

Agilent 33250A

Function/Arbitrary Waveform Generator

Quick Reference Guide

- Square brackets ([]) indicate optional keywords or parameters.
- Braces ({ }) enclose parameters within a command. Default parameters are shown in **bold**.
- Triangle brackets (< >) enclose parameters for which you must substitute a value.
- A vertical bar (|) separates multiple choices.

The APPLy Commands

(see page 144 in User's Guide)

APPLy

```
:SINusoid [<frequency> [, <amplitude> [, <offset>] ]]  
:SQUare [<frequency> [, <amplitude> [, <offset>] ]]  
:RAMP [<frequency> [, <amplitude> [, <offset>] ]]  
:PULSe [<frequency> [, <amplitude> [, <offset>] ]]  
:NOISe [<frequency>|DEF>1 [, <amplitude> [, <offset>] ]]  
:DC [<frequency>|DEF>1 [, <amplitude>|DEF>1 [, <offset>] ]]  
:USER [<frequency> [, <amplitude> [, <offset>] ]]
```

APPLy?

¹ *This parameter has no effect for this command but you MUST specify a value or "DEFault".*

State Storage Commands

(see page 209 in User's Guide)

```
*SAV {0|1|2|3|4}
```

```
*RCL {0|1|2|3|4}
```

MEMory:STATe

```
:NAME {0|1|2|3|4} [, <name>]  
:NAME? {0|1|2|3|4}  
:DELeTe {0|1|2|3|4}  
:RECall:AUTO {OFF|ON}  
:RECall:AUTO?  
:VALId? {0|1|2|3|4}
```

MEMory:NSTATes?



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Output Configuration Commands

(see page 153 in User's Guide)

```
FUNCTION {SINu|SQU|RAMP|PULSe|NOISE|DC|USER}
FUNCTION?

FREQUENCY {<frequency>|MINimum|MAXimum}
FREQUENCY? [MINimum|MAXimum]

VOLTage {<amplitude>|MINimum|MAXimum}
VOLTage? [MINimum|MAXimum]

VOLTage:OFFSet {<offset>|MINimum|MAXimum}
VOLTage:OFFSet? [MINimum|MAXimum]

VOLTage
  :HIGH {<voltage>|MINimum|MAXimum}
  :HIGH? [MINimum|MAXimum]
  :LOW {<voltage>|MINimum|MAXimum}
  :LOW? [MINimum|MAXimum]

VOLTage:RANGE:AUTO {OFF|ON|ONCE}
VOLTage:RANGE:AUTO?

VOLTage:UNIT {VPP|VRMS|DBM}
VOLTage:UNIT?

FUNCTION:SQUare:DCYCLE {<percent>|MINimum|MAXimum}
FUNCTION:SQUare:DCYCLE? [MINimum|MAXimum]

FUNCTION:RAMP:SYMMetry {<percent>|MINimum|MAXimum}
FUNCTION:RAMP:SYMMetry? [MINimum|MAXimum]

OUTPut {OFF|ON}
OUTPut?

OUTPut:LOAD {<ohms>|INFIinity|MINimum|MAXimum}
OUTPut:LOAD? [MINimum|MAXimum]

OUTPut:POLarity {NORMa1|INVERTed}
OUTPut:POLarity?

OUTPut:SYNC {OFF|ON}
OUTPut:SYNC?
```

Pulse Configuration Commands

(see page 166 in User's Guide)

```
PULSe:PERiod {<seconds>|MINimum|MAXimum}
PULSe:PERiod? [MINimum|MAXimum]

PULSe
  :WIDTh {<seconds>|MINimum|MAXimum}
  :WIDTh? [MINimum|MAXimum]
  :TRANSition {<seconds>|MINimum|MAXimum}
  :TRANSition? [MINimum|MAXimum]
```

Modulation Commands

(see page 169 in User's Guide)

AM Commands

```
AM:INTernal
:FUNctIon {SIN|SQU|RAMP|NRAmp|TRI|NOISe|USER}
:FUNctIon?

AM:INTernal
:FREQuency {<frequency>|MINimum|MAXimum}
:FREQuency? [MINimum|MAXimum]

AM:DEPth {<depth in percent>|MINimum|MAXimum}
AM:DEPth? [MINimum|MAXimum]

AM:SOURce {INTernal|EXTernal}
AM:SOURce?

AM:STATe {OFF|ON}
AM:STATe?
```

FM Commands

```
FM:INTernal
:FUNctIon {SIN|SQU|RAMP|NRAmp|TRI|NOISe|USER}
:FUNctIon?

FM:INTernal
:FREQuency {<frequency>|MINimum|MAXimum}
:FREQuency? [MINimum|MAXimum]

FM:DEVIation {<peak deviation in Hz>|MINimum|MAXimum}
FM:DEVIation? [MINimum|MAXimum]

FM:SOURce {INTernal|EXTernal}
FM:SOURce?

FM:STATe {OFF|ON}
FM:STATe?
```

FSK Commands

```
FSKey:FREQuency {<frequency>|MINimum|MAXimum}
FSKey:FREQuency? [MINimum|MAXimum]

FSKey:INTernal:RATE {<rate in Hz>|MINimum|MAXimum}
FSKey:INTernal:RATE? [MINimum|MAXimum]

FSKey:SOURce {INTernal|EXTernal}
FSKey:SOURce?

FSKey:STATe {OFF|ON}
FSKey:STATe?
```

Sweep Commands

(see page 179 in User's Guide)

```
FREQuency
:START {<frequency>|MINimum|MAXimum}
:START? [MINimum|MAXimum]
:STOP {<frequency>|MINimum|MAXimum}
:STOP? [MINimum|MAXimum]

FREQuency
:CENTer {<frequency>|MINimum|MAXimum}
:CENTer? [MINimum|MAXimum]
:SPAN {<frequency>|MINimum|MAXimum}
:SPAN? [MINimum|MAXimum]

SWEep
:SPACing {LINear|LOGarithmic}
:SPACing?
:TIME {<seconds>|MINimum|MAXimum}
:TIME? [MINimum|MAXimum]

SWEep:STATE {OFF|ON}
SWEep:STATE?

TRIGger:SOURce {IMMediate|EXTernal|BUS}
TRIGger:SOURce?

TRIGger:SLOPe {POSitive|NEGative}
TRIGger:SLOPe?

OUTPut
:TRIGger:SLOPe {POSitive|NEGative}
:TRIGger:SLOPe?
:TRIGger {OFF|ON}
:TRIGger?

MARKer:FREQuency {<frequency>|MINimum|MAXimum}
MARKer:FREQuency? [MINimum|MAXimum]

MARKer {OFF|ON}
MARKer?
```

Triggering Commands

(see page 195 in User's Guide)

These commands are used for Sweep and Burst only.

```
TRIGger:SOURce {IMMediate|EXTernal|BUS}
TRIGger:SOURce?

TRIGger
*TRG

TRIGger:DELay {<seconds>|MINimum|MAXimum}
TRIGger:DELay? [MINimum|MAXimum]

TRIGger:SLOPe {POSitive|NEGative}
TRIGger:SLOPe?

BURSt:GATE:POLarity {NORMal|INVerted}
BURSt:GATE:POLarity?

OUTPut
:TRIGger:SLOPe {POSitive|NEGative}
:TRIGger:SLOPe?
:TRIGger {OFF|ON}
:TRIGger?
```

Burst Commands

(see page 187 in User's Guide)

```
BURSt:MODE {TRIGgered|GATed}
BURSt:MODE?

BURSt:NCYCles {<# cycles>|INFIinity|MINimum|MAXimum}
BURSt:NCYCles? [MINimum|MAXimum]

BURSt:INTernal:PERiod {<seconds>|MINimum|MAXimum}
BURSt:INTernal:PERiod? [MINimum|MAXimum]

BURSt:PHASe {<angle>|MINimum|MAXimum}
BURSt:PHASe? [MINimum|MAXimum]

BURSt:STATe {OFF|ON}
BURSt:STATe?

UNIT:ANGLE {DEGREE|RADian}
UNIT:ANGLE?

TRIGger:SOURce {IMMediate|EXTernal|BUS}
TRIGger:SOURce?

TRIGger:DELay {<seconds>|MINimum|MAXimum}
TRIGger:DELay? [MINimum|MAXimum]

TRIGger:SLOPe {POSitive|NEGative}
TRIGger:SLOPe?

BURSt:GATE:POLarity {NORMAL|INVerted}
BURSt:GATE:POLarity?

OUTPut
:TRIGger:SLOPe {POSitive|NEGative}
:TRIGger:SLOPe?
:TRIGger {OFF|ON}
:TRIGger?
```

System-Related Commands

(see page 213 in User's Guide)

```
SYSTem:ERRor?
*IDN?

DISPlay {OFF|ON}
DISPlay?

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

*RST
*TST?

SYSTem:VERSion?

SYSTem
:BEEPPer
:BEEPPer:STATe {OFF|ON}
:BEEPPer:STATe?

*LRN?
*OPC
*OPC?
*WAI
```

Arbitrary Waveform Commands

(see page 198 in User's Guide)

```
DATA VOLATILE, <value>, <value>, ...
DATA
  :DAC VOLATILE, {<binary block>|<value>, <value>, ... }
FORMat:BORDER {NORMa1|SWAPped}
FORMat:BORDER?
DATA:COPIY <destination arb name> [, VOLATILE]
FUNCTION:USER {<arb name>1|VOLATILE}
FUNCTION:USER?
FUNCTION USER
FUNCTION?
DATA
  :CATalog?
  :NVOLatile:CATalog?
  :NVOLatile:FREE?
DATA:DELeTe <arb name>
DATA:DELeTe:ALL
DATA
  :ATTRibute:AVERAge? [<arb name>1]
  :ATTRibute:CFACTOR? [<arb name>1]
  :ATTRibute:POINTs? [<arb name>1]
  :ATTRibute:PTPeak? [<arb name>1]
```

¹ The names of the built-in arb waveforms are:
EXP_RISE, EXP_FALL, NEG_RAMP, SINC, and CARDIAC.

Interface Configuration Commands

(see page 218 in User's Guide)

```
SYSTEM:INTerface {GPIB|RS232}
SYSTEM:LOCal
SYSTEM:RWLock
```

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Status Reporting Commands

(see page 235 in User's Guide)

*STB?

*SRE <enable value>

*SRE?

STATUS

:QUESTIONable:CONDition?

:QUESTIONable[:EVENT]?

:QUESTIONable:ENABLE <enable value>

:QUESTIONable:ENABLE?

*ESR?

*ESE <enable value>

*ESE?

*CLS

STATUS:PRESet

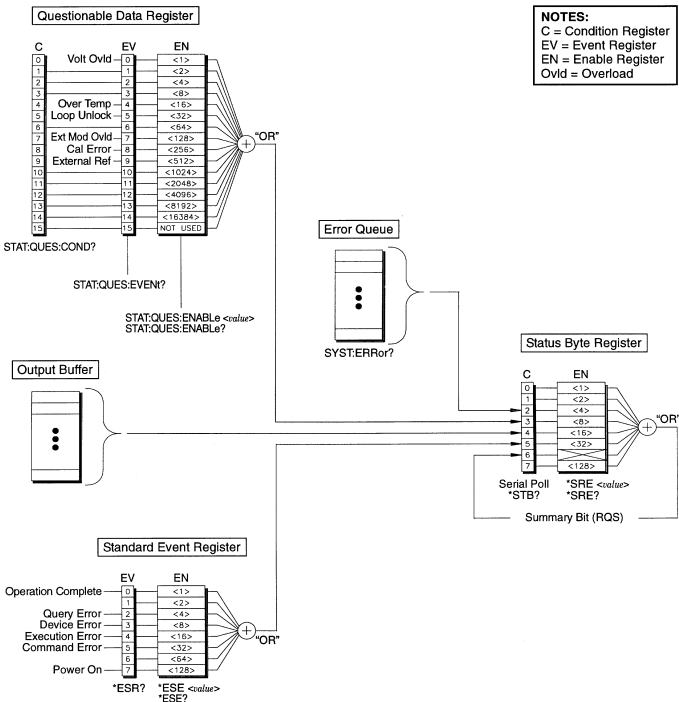
*PSC {0|1}

*PSC?

*OPC

SCPI Status System

(see page 225 in User's Guide)



Phase-Lock Commands

(see page 223 in User's Guide)

```
PHASe {<angle>|MINimum|MAXimum}
PHASe? [MINimum|MAXimum]
PHASe:REFerence
PHASe:UNLock:ERRor:STATe {OFF|ON}
PHASe:UNLock:ERRor:STATe?
UNIT:ANGLE {DEGREE|RADian}
UNIT:ANGLE?
```

Calibration Commands

(see page 239 in User's Guide)

```
CALibration?
CALibration
:SECure:STATe {OFF|ON}, <code>
:SECure:STATe?
:SECure:CODE <new code>
:SETup <0|1|2|3| . . . |115>
:SETup?
:VALue <value>
:VALue?
:COUNT?
:STRing <quoted string>
:STRing?
```

IEEE 488.2 Common Commands

```
*CLS
*ESR?
*ESE <enable value>
*ESE?
*IDN?
*LRN?
*OPC
*OPC?
*PSC {0|1}
*PSC?
*RST
*SAV {0|1|2|3|4}
*RCL {0|1|2|3|4}
*STB?
*SRE <enable value>
*SRE?
*TRG
*TST?
```


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 command string sent from your computer will output a 3 V_{pp} sine wave at 5 kHz with a -2.5 volt offset.

```
APPL:SIN 5.0E+3, 3.0, -2.5
```

Using the Low-Level Commands

Although the `APPLy` command provides 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 command strings sent from your computer will output a 3 V_{pp} sine wave at 5 kHz with a -2.5 volt offset.

```
FUNC SIN  
FREQ 5000  
VOLT 3.0  
VOLT:OFFS -2.5
```

Reading a Query Response

Only the query commands (commands that end with “?”) will instruct the function generator to send a response message. Queries return internal instrument settings. For example, the following command string sent from your computer will read the function generator’s error queue and retrieve the response from the most recent error.

```
dimension statement  
SYST:ERR?  
enter statement
```

Selecting a Trigger Source

When *Sweep* or *Burst* is enabled, the function generator will accept an immediate internal trigger, a hardware trigger from the rear-panel *Trig In* connector, a manual trigger from the **Trigger** key, or a software (bus) trigger. By default, the internal trigger source is selected. If you want to use an external or a software trigger source, you must first select that source. For example, the following command strings sent from your computer will output a 3-cycle burst each time the rear-panel *Trig In* connector receives the rising edge of a TTL pulse.

```
BURS:NCYC 3  
TRIG:SLOP POS  
TRIG:SOUR EXT  
BURS:STAT ON
```

Factory Default Settings

Output Configuration Function Frequency Amplitude / Offset Output Units Output Termination Autorange	Factory Setting Sine wave 1 kHz 100 mVpp / 0.000 Vdc Vpp 50W On
Modulation (AM, FM, FSK) Carrier Waveform Modulating Waveform AM Depth FM Deviation FSK "Hop" Frequency FSK Rate Modulation State	Factory Setting 1 kHz Sine wave 100 Hz Sine wave 100% 100 Hz 100 Hz 10 Hz Off
Sweep Start / Stop Frequency Sweep Time Sweep Mode Sweep State	Factory Setting 100 Hz / 1 kHz 1 Second Linear Off
Burst Burst Frequency Burst Count Burst Period Burst Starting Phase Burst State	Factory Setting 1 kHz 1 Cycle 10 ms 0° Off
System-Related Operations <ul style="list-style-type: none"> • Power-Down Recall Display Mode Error Queue Stored States, Stored Arbs Output State 	Factory Setting <ul style="list-style-type: none"> • Disabled On Errors are Cleared No Change Off
Triggering Operations Trigger Source	Factory Setting Internal (Immediate)
Remote Interface Configuration <ul style="list-style-type: none"> • GPIB Address • Interface • Baud Rate • Parity • Handshake 	Factory Setting <ul style="list-style-type: none"> • 10 • GPIB (IEEE-488) • 57,600 Baud • None (8 data bits) • DTR / DSR
Calibration Calibration State	Factory Setting Secured

Parameters marked with a bullet (•) are stored in *non-volatile* memory.