Front-Panel Menu Reference

Use Recall Menu as a shortcut to recall the last command executed.

A: MODulation MENU

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Selects the shape of the AM modulating waveform.</td>
<td>Enables or disables the internal AM modulating source.</td>
<td>Selects the shape of the FM modulating waveform.</td>
<td>Sets the number of cycles per burst (1 to 50,000 cycles).</td>
<td>Sets the burst rate in Hz for an internal burst source.</td>
<td>Sets the starting phase angle of a burst (-360 to +360 degrees).</td>
<td>Selects an internal or external gate source for burst modulation.</td>
<td>Sets the FSK &quot;hop&quot; frequency.</td>
<td>Selects the internal FSK rate between the carrier and FSK frequency.</td>
<td>Selects an internal or external source for the FSK rate.</td>
</tr>
</tbody>
</table>

B: SWP (Sweep) MENU

<table>
<thead>
<tr>
<th>1: START F</th>
<th>2: STOP F</th>
<th>3: SWP TIME</th>
<th>4: SWP MODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sets the start frequency in Hz for sweeping.</td>
<td>Sets the stop frequency in Hz for sweeping.</td>
<td>Sets the repetition rate in seconds for sweeping.</td>
<td>Selects linear or logarithmic sweeping.</td>
</tr>
</tbody>
</table>

C: EDIT MENU *

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiates a new arb waveform or loads the selected arb waveform.</td>
<td>Sets the number of points in a new arb waveform (8 to 16,000 points).</td>
<td>Performs a linear interpolation between two points in the arb waveform.</td>
<td>Edits the individual points of the selected arb waveform.</td>
<td>Inverts the selected arb waveform by changing the sign of each point.</td>
<td>Saves the current arb waveform in non-volatile memory.</td>
<td>Deletes the selected arb waveform from non-volatile memory.</td>
</tr>
</tbody>
</table>

* The commands enclosed in square brackets ([ ] ) are "hidden" until you make a selection from the NEW ARB command to initiate a new edit session.

D: SYStem MENU

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Selects the output termination (50Ω or high impedance).</td>
<td>Enables or disables automatic power-up in power-down state &quot;0&quot;.</td>
<td>Retrieves errors from the error queue (up to 20 errors).</td>
<td>Performs a complete self-test.</td>
<td>Enables or disables a comma separator between digits on the display.</td>
<td>Displays the function generator’s firmware revision codes.</td>
</tr>
</tbody>
</table>

E: Input / Output MENU

<table>
<thead>
<tr>
<th>1: HPB ADDR</th>
<th>2: INTERFACE</th>
<th>3: BAUD RATE</th>
<th>4: PARITY</th>
<th>5: LANGUAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sets the GPIB bus address (0 to 30).</td>
<td>Selects the GPIB or RS-232 interface.</td>
<td>Selects the baud rate for RS-232 operation.</td>
<td>Selects even, odd, or no parity for RS-232 operation.</td>
<td>Verifies the interface language: SCIPI.</td>
</tr>
</tbody>
</table>

F: CALibration MENU *

<table>
<thead>
<tr>
<th>1: SECURED</th>
<th>2: CALIBRATE</th>
<th>3: CAL COUNT</th>
<th>4: MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The function generator is secured against calibration; enter code to unsecure.</td>
<td>The function generator is unsecured for calibration; enter code to secure.</td>
<td>Performs individual calibrations; must be UNSECURED.</td>
<td>Reads the total number of times the function generator has been calibrated.</td>
</tr>
</tbody>
</table>

* The commands enclosed in square brackets ([ ] ) are "hidden" unless the function generator is UNSECURED for calibration.
The APPLy Commands

(see page 138 in User’s Guide)

APPLy

:SQUare [:frequency] [,<amplitude> [,<offset>] ] ]
:TRIangle [:frequency] [,<amplitude> [,<offset>] ] ]
:NOISE [:frequency] [DEF] [,<amplitude> [,<offset>] ] ]
:DC [:frequency] [DEF] [,<amplitude> [DEF] [,<offset>] ] ]

APPLy?

Output Configuration Commands

(see page 145 in User’s Guide)

[SOURce:]
FUNCTION:SHAPE {SIN|SQU|TRI|RAMP|NOIS|DC|USER}
FUNCTION:SHAPE?

[SOURce:]
FREQuency [<frequency>|MIN|MAX]
FREQuency? [MIN|MAX]

[SOURce:]
PULSe:DCYCle {<percent>|MIN|MAX}
PULSe:DCYCle? [MIN|MAX]

[SOURce:]
VOLTage [<amplitude>|MIN|MAX]
VOLTage? [MIN|MAX]
VOLTage:OFFSet [<offset>|MIN|MAX]
VOLTage:OFFSet? [MIN|MAX]
VOLTage:UNIT {VPP|VRMS|DBM|DEF}
VOLTage:UNIT?

OUTPut:LOAD {50|INF|MIN|MAX}
OUTPut:LOAD? [MIN|MAX]

OUTPut:SYNC {OFF|ON}
OUTPut:SYNC?
Modulation Commands

(see page 154 in User's Guide)

[SOURCE:]
AM:DEPTH {<depth in percent>|MIN|MAX}
AM:DEPTH? [MIN|MAX]
AM:INTERNAL:FUNCTION {SIN|SQU|TRI|RAMP|NOIS|USER}
AM:INTERNAL:FUNCTION?
AM:INTERNAL:FREQUENCY {<frequency>|MIN|MAX}
AM:INTERNAL:FREQUENCY? [MIN|MAX]
AM:SOURce {BOTH|EXT}
AM:SOURce?
AM:STATe {OFF|ON}
AM:STATe?

[SOURCE:]
FM:DEViation {<peak deviation in Hz>|MIN|MAX}
FM:DEViation? [MIN|MAX]
FM:INTERNAL:FUNCTION {SIN|SQU|TRI|RAMP|NOIS|USER}
FM:INTERNAL:FUNCTION?
FM:INTERNAL:FREQUENCY {<frequency>|MIN|MAX}
FM:INTERNAL:FREQUENCY? [MIN|MAX]
FM:STATe {OFF|ON}
FM:STATe?

[SOURCE:]
BM:NCYCles {<# cycles>|INF|MIN|MAX}
BM:NCYCles? [MIN|MAX]
BM:PHASE {<degrees>|MIN|MAX}
BM:PHASE? [MIN|MAX]
BM:INTERNAL:RATE {<frequency>|MIN|MAX}
BM:INTERNAL:RATE? [MIN|MAX]
BM:SOURce {INT|EXT}
BM:SOURce?
BM:STATe {OFF|ON}
BM:STATe?

FSK Commands

(see page 167 in User's Guide)

[SOURCE:]
FSK:FREQuency {<frequency>|MIN|MAX}
FSK:FREQuency? [MIN|MAX]
FSK:INTERNAL:RATE {<rate in Hz>|MIN|MAX}
FSK:INTERNAL:RATE? [MIN|MAX]
FSK:SOURce {INT|EXT}
FSK:SOURce?
FSK:STATe {OFF|ON}
FSK:STATe?
Sweep Commands
(see page 170 in User’s Guide)

[SOURce:]
FREQuency:STARt {<frequency>|MIN|MAX}
FREQuency:STARt? [MIN|MAX]
FREQuency:STOP {<frequency>|MIN|MAX}
FREQuency:STOP? [MIN|MAX]

[SOURce:]
SWEep:SPACing {LIN|LOG}
SWEep:SPACing?
SWEep:TIME {<seconds>|MIN|MAX}
SWEep:TIME? [MIN|MAX]
SWEep:STATe {OFF|ON}
SWEep:STATe?

Arbitrary Waveform Commands
(see page 174 in User’s Guide)

[SOURce:]
FUNCtion:USER {<arb name>|VOLATILE}
FUNCtion:USER?
FUNCtion:SHApe USER
FUNCtion:SHApe?

DATA VOLATILE, <value>,<value>, ...
DATA:DAC VOLATILE, {<binary block>|<value>,<value>, ...}

DATA:ATTRibute:AVERage? [<arb name>]
DATA:ATTRibute:CFACtor? [<arb name>]
DATA:ATTRibute:POINts? [<arb name>]
DATA:ATTRibute:PTPeak? [<arb name>]

DATA:CATalog?
DATA:COPY <destination arb name> [,VOLATILE]

DATA:DELeTe <arb name>
DATA:DELeTe:ALL

DATA:NVOLatile:CATalog?
DATA:NVOLatile:FREE?

FORMat:BORDer {NORMal|SWApped} Specify Byte Order
FORMat:BORDer?
System-Related Commands
(see page 188 in User's Guide)

DISPlay (OFF|ON)
DISPlay?

DISPlay:TEXT <quoted string>
DISPlay:TEXT?
DISPlay:TEXT:CLEar

SYSTem:BEEPer
SYSTem:ERRor?
SYSTem:VERSion?

*IDN?
*RST
*TST?

*SAV {0|1|2|3}  State 0 is the power-down state.
*RCL {0|1|2|3}  States 1, 2, and 3 are user-defined.

MEMory:STATe:DELete {0|1|2|3}

Triggering Commands
(see page 186 in User's Guide)

TRIGger:SOURce {IMM|EXT|BUS}
TRIGger:SOURce?

*TRG

Status Reporting Commands
(see page 209 in User's Guide)

SYSTem:ERRor?
*CLS

*ESE <enable value>
*ESE?

*ESR?

*OPC
*OPC?
Calibration Commands
(see page 193 in User's Guide)

CALibration?

CALibration:COUNt?

CALibration
 :SECure:CODE <new code>
 :SECure:STATE {OFF|ON},<code>
 :SECure:STATe {OFF|ON},<code>

CALibration:SETup <0|1|2|3|...|84>
CALibration:SETup?

CALibration:STRING <quoted string>
CALibration:STRING?

CALibration:VALue <value>
CALibration:VALue?

SCPI Status System
(see page 201 in User's Guide)
**IEEE-488.2 Common Commands**

*(see page 209 in User’s Guide)*

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*CLS</td>
<td>Clear Buffer</td>
</tr>
<tr>
<td>*ESE &lt;enable value&gt;</td>
<td>Enable value</td>
</tr>
<tr>
<td>*ESE?</td>
<td>Enable status</td>
</tr>
<tr>
<td>*ESR?</td>
<td>Error status</td>
</tr>
<tr>
<td>*IDN?</td>
<td>Identify device</td>
</tr>
<tr>
<td>*OPC</td>
<td>Operation completed</td>
</tr>
<tr>
<td>*OPC?</td>
<td>Operation status</td>
</tr>
<tr>
<td>*PSC {0</td>
<td>1}</td>
</tr>
<tr>
<td>*PSC?</td>
<td>Power supply status</td>
</tr>
<tr>
<td>*RST</td>
<td>Reset device</td>
</tr>
<tr>
<td>*SAV {0</td>
<td>1</td>
</tr>
<tr>
<td>*RCL {0</td>
<td>1</td>
</tr>
<tr>
<td>*SRE &lt;enable value&gt;</td>
<td>Synchronize enable status</td>
</tr>
<tr>
<td>*SRE?</td>
<td>Synchronize enable status</td>
</tr>
<tr>
<td>*STB?</td>
<td>Stop status</td>
</tr>
<tr>
<td>*TRG</td>
<td>Trigger device</td>
</tr>
<tr>
<td>*TST?</td>
<td>Trigger status</td>
</tr>
<tr>
<td>*WAI</td>
<td>Wait for status</td>
</tr>
</tbody>
</table>

**RS-232 Interface Commands**

*(see page 200 in User’s Guide)*

- **SYSTem:LOCal**
- **SYSTem:REMote**
- **SYSTem:RWLock**

*For RS-232 wiring and connection information, see page 195 in the User’s Guide.*

**Phase-Lock Commands (Option 001)**

*(see the 33120A Option 001 User’s and Service Guide)*

- **PHASe:ADJust <radians>**
- **PHASe:ADJust?**
- **PHASe:REFerence**
- **PHASe:UNLock:ERRor:STATe {OFF|ON}**
- **PHASe:UNLock:ERRor:STATe?**
- **OUTPut:TRIGger:IMMediate**
- **OUTPut:TRIGger:STATe {OFF|ON}**
- **OUTPut:TRIGger:STATe?**
Simplified Programming Overview

Using the APPLy Command
The APPLy command provides the most straightforward method to program the function generator over the remote interface. For example, the following statement outputs a 3 Vpp sine wave at 5 kHz with a -2.5 volt offset:

"APPL:SIN 5 KHZ, 3.0 VPP, -2.5 V"

Using the Low-Level Commands
Although the APPLy commands provide the most straightforward method to program the function generator, the low-level commands give you more flexibility to change individual parameters. For example, the following statements output a 3 Vpp sine wave at 5 kHz with a -2.5 volt offset:

"FUNC:SHAP SIN"
"FREQ 5.0 KHZ"
"VOLT 3.0 VPP"
"VOLT:OFFS -2.5 V"

Reading a Query Response
Only the query commands (commands that end with “?”) will instruct the function generator to send a response message. Queries return either output values or internal instrument settings. For example, the following statements read the error queue and print the most recent error:

dimension statement
"SYST:ERR?"
bust enter statement
print statement

Selecting a Trigger Source
When burst modulation or frequency sweep is enabled, the function generator will accept an immediate internal trigger, a hardware trigger from the rear-panel Ext Trig terminal, or a software (bus) trigger. By default, the internal trigger source is selected. If you want the function generator to use the external source or a bus trigger, you must select that source. For example, the following statements output a 3-cycle burst each time the Ext Trig terminal receives the rising edge of a TTL pulse:

"BM:NCYC 3"
"TRIG:SOUR EXT"
"BM:STAT ON"
This is a partial listing of error messages. See chapter 5 in the User’s Guide for more information.

-102, “Syntax error” Check for blank space before or after a colon in command header, or before a comma.

-103, “Invalid separator” Check for a comma used instead of a colon, semicolon, or blank space – or a blank instead of a comma.

-108, “Parameter not allowed” Check for extra parameters in the command string.

-109, “Missing parameter” Check for omitted parameters in the command string.

-113, “Undefined header” Check the spelling of the command or you may have used an invalid command.

-221, “Settings conflict” The requested setting is in conflict with the present configuration.

-222, “Data out of range” Check for a numeric parameter value that is outside the valid range for the command.

-224, “Illegal parameter value” Check for an invalid discrete parameter choice for the command.


-350, “Too many errors” More than 20 errors have occurred.

-410, “Query INTERRUPTED” The output buffer contains data from a previous command (the previous data is not overwritten).

781, “Not enough memory to store new arb waveform” Up to four user-defined waveforms can be stored in non-volatile memory. Use DATA :DEL to delete downloaded waveforms.

783, “Arb waveform name too long” The arb name can contain up to 8 characters. The first character must be a letter (A-Z), but the remaining characters can be number (0-9) or “ _ “.

785, “Specified arb waveform does not exist” The arb name specified has not been downloaded into VOLATILE memory.

786, “Cannot delete a built-in arb waveform” You cannot delete the five built-in arb waveforms.

787, “Cannot delete the currently selected active arb waveform” You cannot delete the arb waveform that is currently being output.
The parameters marked with a bullet (•) are stored in non-volatile memory. The factory settings are shown.

<table>
<thead>
<tr>
<th>Output Configuration</th>
<th>Power-On/Reset State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Sine wave</td>
</tr>
<tr>
<td>Frequency</td>
<td>1 kHz</td>
</tr>
<tr>
<td>Amplitude (into 50 ohms)</td>
<td>100 mV peak-to-peak</td>
</tr>
<tr>
<td>Offset</td>
<td>0.00 Vdc</td>
</tr>
<tr>
<td>Output Units</td>
<td>Volts peak-to-peak</td>
</tr>
<tr>
<td>Output Termination</td>
<td>50 ohms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Modulation</th>
<th>Power-On/Reset State</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Carrier Waveform</td>
<td>1 kHz Sine wave</td>
</tr>
<tr>
<td>AM Modulating Waveform</td>
<td>100 Hz Sine wave</td>
</tr>
<tr>
<td>AM Depth</td>
<td>100%</td>
</tr>
<tr>
<td>FM Carrier Waveform</td>
<td>1 kHz Sine wave</td>
</tr>
<tr>
<td>FM Modulating Waveform</td>
<td>10 Hz Sine wave</td>
</tr>
<tr>
<td>FM Peak Frequency Deviation</td>
<td>100 Hz</td>
</tr>
<tr>
<td>Burst Carrier Frequency</td>
<td>1 kHz Sine wave</td>
</tr>
<tr>
<td>Burst Count</td>
<td>1 cycle</td>
</tr>
<tr>
<td>Burst Rate</td>
<td>100 Hz</td>
</tr>
<tr>
<td>Burst Starting Phase</td>
<td>0 degrees</td>
</tr>
<tr>
<td>FSK Carrier Waveform</td>
<td>1 kHz Sine wave</td>
</tr>
<tr>
<td>FSK “Hop” Frequency</td>
<td>100 Hz Sine wave</td>
</tr>
<tr>
<td>FSK Rate</td>
<td>10 Hz</td>
</tr>
<tr>
<td>Modulation State</td>
<td>Off</td>
</tr>
<tr>
<td>Sweep Start / Stop Frequency</td>
<td>100 Hz / 1 kHz</td>
</tr>
<tr>
<td>Sweep Time</td>
<td>1 second</td>
</tr>
<tr>
<td>Sweep Mode</td>
<td>Linear</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System-Related Operations</th>
<th>Power-On/Reset State</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Power-Down Recall</td>
<td>Disabled</td>
</tr>
<tr>
<td>• Display Mode</td>
<td>On</td>
</tr>
<tr>
<td>• Comma Separators</td>
<td>On</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Triggering Operations</th>
<th>Power-On/Reset State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger Source</td>
<td>Internal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input/Output Configuration</th>
<th>Power-On/Reset State</th>
</tr>
</thead>
<tbody>
<tr>
<td>• GPIB Address</td>
<td>10</td>
</tr>
<tr>
<td>• Interface</td>
<td>GPIB (IEEE-488)</td>
</tr>
<tr>
<td>• Baud Rate</td>
<td>9600 baud</td>
</tr>
<tr>
<td>• Parity</td>
<td>None (8 data bits)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Calibration</th>
<th>Power-On/Reset State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration State</td>
<td>Secured</td>
</tr>
</tbody>
</table>

**NOTE:** The power-on state will be different if you have enabled the power-down storage mode. See “Power-Down Recall Mode” on page 109 for more information.