th>DT</th>
<th>Trig</th>
<th>A <code>&lt;GET&gt;</code> interface message initiates a single burst, if instrument is set to FUNC BURST, OFFCYC 99999, and no external signal is connected to the BURST GATE input.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DT?</td>
<td>Response indicates which DT function is enabled.</td>
<td></td>
</tr>
<tr>
<td>ERRMsg?</td>
<td>Returns an event code and a brief description of the event. If RQS is ON, the code indicates the most recent event. If RQS is OFF, the code indicates the highest priority event that has occurred.</td>
<td></td>
</tr>
<tr>
<td>ERRor?</td>
<td>Same as ERRMsg except that the event description is eliminated.</td>
<td></td>
</tr>
<tr>
<td>EVent?</td>
<td>Same as ERRMsg except that the event description is eliminated.</td>
<td></td>
</tr>
<tr>
<td>FLoat</td>
<td>Sets instrument to floating signal output.</td>
<td></td>
</tr>
<tr>
<td>FLT</td>
<td>Sets frequency (main frequency) for all functions except EXT.</td>
<td></td>
</tr>
</tbody>
</table>

2-18
Table 2-3 (cont.)

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Table 2-3 (cont)

<table>
<thead>
<tr>
<th>Function?</th>
<th>Returns enabled function (and number indicating SMPTE/DIN ratio or burst percent, if applicable).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gate?</td>
<td>Returns 'GATE &lt;num&gt;:', where &lt;num&gt; is 0 if signal at BURST GATE connector is unasserted; &lt;num&gt; is 1 if BURST GATE is asserted.</td>
</tr>
<tr>
<td>GRound GNd</td>
<td>Sets instrument to grounded signal output.</td>
</tr>
<tr>
<td>GRound GNd</td>
<td>Sets instrument to floating signal output.</td>
</tr>
<tr>
<td>GRound? GNd?</td>
<td>Response indicates whether signal output is grounded or floating.</td>
</tr>
<tr>
<td>Help?</td>
<td>Returns a string list of all SG 5010 command headers.</td>
</tr>
<tr>
<td>Identify?</td>
<td>Returns the instrument type, Tektronix Codes and Formats version, and the instrument firmware version.</td>
</tr>
</tbody>
</table>

2-20
### SG 5010-Programming

#### Table 2-3 (cont)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INIT (cont)</strong></td>
<td></td>
</tr>
<tr>
<td>STARTV 0.1;</td>
<td>Sets instrument to settings stored in <code>&lt;binblk&gt;</code>, except DT, CLI, OVER, OPC, PLI, RQS, and USEREQ.</td>
</tr>
<tr>
<td>STOPV 10.0;</td>
<td></td>
</tr>
<tr>
<td>STEPT 0.1,FREQ;</td>
<td></td>
</tr>
<tr>
<td>SWEEP OFF;</td>
<td></td>
</tr>
<tr>
<td>USER OFF;</td>
<td></td>
</tr>
<tr>
<td><strong>LLSET</strong></td>
<td>Sets instrument to settings stored in <code>&lt;binblk&gt;</code>, except DT, CLI, OVER, OPC, PLI, RQS, and USEREQ.</td>
</tr>
<tr>
<td><strong>LLSET?</strong></td>
<td>Returns instrument settings in binary format.</td>
</tr>
</tbody>
</table>
| **LOCK?** | Returns "LOCK 
`<num>:`;", where `<num>` is 1 if instrument has not been in phase lock for more than 1 ms; `<num>` is 0 if instrument is in phase lock. |
| **MODE** | Sets sweep to amplitude mode. |
| **MODE** | Sets sweep to frequency mode. |
| **MODE?** | Returns sweep mode (amplitude or frequency). |
Table 2.3 (cont.)

<table>
<thead>
<tr>
<th>BURST AT BE</th>
<th>( n_{\text{burst}} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( n_{\text{burst}} ) = 10 6666 (6666) LIM</td>
<td>( n_{\text{burst}} ) = 10 6666</td>
</tr>
<tr>
<td>( n_{\text{burst}} ) = 10 6666 (6666) LIM</td>
<td>( n_{\text{burst}} ) = 10 6666</td>
</tr>
<tr>
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</tr>
<tr>
<td>( n_{\text{burst}} ) = 10 6666 (6666) LIM</td>
<td>( n_{\text{burst}} ) = 10 6666</td>
</tr>
</tbody>
</table>
Table 2-3 (cont)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFFCycles?</td>
<td>Returns number of off cycles for burst.</td>
</tr>
<tr>
<td>ON Cycles <code>&lt;num&gt;</code></td>
<td>Specifies number of on cycles for burst. Valid range is 1 to 65535.</td>
</tr>
<tr>
<td>ONCycles?</td>
<td>Returns number of on cycles.</td>
</tr>
<tr>
<td>OPc ON</td>
<td>Enables operation complete interrupt; instrument asserts SRQ when it completes one sweep.</td>
</tr>
<tr>
<td>OPc OFF</td>
<td>Disables operation complete interrupt; instrument does not assert SRQ when it completes one sweep.</td>
</tr>
<tr>
<td>OPc?</td>
<td>Returns setting of operation complete interrupt: “OPC ON;” or “OPC OFF;”.</td>
</tr>
<tr>
<td>OVerrange ON</td>
<td>Enables sweep overrange interrupt; instrument asserts SRQ when the sweep exceeds a limit of a sweep parameter.</td>
</tr>
</tbody>
</table>

2-24
### Table 2-3 (cont)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OVrange</strong> OFF</td>
<td>Disables sweep overrange interrupt; instrument does not assert SRQ when the sweep exceeds a limit of a sweep parameter.</td>
</tr>
<tr>
<td><strong>OVrange?</strong></td>
<td>Returns setting of sweep overrange interrupt: &quot;OVER ON;&quot; or &quot;OVER OFF;&quot;.</td>
</tr>
<tr>
<td><strong>OUtput ON</strong></td>
<td>Turns on signal output.</td>
</tr>
<tr>
<td><strong>OUtput OFF</strong></td>
<td>Turns off signal output.</td>
</tr>
<tr>
<td><strong>OUT?</strong></td>
<td>Response indicates signal output state (on or off).</td>
</tr>
<tr>
<td><strong>PLi ON</strong></td>
<td>Enables phase lock interrupt; instrument asserts SRQ when it goes out of phase lock from a reportable out-of-phase lock condition.</td>
</tr>
</tbody>
</table>
Table 2-3 (cont)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PLi</strong></td>
<td>OFF</td>
</tr>
<tr>
<td><strong>PLi?</strong></td>
<td>Returns setting of phase lock interrupt: &quot;PLI ON;&quot; or &quot;PLI OFF;&quot;.</td>
</tr>
<tr>
<td><strong>REcall</strong></td>
<td>&lt;num&gt;</td>
</tr>
<tr>
<td><strong>RQs</strong></td>
<td>ON</td>
</tr>
<tr>
<td><strong>RQs</strong></td>
<td>OFF</td>
</tr>
<tr>
<td><strong>RQs?</strong></td>
<td>Returns setting of service request interrupt: &quot;RQS ON;&quot; or &quot;RQS OFF;&quot;.</td>
</tr>
<tr>
<td><strong>RSource</strong></td>
<td>&lt;num&gt;</td>
</tr>
<tr>
<td><strong>RSrc</strong></td>
<td>&lt;num&gt;</td>
</tr>
</tbody>
</table>
spaced mode.
mode is the previously
Amplitude: default
FREQUENCY of
Sweep mode is either
1 second resolution
1 to 125.0 seconds with
VFD range for time is
Step and sweep mode:
Set time per sweep
Vrms
Waves amplitude setting in
RMS wave form
Vrms
For sweep operation in
Sets start amplitude
Return start
Program to operation
Sweep settings
Returns a string list of
running
current instrument
Running (sweep) or (sweep
Returns 0 (sweep not
Returns source
Impedance settings:
Table 2.3 (cont)
SG 5100 Programming
**SG 5010-Programming**

**Table 2-3 (cont)**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEptime?</td>
<td>Returns time per sweep step and sweep mode.</td>
</tr>
<tr>
<td>STOPFreq</td>
<td>&lt;num&gt;</td>
</tr>
<tr>
<td>STOPFreq?</td>
<td>Sets stop frequency for sweep operation.</td>
</tr>
<tr>
<td>STOPVolts</td>
<td>&lt;num&gt;</td>
</tr>
<tr>
<td>STOPVolts?</td>
<td>Sets stop amplitude for sweep operation, in Vrms.</td>
</tr>
<tr>
<td>STORE</td>
<td>&lt;num&gt;</td>
</tr>
<tr>
<td></td>
<td>[,&lt;num&gt;...]</td>
</tr>
<tr>
<td></td>
<td>Stores the current settings in specified storage location(s) (except CLI, DT, OVER, OPC, PLI, RQS, USEREQ0). Locations are 0 through 9.</td>
</tr>
<tr>
<td>STORE</td>
<td>&lt;num&gt;:</td>
</tr>
<tr>
<td></td>
<td>&lt;binblk&gt;</td>
</tr>
<tr>
<td></td>
<td>Stores &lt;binblk&gt; settings data in specified storage location (0 through 9).</td>
</tr>
<tr>
<td>STORE?</td>
<td>&lt;num&gt;</td>
</tr>
<tr>
<td></td>
<td>[,&lt;num&gt;...]</td>
</tr>
<tr>
<td></td>
<td>Outputs settings stored in specified location(s) 0 through 9, using the format STORE &lt;num&gt;:&lt;binblk&gt;;</td>
</tr>
</tbody>
</table>
Table 2.2 (cont.)

<table>
<thead>
<tr>
<th>SC 5010 Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses: OFF</td>
</tr>
<tr>
<td>Interfaces: USB (not available)</td>
</tr>
<tr>
<td>Channels: 4</td>
</tr>
<tr>
<td>Sensors: 8</td>
</tr>
<tr>
<td>Display: 2.8&quot; color LCD</td>
</tr>
<tr>
<td>Battery: 8.35V Li-ion 1400mAh</td>
</tr>
<tr>
<td>Dimensions: 300 x 150 x 80mm</td>
</tr>
<tr>
<td>Weight: 2.5kg</td>
</tr>
<tr>
<td>Compliance: CE, FCC, RoHS</td>
</tr>
<tr>
<td>Warranty: 1 year</td>
</tr>
</tbody>
</table>

Note: Table 2.2 (cont.) is not fully visible in the image.
### Table 2-3 (cont)

<table>
<thead>
<tr>
<th>USreq?</th>
<th>Response indicates the user request interrupt state (on or off).</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPP</td>
<td>Sets amplitude to equivalent Vrms value of argument.</td>
</tr>
<tr>
<td>VPP?</td>
<td>Returns amplitude in Vpp units.</td>
</tr>
<tr>
<td>Vrms</td>
<td>Sets amplitude to specified Vrms value.</td>
</tr>
<tr>
<td>Vrms?</td>
<td>Returns amplitude in Vrms.</td>
</tr>
</tbody>
</table>

#### Sending Interface Control Messages

Bus communications are performed through use of controller input and output statements. Commands are transmitted in ASCII by TEKTRONIX 4041 and 4050-Series controllers using PRINT statements; INPUT statements are used to return data from the SG 5010. The SG 5010 GPIB address is factory set to decimal address 25; message terminator to EOI ONLY.

`PRINT @25: "SET?"
INPUT @25: A$`
USER OFF
ROS ON
Pl OFF
OEP OFF
Ope OFF
CL OFF

Down with the following exceptions:
- Assumes the settings handed when last powered up.
- After the Local Switch (LOCS) and asserts STG.
- Includes all manual errors detected in the instrument.
- DC self-tests during which all front panel lights remain.
- When powered up, the SG 5010 performs a diagnostics.

Power-up Settings

For information on using WRITE statements.
Refer to the 401 and 450 Series control manuals.

WRITE @ 25:
Serial port disable (SPD)
WRITE @ 24:
Serial port enabled (SEP)
WRITE @ A8: group execute trigger (GET)
WRITE @ 17: local with location (LWLS)
WRITE @ 17:
A17
WRITE @ A17:
Remote with location (RWLS)
WRITE @ A17:
C0 to load (CLL)
WRITE @ A4:
Selected device clear (SDC)
WRITE @ 20:
Device clear (DCl)
WRITE @ 98:
Invalid (UNL)
WRITE @ E0:
Tag (TR)
WRITE @ E0:
Inversion (INV)
WRITE @ E0:
Laser (MLA)

Class 3B: = address + 64
EN and peak addresses A = SG 5010 primary and
the following examples A and B are the SG 5010.
Using WRITE statements (450 Series controllers) in
interface control messages are sent to the SG 5010

SG 5010 Programming
USER OFF
STEP 0.1 FREED
STOP 1.00
STARRY A
STOP 2.00
START 2.0
STOP 2.00
START 2.0
Aפג 600
AGS ON
PIL OFF
OVER OFF
OUT OFF
ONCE 10
OFC OFF
OFC0 90
STEPS 30
t0.100
IMP 0
GNP OFF
FIND SI:
FREE 10000
O7 OFF
DISP VMS
C! OFF
BAL ON
AMPL Y-VRMS

Identize the stage location in group
following steps, and display an error code that
the power-on settings were selected. It assumes the
tracks a different section in the manual section in which
During the power-off settings, the instrument de-

SG 5010-Programming
Talker Listener Programs

Refer to the SG 5010 Instruction Manual for additional Talker/Listener Program information.

NOTE
The double asterisks shown in the 4052A and 4041 program code lines indicate a line wrap-around and are not part of the program coding.

4052A Controller Program

The following program allows a user to send any SG 5010 commands from the controller to the instrument and return data from the SG 5010 to the controller. The program includes an SRQ handler.

```
540 INIT
550 DIM Sg_response$(300),Sg_command$(100),
** Addr_list(15)
560 Sg_pri_addr=25
570 I
580 CALL _config",Config_code;Addr_list
590 IF Config_code THEN
600 PRINT "Configuration routine failed
** due to problem on GPIB."
610 STOP
620 END IF
630 I
640 ON SRQ THEN 790
650 I
660 PRINT "SG 5010 TALKER/LISTENER PROGRAM"
670 I
680 PRINT "Enter command message: ";
690 INPUT Sg_command$
700 PRINT @Sg_pri_addr:Sg_command$
710 INPUT @Sg_pri_addr:Sg_response$
720 PRINT Sg_response$
730 GO TO 680
740 END
```

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441. Controller Program

860 RETURN
862 END
864 END_ROUTINE
866 PRINT "End of Report"
868 PRINT ""
SG 5010-Programming

680  Print response$ ! SG 5010 returns blank line if not queried in
**
**  command$
690  Goto tlk_lian
700  End ! Main
800  Sub pollbus local report$
810  ** PURPOSE:
820  ! Handles gpib service requests.
**
**  Polls all primary addresses until
830  ! source of srq is found. If srq from
**  instrument at SG 5010 primary
840  ! address, routine queries id and
**  error message.
850  !
860  ** LOCAL VARIABLE:
870  ! Report$: Id and event report from
**  instrument at sg_pa if it has srq.
880  !
890  Dim report$ to 80
900  Poll applista, appladd
910  If appladd=sg_pa then input #100
**
**  prompt "id?;errmsg?":report$
920  Print report$, "STATUS=":applista,
**
**  "ADDRESS=":appladd, "PORT=",
**
**  val(msgtrem$)
930  Resume
940  End ! Sub pollbus
Table 3-1: Error Reporting

These codes are described in Section 3.1. Each error is associated with a code (STB) in response to the instrument. The code

Table 3-1: Error Reporting

These codes are described in Section 3.1. Each error is associated with a code (STB) in response to the instrument. The code

Error Codes

Section 3
SG 5010-Error Codes

If there is more than one event to be reported, the instrument continues to assert SRQ until it reports all events. (SRQ “stacking” consists of reporting only the latest event of each priority level.) Each event is automatically cleared when it is reported via Serial Poll. The Device Clear (DCL) interface message may be used to clear all events except Power-On.

Commands are provided to control the reporting of some individual events and to disable all service requests. For example, the User Request command (USER) provides individual control over the reporting of the user request event that occurs when the front panel INST ID button is pressed. The Request for Service command (RQS) controls whether the instrument reports any events with SRQ.

RQS OFF inhibits all SRQ’s. When RQS is OFF, the ERR query allows the controller to find out about events without first performing a Serial Poll. With RQS OFF, the controller may send the ERR query at any time and the instrument will return an event waiting to be reported. The controller can clear all events by sending the ERR query until a zero (0) code is returned, or clear all events except Power-Up through the DCL interface message.

With RQS OFF, the controller may perform a Serial Poll, but the Status Byte contains only Device Dependent Status information.

With RQS ON, the STB contains the class of the event: a subsequent error query returns additional information about the previous event reported in the STB.