

**TG8000**  
**Multiformat Test Signal Generator**  
**Programmer Manual**



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**Tektronix**



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**Programmer Manual**

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# Preface

This manual provides programming information for the TG8000 Multifformat Test Signal Generator and related modules.

## Related manuals

The following table lists the user documents for the TG8000 and its related modules:

**Table i: TG8000 product documentation**

| Document   | Tektronix Part Number  | Description   | Availability |     |    |
|--|------------------------|---|--------------|-----|----|
|  |                        |   | Print        | Web | CD |
| User Manual  | 071-3036-xx (English)  | Describes how to install, operate, and configure the instrument   | ✓            | ✓   | ✓  |
|  | 071-3037-xx (Japanese) |   |              | ✓   | ✓  |
|  | 071-3038-xx (Russian)  |   |              | ✓   | ✓  |
| PC Tools Technical Reference   | 077-0684-xx            | Describes how to use the PC tools software that is supplied with the instrument   |              | ✓   | ✓  |
| Specifications and Performance Verification  | 077-0685-xx            | Lists the product specifications and provides procedures for verifying the performance of the instrument  |              | ✓   | ✓  |
| Programmer Manual  | 077-0686-xx            | Provides programming information for the mainframe and related modules  |              | ✓   | ✓  |
| Service Manual   | 077-0687-xx            | Describes how to service the mainframe to the module level (such as circuit boards and fuses) and provides information about servicing generator modules  |              | ✓   |    |
| Declassification and Security Instructions   | 077-0688-xx            | Describes how to clear or sanitize the data storage (memory) devices in the product for customers with data security concerns.  |              | ✓   |    |
| Release Notes  | 077-0689-xx            | Describes the new features, improvements, and limitations of the instrument firmware  |              | ✓   |    |
| Video Sync Pulse Generator and Electronic Changeover Unit System Integration Technical Reference | 077-0563-xx            | Provides information for system integrators who are designing systems for high-definition (HD) and standard-definition (SD) digital video content where Tektronix electronic changeover units and video sync pulse generators are to be deployed. |              | ✓   | ✓  |



# Getting started

To help you get started with programming the TG8000, this section includes the following subsections:

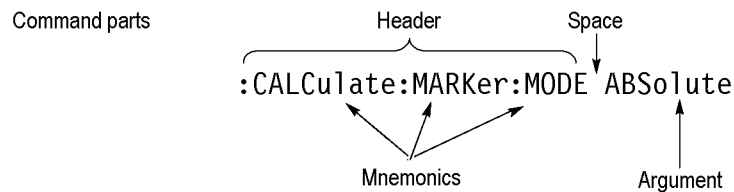
- *Overview of the Manual* Summarizes each major section of this manual.
- *Connecting the Interface* Describes how to physically connect the analyzer to a controller.

## Overview of the manual

The information contained in each major section of this manual is described below.

### Syntax and commands

Section 2, *Syntax and Commands*, describes the structure and content of the messages your program sends to the analyzer. Figure 1–1 shows command parts as described in the Command Syntax subsection.



**Figure 1: Command parts**

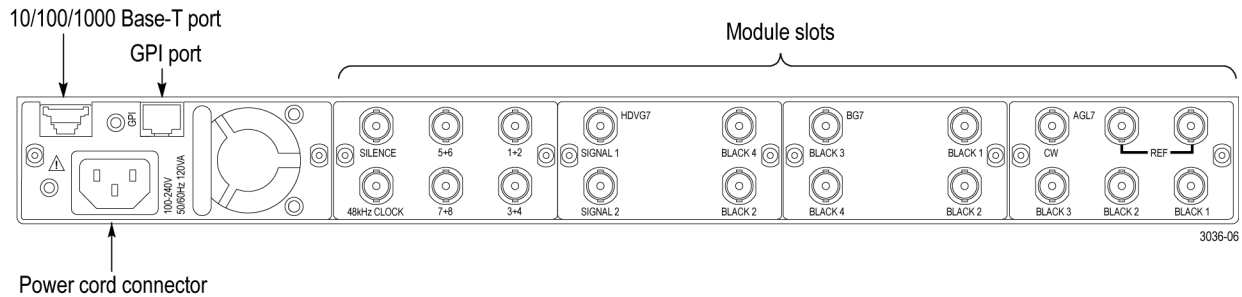
Section 2 also describes the effect of each command and provides examples of how you might use it.

### Error messages and codes

The program may request information from the **instrument**. The **instrument** provides information in the form of status and error messages. Section 3, *Status and Events*

## Connecting the interface

The TG8000 has a 10/100/1000 BASE-T port on the rear panel that allows you to control the instrument remotely, using your PC to upload and download various files such as signal files or logo files. For details on connecting to this port, see the *TG8000 Multiformat Test Signal Generator User Manual*, Tektronix part number 071-3036-XX.



**Figure 2:** 10/100/1000 Base-T connector is on the left side of the rear panel

## Network interface specifications

**NOTE.** Refer to the *TG8000 Multiformat Test Signal Generator User Manual* for instructions on connecting the TG8000 to a single PC or a network and setting the network parameters for the 10/100/1000 BASE-T port.

The TG8000 supports remote control using the Ethernet interface. This section describes the TG8000 network interface specifications.

The TCP/IP is used as the network protocol, and the port number is fixed 5000. The commands can be sent from the application program through the socket interface of the TCP/IP. Also, the query can be received through the interface.

Keep the following in mind while controlling the TG8000 remotely with the Ethernet interface.

- The Line Feed (LF) code is needed at the end of a message as a terminator.
- The IEEE 488.1 standard (such as Device Clear and Service Request) is not supported.
- The Message Exchange Control Protocol in the IEEE 488.2 is not supported. However, the common commands such as \*ESE and the event handling features are supported.
- The Indefinite format (the block start at #0) in the <ARBITRARY BLOCK PROGRAM DATA> of the IEEE 488.2 is not supported.

## Checking remote command operation

To check remote command operation of the TG8000 mainframe, perform the following procedure:

1. Connect the TG8000 to your PC using an Ethernet cable. Refer to the *TG8000 Multiformat Test Signal Generator User Manual* (Tektronix part number 071-3036-XX) for detailed information about how to connect the TG8000 to your PC.

2. Click Windows **Start** button and select **Run** from the start menu

3. In the dialog box, type **telnet** and then click **OK**.

The TELNET window appears.

4. Select **Terminal > Preferences**.

5. Select **Local Echo** and click **OK**.

6. Select **Connect > Remote System**.

7. Enter the IP address of the TG8000 in the Host Name field and **5000** in the Port field.

8. Click **Connection**.

9. Type **\*IDN** in the command line and press the Enter key.

10. Check that the ID information of the TG8000 appears on the PC.

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**NOTE.** *If you use a PC running Windows 2000/XP/7, connect the TG8000 and your PC using the Hyper Terminal application supplied with Windows. Refer to Windows Online Help or other documentation for detailed information about Hyper Terminal.*

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# TG8000 syntax

This section contains information on the Standard Commands for Programmable Instruments (SCPI) and IEEE 488.2 Common Commands you can use to program your TG8000. The information is organized in the following subsections:

- *Programming Model* - This subsection provides information on programming prerequisites
- *SCPI Commands and Queries* - This subsection describes the SCPI command organization and syntax
- *IEEE 488.2 Common Commands* - This subsection lists the commands and argument structures that are common to all SCPI commands
- *Constructed Mnemonics* - This subsection describes the usage of constructed mnemonics by the TG8000.
- *Block Arguments* - This subsection describes the usage of block arguments by the TG8000.
- *Special Characters* - This subsection lists the special character sets that are used by the remote control interface.

## Programming model

Specific conditions must exist before programming commands will affect the test signal generated by a module.

### Selecting the module

Select the module to be addressed before executing any commands. Many of the commands used by the **TG8000** are shared by several modules and will be accepted without a reported error.

### Command arguments

Many commands accept either string or numeric arguments. For example: a boolean argument can either be "1" or "ON".

Signal parameter commands that have a :STEP node can accept either a numeric value or a string argument that refers to the :STEP increment.

Select signal parameter commands accept either a numeric value or one of the following strings:

**UP.** Use this argument to increase the parameter value one increment as defined by the :STEP value.

**DOWN.** Use this argument to decrease the parameter value one increment as defined by the :STEP value.

**MINimum.** Use this argument to query the minimum value or set the parameter value to the minimum acceptable value.

**MAXimum.** Use this argument to query the maximum value or set the parameter value to the maximum acceptable value.

**DEFault.** Use this argument to query the default value or set the parameter value to the default value.

---

**NOTE.** *If the TG8000 does not return a value in response to a MIN or MAX query, then the values are undefined and an error message is generated.*

---

### Query arguments

If you send a query with no argument, the response is the current value. You can also use MINimum, MAXimum, and DEFault as arguments for queries whose command form can use these arguments (refer to the command syntax for the specific command). Instead of returning the current value, queries using these arguments return the following information:

**MINimum.** Returns the minimum acceptable value.

**MAXimum.** Returns the maximum acceptable value.

**DEFault.** Returns the default value.

### Argument example

The following example demonstrates the effect of each of the arguments when used with a step value:

1. `:INSTrument:SElect "HDVG7:#" selects the HDTV digital video generator module located in the slot number indicated by the "#" symbol.`
2. `:OUTPut:CIRClE:STATe ON displays a circle on the video display.`

---

**NOTE.** *:OUTPut:CIRClE:DIAMeter uses an argument that is the percent of picture height.*

---

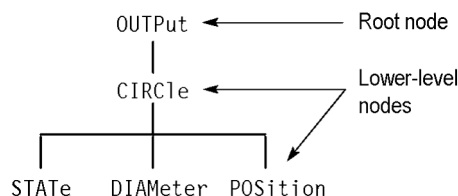
3. `:OUTPut:CIRClE:DIAMeter DEFault sets the circle diameter to 90 percent of the screen height.`
4. `:OUTPut:CIRClE:DIAMeter:STEP 10 sets the step increment to 10 percent.`
5. `:OUTPut:CIRClE:DIAMeter DOWN changes the circle diameter to 80 percent of the screen height.`
6. `:OUTPut:CIRClE:DIAMeter 50 changes the circle diameter to 50 percent of the screen height.`

7. :OUTPut:CIRClE:DIAMeter MAXimum changes the circle diameter to 100 percent of the screen height.
8. :OUTPut:CIRClE:DIAMeter MINimum changes the circle diameter to 0 percent of the screen height.
9. :OUTPut:CIRClE:DIAMeter UP changes the circle diameter to 10 percent of the screen height.
10. :OUTPut:CIRClE:DIAMeter MAXimum queries the maximum circle diameter (not the current diameter). The query returns the value of 100 percent, which is the maximum circle diameter allowable.

## SCPI commands and queries

SCPI is a standard created by a consortium that provides guidelines for remote programming of instruments. These guidelines provide a consistent programming environment for instrument control and data transfer. This environment uses defined programming messages, instrument responses, and data format across all SCPI instruments, regardless of manufacturer. The TG8000 uses a command language based on the SCPI standard.

The SCPI language is based on a hierarchical or tree structure (see Figure 2-1) that represents a subsystem. The top level of the tree is the root node; it is followed by one or more lower-level nodes.



**Figure 3: Example of SCPI subsystem hierarchy tree**

You can create commands and queries from these subsystem hierarchy trees. Commands specify actions for the instrument to perform. Queries return measurement data and information about parameter settings.

### Creating commands

SCPI commands are created by stringing together the nodes of a subsystem hierarchy and separating each node by a colon.

In Figure 2-1, OUTPut is the root node and CIRClE, STATe, DIAMeter, and POSition are lower-level nodes. To create a SCPI command, start with the root node OUTPut and move down the tree structure adding nodes until you reach the end of a branch. Most commands and some queries have parameters; you must include a value for these parameters. If you specify a parameter value that is out of range, the parameter will be set to a default value.

For example, OUTPut:CIRClE:STATe ON is a valid SCPI command created from the hierarchy tree in Figure 2-1.

### Creating queries

To create a query, start at the root node of a tree structure, move down to the end of a branch, and add a question mark. OUTPut:CIRClE:STATe? is an example of a valid SCPI query using the hierarchy tree in Figure 2-1.

### Parameter types

Every parameter in the command and query descriptions is of a specified type. The parameters are enclosed in brackets, such as <pattern>. The parameter type is listed after the parameter and is enclosed in parentheses, for example, (discrete). Some parameter types are defined specifically for the **TG8000** command set and some are defined by ANSI/IEEE 488.2-1987 (see Table 2-1).

**Table 1: Parameter types used in syntax descriptions**

| Parameter type  | Description  | Example  |
|-----------------|--|--|
| binary          | Binary numbers   | #B0110   |
| arbitrary block | A specified length of arbitrary data                     | #512234xxxxx . . . where 5 indicates that the following 5 digits (12234) specify the length of the data in bytes; xxxxx ... indicates the data |
| boolean         | Boolean numbers or values                                | ON or 1 OFF or 0   |
| discrete        | A list of specific values                                | MIN, MAX, UP, DOWN   |
| hexadecimal     | Hexadecimal numbers (0-9, A, B, C, D, E, F)              | #HAA, #H1  |
| NR1 numeric     | Integers   | 0, 1, 15, -1   |
| NR2 numeric     | Decimal numbers  | 1.2, 3.141516, -6.5  |
| NR3 numeric     | Floating point numbers                                   | 3.1415E-9, -16.1E5   |
| NRf numeric     | Flexible decimal number that may be type NR1, NR2 or NR3 | See NR1, NR2, NR3 examples   |
| string          | Alphanumeric characters (must be within quotation marks) | "Testing 1, 2, 3"  |

<sup>1</sup> Defined in ANSI/IEEE 488.2 as "Definite Length Arbitrary Block Response Data."

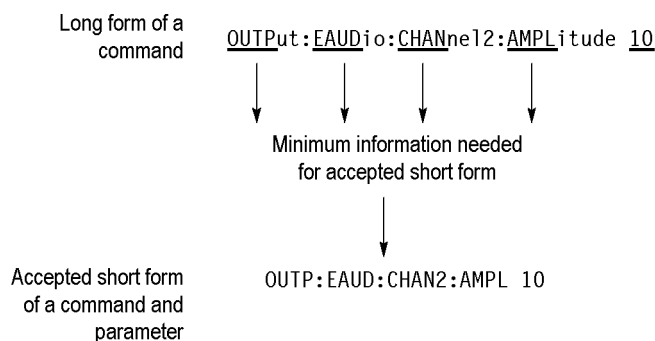
<sup>2</sup> An ANSI/IEEE 488.2-1992-defined parameter type.

<sup>3</sup> Some commands and queries will accept a hexadecimal value even though the parameter type is defined as NR1.

<sup>4</sup> Defined in ANSI/IEEE 488.2 as "String Response Data."

## Abbreviating commands, queries, and parameters

You can abbreviate most SCPI commands, queries, and parameters to an accepted short form. This manual shows these short forms as a combination of upper and lower case letters. The upper case letters indicate the accepted short form of a command. As shown in Figure 2-2, you can create a short form by using only the upper case letters. The accepted short form and the long form are equivalent and request the same action of the instrument.

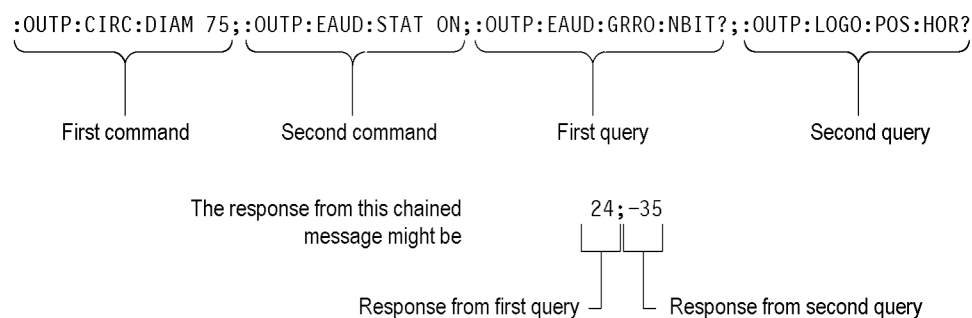


**Figure 4: Example of abbreviating a command**

**NOTE.** The numeric suffix of a command or query may be included in either the long form or short form; the TG8000 will default to "1" if no suffix is used. In Figure 2-2, the "2" of "CHAN2" indicates that the command is directed to the second channel.

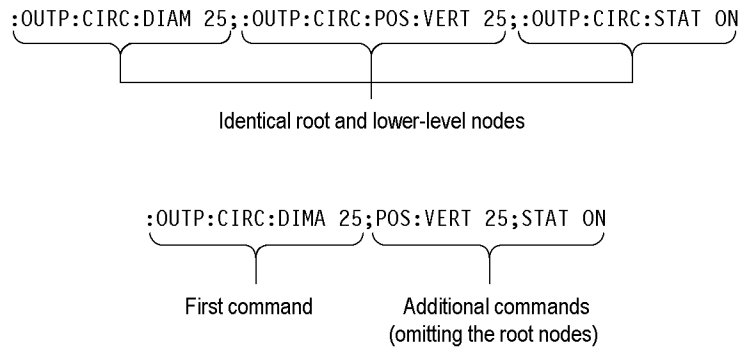
## Chaining commands and queries

You can chain several commands or queries together into a single message. To create a chained message, first create a command or query, add a semicolon (;), and then add more commands or queries and semicolons until you are done. If the command following a semicolon is a root node, precede it with a colon (:). Figure 2-3 illustrates a chained message consisting of several commands and queries. The single chained message should end in a command or query, not a semicolon. Responses to any queries in your message are separated by semicolons.



**Figure 5: Example of chaining commands and queries**

If a command has the same root and lower-level nodes as the previous command, you can omit these nodes. In Figure 2-4, the second command has the same root node (CIRC) as the first command, so these nodes can be omitted.



**Figure 6: Example of omitting root and lower-level nodes in a chained message**

### General rules

Here are three general rules for using SCPI commands, queries, and parameters:

- You can use single ( ' ') or double ( " ") quotation marks for quoted strings, but you cannot use both types of quotation marks for the same string.

correct: "This string uses quotation marks correctly."

correct: 'This string also uses quotation marks correctly.'

incorrect: "This string does not use quotation marks correctly.'

- You can use upper case, lower case, or a mixture of both cases for all commands, queries, and parameters.

OUTPUT:TEXT:POSITION:HORIZONTAL 25

is the same as

output:text:position:horizontal 25

and

OUTPUT:text:position:HORIZONTAL 25

---

**NOTE.** *Literal strings (quoted) are case sensitive. For example: file names.*

---

- No embedded spaces are allowed between or within nodes.

correct: OUTPUT:TEXT:POSITION:HORIZONTAL 25

incorrect: OUTPUT: TEXT: POSITION: HOR IZONTAL 25

## IEEE 488.2 common commands

**Description** ANSI/IEEE Standard 488.2 defines the codes, formats, protocols, and usage of common commands and queries used on the interface between the controller and the instruments. The **TG8000** complies with this standard.

**Command and query structure** The syntax for an IEEE 488.2 common command is an asterisk (\*) followed by a command and, optionally, a space and parameter value. The syntax for an IEEE 488.2 common query is an asterisk (\*) followed by a query and a question mark. All of the common commands and queries are listed in the last part of the *Syntax and Commands* section.

- \*ESE 16

- \*CLS

The following are examples of common queries:

- \*ESR

- \*IDN

**Backus-Naur form definition** This manual may describe commands and queries using the Backus-Naur Form (BNF) notation. Table 2-2 defines the standard BNF symbols:

**Table 2: BNF symbols and meanings**

| Symbol | Meaning                             |
|--------|-------------------------------------|
| < >    | Defined element                     |
| ::=    | Is defined as                       |
|        | Exclusive OR                        |
| { }    | Group; one element is required      |
| [ ]    | Optional; can be omitted            |
| ...    | Previous element(s) may be repeated |
| ( )    | Comment                             |

**Message terminators** This manual uses<EOM> (End of message) to represent a message terminator.

| Symbol | Meaning            |
|--------|--------------------|
| <EOM>  | Message terminator |

The end-of-message terminator may be the ASCII code for line feed (LF) sent as the last data byte. The TG8000 always terminates messages with LF. It allows white space before the terminator.

## Constructed mnemonics

Some header mnemonics specify one of a range of mnemonics. For example, an audio channel mnemonic can be either CHANnel1, CHANnel2, CHANnel3, or CHANnel4. You use these mnemonics in the command just as you do any other mnemonic. For example, there is a:OUTP:EAUD:CHAN1:STAT query, and there is also an :OUTP:EAUD:CHAN2:STAT query. In the command descriptions, this list of choices is abbreviated as CHANnel<n>. The value of <n> is the upper range of valid suffixes. If the numeric suffix is omitted, the TG8000 uses the default value of "1".

## Block arguments

Several TG8000 commands use a block argument form:

| Symbol  | Meaning  |
|---------|--|
| <NZDig> | A non-zero digit character, in the range 1-9   |
| <Dig>   | A digit character, in the range 0-9  |
| <DChar> | A character with the hex equivalent of 00 through FF hexadecimal (0 through 255 decimal)                                     |
| <Block> | A block of data bytes, defined as:<br><Block> ::= {<br>#<NZDig><Dig>[<Dig>...][<DChar>...]  <br>#0[<DChar>...]<terminator> } |

<NZDig> specifies the number of <Dig> elements that follow. Taken together, the <Dig> elements form a decimal integer that specifies how many <DChar> elements follow.

## Special characters

The remote control interface handles characters differently than the front panel or SDP2000 software.

| Standard symbol (ASCII) | Remote control sequence |
|-------------------------|-------------------------|
| / (47)                  | 's                      |
| \ (92)                  | 'b                      |
| - (45)                  | 'h                      |
| ' (96)                  | "                       |
| : (58)                  | 'c                      |
| Line return             | ^ (94)                  |

Signal names created from SDP2000 software will be displayed as created. Signals created or displayed using the SCPI interface use the remote control sequence.

For example: "SinX/X" is displayed as "SinX/X" via the front panel or SDP2000 software; however, "SinX/X" is displayed as "SinX'sX" via when using SCPI.

Use the caret symbol "^" as a line return when naming buttons and signals.

## TG8000 remote commands

This section describes the remote command set used in the TG8000. The commands for the TG8000 are divided into the following eight groups:

- Common commands
- DIAGNOSTIC commands
- DISPLAY commands
- INSTRUMENT commands
- MASS MEMORY commands
- PROGRAM commands
- SENSE commands
- STATUS commands
- SYSTEM commands

The TG8000 can be controlled remotely through the Ethernet interface on the rear panel. Refer to the *TG8000 TV Signal Generator User Manual*, Tektronix part number 071-3036-XX, for detailed information about how to connect and set up for remote operation.

### Common commands

The Common commands have a "\*" prefix and address all of the installed modules.

#### Command tree

---

\*CLS

---

\*ESE()

---

\*ESR

---

\*IDN

---

\*OPC()

---

\*OPT

---

\*RST

---

\*SRE()

---

\*STB

---

\*TST

---

\*WAI

---

**Command description****\*CLS**

Clears SESR (Standard Event Status Register), the SBR (Status Byte Register), and Event Queue, which are used in the instrument status and event reporting system.

**\*ESE**

Sets the bits of the ESER (Event Status Enable Register) used in the status and events reporting system.

**\*ESE?**

Returns the contents of the ESER.

**\*ESR?**

Returns the contents of SESR (Standard Event Status Register) used in the status and events reporting system.

**\*IDN?**

Returns the ID information of the instrument. Query only command returns "TEKTRONIX,TG8000,0,0".

**\*OPC**

Causes bit 0 in the SESR (Standard Event Status Register) to be set, and the operation complete message to be issued, when all pending operations are finished.

**\*OPC?**

Waits until all pending operations are finished and returns a "1 " ASCII character.

**\*OPT?**

Lists all of the occupied slots in the TG8000 and the nomenclature, slot, hardware version, and software version of the installed modules.

Each field is a slot. Each field is separated by commas. The information within a field is colon delimited, as in "<CPU version>, <Frame FPGA>,<Front Panel version>,<SW version>, <compilation date>;<module name>[slot];<hardware version><hardware version string (often contains versions for additional FPGAs)>;<software version><software date string>",<repeat for additional slots>".

**\*RST**

Resets the instrument to the default state.

**\*SRE**

Sets the bits of the SRER (Service Request Enable Register).

**\*SRE?**

Returns the contents of SRER.

**\*STB?**

Returns the value of the SBR (Status Byte Register). Bit 6 of the SBR is read as a MSS (Master Status Summary) bit.

**\*TST?**

Self-test query. This query does not perform any tests; however, this query is accepted as a valid command to comply with IEEE 488.2 requirements.

**\*WAI**

Wait-to-continue command. This command is not necessary since the TG8000 handles commands sequentially; however, this query is accepted as a valid command to comply with IEEE 488.2 requirements.

## Calibration commands

Use these commands to perform calibration on the mainframe.

**Command tree**

---

**:CALibration**

---

**:FREQuency**

---

**:CALibration:FREQuency**

---

---

**NOTE.** *AGL7 or GPS7 must be installed for this command to function properly. Refer to the User Manual for calibration instructions.*

---

Initiates frequency calibration or query current frequency calibration value.

## DISPLAY commands

Use these commands to control the contrast and backlight settings of the LCD display.

**Command tree**

---

**:DISPlay**

---

**:BACKlight** ON | OFF

---

**:CONTRast** <numeric\_value>

---

**[ :WINDow ] [ :TEXT ] [ :DATA ]** <message>

---

|                            |  |
|----------------------------|--|
| <b>Command description</b> | <b>:DISPlay:BACKlight ON OFF</b>   |
|                            | Turns the LCD display backlight on or off. You can use 1 or 0 instead of ON or OFF.                            |
|                            | <b>:DISPlay:BACKlight?</b>   |
|                            | Returns the current status of the backlight.   |
|                            | <b>:DISPlay:CONTRast &lt;numeric_value&gt;</b>   |
|                            | Controls the intensity of the front-panel LCD display. The value should be an integer number between 1 and 40. |
|                            | <b>:DISPlay:CONTRast?</b>  |
|                            | Returns the current contrast value.  |

## INSTRUMENT commands

Use these commands to list, identify, and query modules.

|                     |                                       |
|---------------------|---------------------------------------|
| <b>Command tree</b> | <b>:INSTrument</b>                    |
|                     | <b>:CATalog?</b>                      |
|                     | <b>:FULL?</b>                         |
|                     | <b>[ :SElect] &lt;module_name&gt;</b> |
|                     | <b>:NSElect &lt;slot_number&gt;</b>   |

|                            |   |
|----------------------------|---|
| <b>Command description</b> | <b>:INSTrument:CATalog</b>  |
|                            | Returns a comma delimited list of all slots that are occupied by modules.   |
|                            | <b>:INSTrument:CATalog:FULL</b>   |
|                            | Returns a comma delimited list of module names and slot numbers, in pairs. The string type of module and the numeric suffix indicates the slot. For example, "AGL7:1", "HDVG7:2", where 1 indicates an AGL7 in slot 1, and a HDVG7 in slot 2. |
|                            | <b>:INSTrument[:SElect] &lt;module_name&gt;</b>   |
|                            | Selects a module by name.   |
|                            | <b>:INSTrument[:SElect]?</b>  |
|                            | Returns a module by name.   |
|                            | <b>:INSTrument:NSElect &lt;slot_number&gt;</b>  |
|                            | Select a module by slot number.   |

:INSTRument:NSElect?

Returns a module by slot number.

## MASS MEMORY commands

All signal movement within the memory is accomplished by copying all appropriate files of the named signal(s) to the new location. The signal tree is traversable and the use of wildcards permits copying or storing individual signals or the entire module signal list.

### Command tree

:MMEemory

|             |                               |
|-------------|-------------------------------|
| :CATalog    | [<directory_path>]            |
| :CDIRECTory | <directory_path>              |
| :COPY       | <source>,<destination>        |
| :DATA       | <file_name>,<block_data>      |
| :DELEte     | <file_name>                   |
| :LOAD       |                               |
| :DOWNload   | <block_data>                  |
| :PRESet     | <preset_ID> <preset_name>     |
| :SIGNa1     | <module_name>,<signal_name>   |
| :MDIRECTory | <directory_path>              |
| :MOVE       | <from_filename>,<to_filename> |
| :RDIRectory | <directory_path>              |
| :SIGNa1     |                               |
| :ACTive     | <signal_name>                 |
| :STORE      |                               |
| :PRESet     | <preset_ID> <preset_name>     |
| :PRESet     |                               |
| :CATalog    | <preset_ID>                   |
| :ALL?       |                               |
| :DELEte     | <preset_ID> <preset_name>     |
| :REName     | <preset_ID>,<preset_name>     |

The argument <signal\_name> is the full or partial path name to a signal found in a module. The argument <file\_name> is the MS-DOS compatible naming convention. For example, the syntax for a complete path would be: module\_type/signal\_set/button/test\_signal.

- module\_type is the directory level for a given module type
- signal\_set is the directory level for different sets of signals

- button is the directory level for different buttons
- test\_signal is the directory level for different test signals

**Command description**

**:MMEMory:CATalog? [<directory\_path>]**

Lists the current directory level. If at the top level, it returns a list of signal sets and the other files and directories for the module partition you are currently in. If in a Signal Set directory, it returns a list of buttons. If in a button directory, it returns a list of test signals.

Query response - <used\_bytes>, <available\_bytes>, <file\_name1>, <file\_size1>, <file\_name2>, <file\_size2>.

**:MMEMory:CDIRectory [<directory\_path>]**

Changes the current working directory.

**:MMEMory:CDIRectory?**

Returns the current working directory path.

**:MMEMory:COPY <source>,<destination>**

Copies a file within the TG8000 file system. Wildcards are not supported.

This command is provided to support sequence files and is not recommended for use with signal files.

**:MMEMory:DATA <file\_name>,<block\_data>**

Loads data created by a PC to the flash memory of the TG8000 with the specified file name. The file name should have an appropriate extension.

**:MMEMory:DATA? <file\_name>**

Lists the block data for the specified file name.

**:MMEMory:DELEte <file\_name>**

Removes files from the flash memory of the TG8000.

**:MMEMory:LOAD:DOWNload <block\_data>**

Adds DNL files to the TG8000.

**:MMEMory:LOAD:PREset <preset\_ID>|<preset\_name>**

Loads a saved preset. This command accepts the name of a previously saved preset. Current instrument settings are overwritten by this command. The preset\_IDs are from 0 to 15; 0 represents the Power on Default, 1 to 13 represent ordinary presets, 14 represents the User Default, and 15 represents the Factory Default.

**:MMEMory:LOAD:SIGNAL <module\_name>,<signal\_name>**

**:MMEMory:LOAD:SIGNAL <slot\_number>,<signal\_name>**

Loads the named signal into the named module. The current signal in the module is overwritten.

**:MMEMory:MDIRECTory <directory\_name>**

Creates a directory by the given name.

**:MMEMory:MOVE <from\_filename>,<to\_filename>**

Changes the name of the specified file.

**:MMEMory:RDIRECTory <directory\_name>**

Removes the specified directory from the file system.

**:MMEMory:SIGNAL:ACTIVE <slot\_number>|<module\_name>**

Lists the current output signal in the specified module.

**:MMEMory:STORE:PRESet <preset\_ID>|<preset\_name>**

Saves all the instrument settings with the specified preset ID or preset name. The preset\_IDs are from 0 to 15; 0 represents the Power on Default, 1 to 13 represent ordinary presets, 14 represents the User Default, and 15 represents the Factory Default.

**:MMEMory:PRESet:CATALOG? <preset\_ID>**

Lists the name of the specified preset saved in the TG8000. The preset\_IDs are from 0 to 15; 0 represents the Power on Default, 1 to 13 represent ordinary presets, 14 represents the User Default, and 15 represents the Factory Default.

**:MMEMory:PRESet:CATALOG:ALL**

Lists the names of all presets saved in the TG8000.

**:MMEMory:PRESet:DELEte <preset\_ID>|<preset\_name>**

Deletes the specified preset saved in the TG8000. The preset\_IDs are from 0 to 15; 0 represents the Power on Default, 1 to 13 represent ordinary presets, 14 represents the User Default, and 15 represents the Factory Default.

**:MMEMory:PRESet:REName <preset\_ID>,<preset\_name>**

Renames the specified preset saved in the TG8000. The preset\_IDs are from 0 to 15; 0 represents the Power on Default, 1 to 13 represent ordinary presets, 14 represents the User Default, and 15 represents the Factory Default.

## PROGRAM commands

Use these commands to access and run programs called "sequences".

### Command tree

|              |   |
|--------------|---|
| :PROGram     |   |
| [:SELEcted]? |   |
| :NAME        | <progrname>                                   |
| :STATe       | RUN   PAUSE   STOP  <br>CONTinue              |
| :WAIT?       |   |
| :EXPLicit    |   |
| :STATe       | <progrname>, RUN   PAUSE  <br>STOP   CONTinue |
| :WAIT?       |   |

### Command description

:PROGram[:SELEcted]:NAME <program>

Selects the default sequence file.

:PROGram[:SELEcted]:NAME?

Returns the name of the default sequence file.

:PROGram[:SELEcted]:STATe RUN|PAUSE|STOP|CONTinue

Controls execution of the default sequence. The choices are Run, PAUSE, STOP, and CONTinue.

:PROGram[:SELEcted]:STATe?

Returns the condition of the execution of the default sequence.

:PROGram[:SELEcted]:WAIT

Holds off further commands until the default sequence completes.

:PROGram[:SELEcted]:WAIT

If sequence has terminated or paused, this returns 1. If sequence is running, this returns 0.

:PROGram:EXPLicit:STATe <progrname> RUN|PAUSE|STOP|CONTinue

Controls execution of the specified sequence. The choices are RUN, PAUSE, STOP, and CONTinue.

:PROGram:EXPLicit:STATe? <progrname>

Returns the condition of the execution of the specified sequence.

:PROGram:EXPLicit:WAIT <progrname>

Holds off further commands until the specified sequence completes.

**:PROGram:EXPLicit:WAIT? <progrname>**

If sequence has terminated or paused, this returns 1. If sequence is running, this returns 0.

## SENSE commands

Use these queries to list which generator modules are using which frame reset signals.

### Command tree

**:SENSe**

**:ROSCillator**

**:FRAMe[3]**

**:CATALog?**

**:FREQUency?**

### Command description

**:SENSe:ROSCillator:FRAMe<n>:CATALog**

Lists the modules using the frame reset signal <n>. The suffix identifies which of three frame reset signals to query.

**:SENSe:ROSCillator:FRAMe<n>:FREQUency**

Lists the specific frame reset signal frequency.

## STATUS commands

Use these commands to address the instrument status and event queue.

### Command tree

**:STATUs**

**:OPERation**

**[ :EVENT ]?**

**:CONDition?**

**:ENABle** <numeric\_value>

**:PTRansition** <numeric\_value>

**:NTRansition** <numeric\_value>

**:MAP** <numeric\_value>,  
<numeric\_value>

**:INSTrument**

|               |                                     |
|---------------|-------------------------------------|
| [:EVENT]?     |                                     |
| :CONDition?   |                                     |
| :ENABle       | <numeric_value>                     |
| :PTRansition  | <numeric_value>                     |
| :NTRansition  | <numeric_value>                     |
| :PRESet       |                                     |
| :QUEue        |                                     |
| [:NEXT]       |                                     |
| :ENABle       |                                     |
| :QUESTionable |                                     |
| [:EVENT]?     |                                     |
| :CONDition    |                                     |
| :ENABle       | <numeric_value>                     |
| :PTRansition  | <numeric_value>                     |
| :NTRansition  | <numeric_value>                     |
| :MAP          | <numeric_value>,<br><numeric_value> |
| :INSTrument   |                                     |
| [:EVENT]?     |                                     |
| :CONDition?   |                                     |
| :ENABle       | <numeric_value>                     |
| :PTRansition  | <numeric_value>                     |
| :NTRansition  | <numeric_value>                     |

## Command description

**PRESet.** The OPERation node covers areas of instrument operational events. This node reports such items as signal settling, calibration, or running a sequence **QUESTionable**.

**QUESTionable.** The QUESTionable node covers areas of questionable conditions that exist within the instrument. Questionable conditions might cause you to be unsure of the quality of the generated signals.

**Subnodes.** Each node has a set of subnodes that query the contents, or control the involvement, of each bit:

- ENABle selects which bits are active in reporting the status.
- EVENT is a destructive query only of the status.
- CONDition is a nondestructive query only of the status.
- PTRansition allows a status to become true on a positive transition of the event.

- **NTRansition** allows a status to become true on a negative transition of the event.
- **MAP** reassigns event reporting at the top level of the status hierarchy.
- **INSTRument**. Both main nodes have this sub node that summarizes the operational and questionable condition of the instrument. Each bit in these two registers represents a slot in the TG8000. The summation of each register will feed into bit 13 of its respective parent register.

**PRESet.** All of the enable registers are set to TRUE so that they return to power-up conditions.

**QUEue.** **QUEue:ENABLe** enables certain events or error conditions to be reported. Values that are not explicitly specified are not reported. **STATus:QUEue[:NEXT]** is the same as **SYSTem:ERRor**.

Due to the repetitiveness of this subsystem, the details will be covered for the nodes **EVENTt**, **CONDition**, **ENABLe**, **PTRansition**, **NTRanstion**, and **MAP**. The syntax and examples do not include the full command. Refer to the Command Tree to derive what commands would be appropriate. The following text then describes each major branch within the **STATus** subsystem.

**[ :EVENT ]?**

Performs a destructive reading of the specific event status register. The contents are cleared by reading or by **\*CLS**.

**:CONDition?**

Performs a nondestructive reading of the specified condition register. Contents are cleared as a result of **\*CLS**.

**:ENABLe <numeric\_value>**

Sets the register that enables the individual bits within the Event Register, which records event transition.

**:ENABLe?**

Returns the current Event Register settings.

**:PTRansition <numeric\_value>**

Sets the transition register for enabling events to set bits true during a positive transition.

**:PTRansition?**

Returns the transition register for enabling events to set bits true during a positive transition.

**:NTRansition <numeric\_value>**

Sets the transition register for enabling events to set bits true during a negative transition.

:NTRansition?

Returns the transition register for enabling events to set bits true during a negative transition.

:STATus:OPERation:MAP <bit>,<event>

:STATus:QUESTionable:MAP <bit>,<event>

Reassigns events to bits in the OPERation or QUESTionable registers.

## SYSTEM commands

Use these commands to query the system related information and set the front-panel lock function.

### Command tree

|                   |           |
|-------------------|-----------|
| :SYSTem           |           |
| :ALARm            |           |
| :AGLOutput        |           |
| :SELEct           |           |
| :LOL[:STATe]      |           |
| NLOL[:STATe]      |           |
| :NOSignal[:STATe] |           |
| [:STATe]          |           |
| :GPIOutput        |           |
| :SELEct           |           |
| :FAN[:STATe]      | <boolean> |
| :LOL[:STATe]      | <boolean> |
| :NLOL[:STATe]     | <boolean> |
| :NOSignal[:STATe] | <boolean> |
| [:STATe]          | <boolean> |
| :RESEt            |           |
| [:STATe]?         |           |
| :BEEPER           | <boolean> |
| :ERROR            |           |
| [:NEXT]?          |           |
| :HELP             |           |
| :SYNTax?          |           |
| :KLOCK            |           |
| :STATE            | ON   OFF  |

|            |
|------------|
| :REStArt   |
| :FACTory   |
| [ :NORMal] |
| :UPGRade   |
| :USB       |
| :MOUNt     |
| [ :STATe]? |
| :UNMOUNt   |
| :VERSion?  |

**Command description**

:SYSTem:ALARm:AGLOutput:SELEct:LOL[:STATe] <boolean>

Enables the loss-of-lock AGL output glitch alarm.

:SYSTem:ALARm:AGLOutput:SELEct:NLOL[:STATe] <boolean>

Enables the near-loss-of-lock AGL output glitch alarm.

:SYSTem:ALARm:AGLOutput[:STATe] <boolean>

Enables/disables the AGL black output glitch alarm feature.

:SYSTem:ALARm:AGLOutput:SELEct:NOSignal[:STATe] <boolean>

Enables the no-signal AGL output glitch alarm.

:SYSTem:ALARm:GPIOutput:SELEct:FAN[:STATe] <boolean>

Enables the fan fault GPI output alarm.

:SYSTem:ALARm:GPIOutput:SELEct:LOL[:STATe] <boolean>

Enables the loss-of-lock GPI output alarm.

:SYSTem:ALARm:GPIOutput:SELEct:NLOL[:STATe] <boolean>

Enables the near-loss-of-lock GPI output alarm.

:SYSTem:ALARm:GPIOutput:SELEct:NOSignal[:STATe] <boolean>

Enables the no-signal GPI output alarm.

:SYSTem:ALARm:GPIOutput[:STATe] <boolean>

Enables/disables the GPI output alarm feature.

:SYSTem:ALARm:RESEt

Reset the alarm state back to “No Alarm”.

:SYSTem:ALARm[:STATe]?

Returns the current alarm state. Possible values are:

- No Alarm
- Genlock: Near Loss of Lock
- Genlock: Loss of Lock
- No Signal
- Fan Fault

**:SYSTem:BEEPer <boolean>**

Enables/disables the front panel beeper alarm.

**:SYSTem:ERRor?**

Lists the next event in the Error/Event queue. Queue is cleared at power up, upon \*CLS, and upon reading the last item.

**:SYSTem:HELP:SYNTax?**

Lists correct command syntax.

**:SYSTem:KLOCK:STATe ON|OFF**

Locks or unlocks the front-panel buttons. You can use 1 or 0 instead of ON or OFF.

**:SYSTem:KLOCK:STATe?**

Returns the current status of the front-panel buttons.

**:SYSTem:REStArt[:NORMal]**

Restarts the instrument application into normal mode. This is the same as holding the MODULE, FORMAT and ENABLE buttons to restart the instrument.

**:SYSTem:REStArt:FACTory**

Restarts the instrument into factory mode.

**:SYSTem:UPGRade**

Initiates network firmware upgrade process.

**:SYSTem:USB:MOUNt**

Mounts a flash drive attached to the front-panel USB port.

**:SYSTem:USB[:STATe]?**

Returns the current state of any flash drive connected to the front-panel USB port. Possible return values are:

- Mounted
- Not Mounted
- Not Connected

:SYSTem:USB:UNMOUNT

Unmounts a flash drive attached to the front-panel USB port.

:SYSTem:VERSion?

Lists the SCPI compliance version. Query only.

# AG7 Audio Generator module remote commands

This section describes the command sets used for the AG7 Audio Generator module remote operation. The commands for the module are divided into the following groups:

- OUTPUT commands
- SENSE commands

## OUTPUT commands

Use these commands to set the parameters for each audio channel, the audio data resolution, and the synchronization state relative to the frame reset signals.

### Command tree

|               |                                 |
|---------------|---------------------------------|
| :OUTPut       |                                 |
| :AUDio        |                                 |
| :CHANnel<n>   |                                 |
| :AMPLitude    | <numeric_value>                 |
| :FREQuency    | <numeric_value>                 |
| :CLICk        | 0   1   2   3   4               |
| :NBITS        |                                 |
| :SYNChronized | FREErun   FRAME_ONE   FRAME_TWO |

### Command description

:OUTPut:AUDio:CHANnel<n>:AMPLitude <numeric\_value>

Sets the amplitude of a specific audio channel. The numeric value can range from -60 dBFS to 0 dBFS in 1 dBFS steps. The <n> in the command represents the channel number. You can use any channel number from 1 through 8.

:OUTPut:AUDio:CHANnel<n>:AMPLitude?

Returns the amplitude of a specific audio channel. The <n> in the command represents the channel number. You can use any channel number from 1 through 8.

:OUTPut:AUDio:CHANnel<n>:FREQuency <numeric\_value>

Sets the frequency of a specific audio channel. The unit is Hertz. The choices are 0, 50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1000, 1200, 1500, 1600, 2000, 2400, 3000, 3200, 4000, 4800, 5000, 6000, 8000, 9600, 10000, 12000, 15000, 16000, and 20000. The <n> in the command represents the channel number. You can use any channel number from 1 through 8.

**:OUTPut:AUDio:CHANnel<n>:FREQuency?**

Returns the frequency of a specific audio channel. The <n> in the command represents the channel number. You can use any channel number from 1 through 8.

**:OUTPut:AUDio:CHANnel<n>:CLICK 0|1|2|3|4**

Sets the audio click of a specific audio channel. The choices are 1 sec to 4 sec, or 0. When 1 to 4 is selected, the audio click becomes valid. When audio click is valid, audio tone is turned off for 0.25 seconds around the time of the click. The <n> in the command represents the channel number. You can use any channel number from 1 through 8.

**:OUTPut:AUDio:CHANnel<n>:CLICK?**

Returns the audio click setting for the specified audio channel. The <n> in the command represents the channel number. You can use any channel number from 1 through 8.

**:OUTPut:AUDio:NBITs 20|24**

Sets the sample bits of the audio signal. The choices are 20 bits or 24 bits.

**:OUTPut:AUDio:NBITs?**

Returns the sample bits of the audio signal.

**:OUTPut:AUDio:SYNChronized FREErun|FRAME\_ONE|FRAME\_TWO**

Selects the frame reset signal to synchronize with the audio signal. The choices are FREErun (free run), FRAME\_ONE (frame reset signal 1), and FRAME\_TWO (frame reset signal 2). For FREErun, the audio signal is not synchronized with any of the frame reset signals.

**:OUTPut:AUDio:SYNChronized?**

Returns the frame reset signal synchronized with the audio signal.

## SENSE commands

Use these commands to adjust the timing offset of the audio outputs relative to the internal reference signal (frame reset signal).

### Command tree

|                    |                              |
|--------------------|------------------------------|
| <b>:SENSe</b>      |                              |
| <b>:CORRection</b> |                              |
| <b>:MDElay</b>     | <b>&lt;numeric_value&gt;</b> |
| <b>:STEP</b>       | <b>&lt;numeric_value&gt;</b> |

|                            |  |
|----------------------------|--|
| <b>Command description</b> | <b>:SENSe:CORRection:MDElay &lt;numeric_value&gt;</b><br><br>Sets the timing offset of the audio outputs. The numeric values range from -160 ms to 160 ms in 1ms steps. You can use UP, DOWN, or DEF instead of the numeric values.<br><br><b>:SENSe:CORRection:MDElay?</b><br><br>Returns the timing offset of the audio outputs.<br><br><b>:SENSe:CORRection:MDElay:STEP &lt;numeric_value&gt;</b><br><br>Sets the step increment used by the UP or DOWN commands. The unit is microseconds.<br><br><b>:SENSe:CORRection:MDElay:STEP?</b><br><br>Returns the step increment used by the UP or DOWN commands. |
|----------------------------|--|

## AGL7 Analog Genlock module remote commands

This section describes the commands used for the AGL7 Analog Genlock module remote operation. The commands for the module are divided into the following four groups:

- INPUT commands
- SOURCE commands
- OUTPUT commands
- SENSE commands

### INPUT commands

Use these commands to set the input standard and input connector for the genlock signal.

#### Command tree

|               |   |
|---------------|---|
| :INPut        |   |
| :REFeRence    |   |
| :STANdard     | NBURst   PBURst   N318M  <br>NSYNc   PSYNc   HDSYNc |
| :STATUs?      |   |
| :HDSYNc?      |   |
| :SELeCt       | REFeRence   CW                                      |
| :SOURce       | INteRna1   EXteRna1                                 |
| :CWAVE        |   |
| :FRAMe        | 2.997   3.0   6.25   14.985<br>  15.0   0           |
| :FREQuency    |   |
| :LLOSS:ACTIon | INteRna1   STAY                                     |

#### Command description

**:INPut:REFeRence:STANdard**  
NBURst | PBURst | N318M | NSYNc | PSYNc | HDSYNc

Selects the input standard expected at the REF connector. The choices are NBURst (burst lock to NTSC black burst), PBURst (burst lock to PAL black burst), N318M (burst lock to NTSC black burst with 10 field ID), NSYNc (sync lock to NTSC black burst), PSYNc (sync lock to PAL black burst), and HDSYNc (lock to HDTV trilevel sync).

**:INPut:REFeRence:STANdard?**

Returns the current input standard.

**:INPut:REFeRence:STATus?**

Returns the current genlock status. The available responses are INTERNAL, ABSent, UNLOCKed, or LOCKed.

**:INPut:REFeRence:HDSYnc?**

Returns the format of the HDTV trilevel sync signal currently inputted. The available responses are HD1080\_60I, HD1080\_59I, HD1080\_50I, HD1080\_24SF, HD1080\_23SF, HD1080\_30P, HD1080\_29P, HD1080\_25P, HD1080\_24P, HD1080\_23P, HD720\_60P, HD720\_59P or HD720\_50P.

**:INPut:SELEct REF|CW**

Sets the reference input for the genlock source. For REF, a black burst signal or HDTV trilevel signal applied to the REF connector is used. For CW, a CW signal applied to the CW connector is used for the genlock source.

**:INPut:SELEct?**

Returns the reference input currently used.

**:INPut:SOURce INTERNAL|EXTERNAL**

Determines whether the internal signal or external signal is used as a reference signal.

**:INPut:SOURce?**

Returns the signal source (internal or external) used as a reference signal.

**:INPut:CWAVE:FRAME 2.997|3.0|6.25|14.985|15.0|0**

Sets the frame reset signal frequency used when a CW signal is applied to the CW connector. The choices are 2.997 Hz, 3.0 Hz, 6.25 Hz, 14.985 Hz, and 15.0 Hz. For 0, the instrument is set to Keep Composite Timing.

**:INPut:CWAVE:FRAME?**

Returns the current frequency of the frame reset signal for the CW input.

**:INPut:CWAVE:FREQUENCY?**

Returns the frequency of the CW signal currently applied. The available responses are 1.0, 3.58, 4.43, 5.0, or 10.0.

**:INPut:LLOSS:ACTion INTERNAL|STAY**

Sets the instrument action when a loss of genlock state occurs. For INTERNAL, the instrument automatically switches to the internal reference. For STAY, the instrument maintains the current state.

**:INPut:LLOSS:ACTion?**

Returns the current instrument action when a loss of genlock state occurs. The available responses are INT or STA.

## SOURCE commands

Use these commands to set the timing offset of the genlock input signal relative to the internal reference signal (frame reset signal).

Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the setting range.

### Command tree

|             |                 |
|-------------|-----------------|
| :SOURCE     |                 |
| :CORREction |                 |
| :MDELay     |                 |
| :HORizontal | <numeric_value> |
| :STEP       | <numeric_value> |
| :VERTical   | <numeric_value> |
| :STEP       | <numeric_value> |

### Command description

:SOURCE:CORREction:MDELay:HORizontal <numeric\_value>

Sets the horizontal timing offset of the genlock input signal relative to the internal reference signal. The units are microseconds. You can use UP, DOWN, or DEF instead of a numeric value.

:SOURCE:CORREction:MDELay:HORizontal?

Returns the horizontal timing offset of the genlock input signal.

:SOURCE:CORREction:MDELay:HORizontal:STEP <numeric\_value>

Sets the step increment used by the UP or DOWN command. The units are microseconds. You can use MIN, MAX, or DEF instead of a numeric value.

:SOURCE:CORREction:MDELay:HORizontal:STEP?

Returns the step increment used by the UP or DOWN command.

:SOURCE:CORREction:MDELay:VERTical <numeric\_value>

Sets the vertical timing offset of the genlock input signal relative to the internal reference signal. The units are line numbers. You can use UP, DOWN, or DEF instead of a numeric value.

:SOURCE:CORREction:MDELay:VERTical?

Returns the vertical timing offset of the genlock input signal.

:SOURCE:CORREction:MDELay:VERTical:STEP <numeric\_value>

Sets the step increment used by the UP or DOWN command. The units are line numbers. You can use MIN, MAX, or DEF instead of a numeric value.

:SOURCE:CORREction:MDELay:VERTical:STEP?

Returns the step increment used by the UP or DOWN command.

## OUTPUT commands

Use these commands to set the video standard and the type of signal for the BLACK outputs.

### Command tree

|            |  |
|------------|--|
| :OUTPut1   |  |
| :STANDARD  | NTSC PAL NTSC_NSU  |
| :OUTPut2   |  |
| :STANDARD  | NTSC   PAL   NTSC_NS  <br>HDSync   |
| :OUTPut3   |  |
| :STANDARD  | BB   HD1080_60I  <br>HD1080_59I   HD1080_50I<br>  HD1080_24SF   HD1080_30P<br>  HD1080_29P   HD1080_25P<br>  HD1080_24P   HD1080_23P<br>  HD720_60P   HD720_59P  <br>HD720_50P |
| :OUTPUT<n> |  |
| :SIGNAL    | BB   BB_FREF   BB_NO_FREE  |

### Command description

:OUTPut1:STANDARD NTSC|PAL|NTSC\_NSU

Sets the video standard for the BLACK 1 output. The choices are NTSC, PAL, and NTSC\_NSU (NTSC no setup).

:OUTPut1:STANDARD?

Returns the video standard for the BLACK 1 output.

:OUTPut2:STANDARD NTSC|PAL|NTSC\_NSU|HDSync

Sets the video standard for the BLACK 2 output. The choices are NTSC, PAL, NTSC\_NSU (NTSC no setup), and HDSync (HDTV trilevel sync).

:OUTPut2:STANDARD?

Returns the video standard for the BLACK 2 output.

:OUTPut3:STANDARD BB|HD1080\_60I|HD1080\_59I|HD1080\_50I|  
HD1080\_24SF|HD1080\_30P|HD1080\_29P|  
HD1080\_25P|HD1080\_24P|HD1080\_23P|  
HD720\_60P|HD720\_59P|HD720\_50P

Sets the video standard for the BLACK 3 output. The choices are BB (black burst) and HD1080\_60I to HD720\_50P.

**:OUTPut3:STANdard?**

Returns the video standard for the BLACK 3 output.

**:OUTPut<n>:SIGNal BB|BB\_FREF|BB\_NO\_FREF**

Sets what kind of signal is available from a specific BLACK output. The <n> in the command represents the connector number. You can use connector number 1 and 2.

If the standard is NTSC or NTSC\_NSU, the options are BB (black burst) or BB\_FREF (black burst with field reference).

If the standard is PAL, the options are BB (black burst) or BB\_NO\_FREF (black burst no field reference).

**:OUTPut<n>:SIGNal?**

Returns the current output signal. The <n> in the command represents the connector number. You can use connector number 1 and 2.

## SENSE commands

Use these commands to set the timing offset of the BLACK outputs relative to the internal reference signal (frame reset signal).

Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the setting range.

### Command tree

|                        |                              |
|------------------------|------------------------------|
| <b>:SENSe&lt;n&gt;</b> |                              |
| <b>:CORRection</b>     |                              |
| <b>:MDElay</b>         |                              |
| <b>:HORizontal</b>     | <b>&lt;numeric_value&gt;</b> |
| <b>:STEP</b>           | <b>&lt;numeric_value&gt;</b> |
| <b>:VERTical</b>       | <b>&lt;numeric_value&gt;</b> |
| <b>:STEP</b>           | <b>&lt;numeric_value&gt;</b> |

**Command description**    **:SENSe<n>:CORRection:MDElay:HORizontal <numeric\_value>**

Sets the horizontal timing offset of a specific BLACK output. The units are microseconds. You can use UP, DOWN, or DEF instead of a numeric value. See page 2-2 for additional detail on UP, DOWN, and DEF. If the argument exceeds the horizontal time value, then the vertical offset is adjusted to accommodate the requested offset. The <n> in the command represents the connector number. You can use any connector number from 1 through 3.

**:SENSe<n>:CORRection:MDElay:HORizontal**

Returns the horizontal timing offset of a specific BLACK output. The <n> in the command represents the connector number. You can use any connector number from 1 through 3.

**:SENSe<n>:CORRection:MDElay:HORizontal:STEP <numeric\_value>**

Sets the step increment used by the UP or DOWN command. The units are microseconds. You can use MIN, MAX, or DEF instead of a numeric value. The <n> in the command represents the connector number. You can use any connector number from 1 through 3.

**:SENSe<n>:CORRection:MDElay:HORizontal:STEP?**

Returns the step increment used by the UP or DOWN command. The <n> in the command represents the connector number. You can use any connector number from 1 through 3.

**:SENSe<n>:CORRection:MDElay:VERTical <numeric\_value>**

Sets the vertical timing offset of a specific BLACK output. The units are horizontal lines. You can use UP, DOWN, or DEF instead of a numeric value. The <n> in the command represents the connector number. You can use any connector number from 1 through 3.

**:SENSe<n>:CORRection:MDElay:VERTical?**

Returns the vertical timing offset of a specific BLACK output. The <n> in the command represents the connector number. You can use any connector number from 1 through 3.

**:SENSe<n>:CORRection:MDElay:VERTical:STEP <numeric\_value>**

Sets the step increment used by the UP or DOWN commands. The units are horizontal lines. You can use MIN, MAX, or DEF instead of a numeric value. The <n> in the command represents the connector number. You can use any connector number from 1 through 3.

**:SENSe<n>:CORRection:MDElay:VERTical:STEP?**

Returns the step increment used by the UP or DOWN commands. The <n> in the command represents the connector number. You can use any connector number from 1 through 3.

## ATG7 Analog Test Generator module remote commands

This section describes the command sets used for the ATG7 Analog Test Generator module remote operation. The commands for the module are divided into the following three groups:

- MASS MEMORY commands (Refer to the *TG8000 Multiformat Test Signal Generator User Manual*)
- OUTPUT commands
- SENSE commands

### MASS MEMORY commands

Two MASS MEMORY commands are listed here for your reference. You can use these to load and query the output test signal. Detailed information for using these commands are located in the *TG8000 Multiformat Test Signal Generator User Manual*.

`:MMEMory:LOAD:SIGNal <module_name>,<signal_name>`

`:MMEMory:LOAD:SIGNal <slot_number>,<signal_name>`

Loads a signal into the specified module.

`:MMEMory:SIGNal:ACTive <slot_number>|<module_name>`

Returns the current output signal of the specified module.

### OUTPUT commands

Use these commands to control the output parameters of the module. These include ID text overlay and APL features.

#### Command tree

|                               |   |
|-------------------------------|---|
| <code>:OUTPut&lt;n&gt;</code> |   |
| <code>:STANdard</code>        | NTSC NTSC_NSU PAL   |
| <code>:SIGNal</code>          | BB   BB_FREF   BB_NO_FREF  <br>SYNC   BLANKING   SUBCARRIER<br>  H_DRIVE   V_DRIVE   FREF  <br>PAL_PULSE (n=1,2)        |
|                               | BB   BB_NO_FREF   CB100_PER<br>  CB75_PER   CB_SMPTE  <br>FF40PER   CB100_OR   CB75_OR<br>  OTHER_ONE   OTHER_TWO (n=4) |
| <code>:OVERlay</code>         |   |

|             |  |
|-------------|--|
| :BLINK      |  |
| :STATE      | ON   OFF                                     |
| :PERiod     | <numeric_value>                              |
| :TEXT       |  |
| :STATE      | ON   OFF                                     |
| :DATA       | <string>                                     |
| :POSition   |  |
| :HORizontal | <numeric_value>                              |
| :VERTical   | <numeric_value>                              |
| :SAVE       |  |
| :APL        |  |
| :MODE       | APL_OFF   APL_HIGH   APL_LOW<br>  APL_BOUNCE |
| :PERiod     | <numeric_value>                              |

## Command description

:OUTPut<n>:STANdard NTSC|NTSC\_NSU|PAL

Sets the video standard for the BLACK 1, BLACK 2, or BARS output. The choices are NTSC, NTSC\_NSU (NTSC no setup), or PAL. The <n> in the command represents the output connector type and you can specify 1, 2, or 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, and "4" represents the BARS connector.

:OUTPut<n>:STANdard?

Returns the video standard for the BLACK 1, BLACK 2, or BARS output. The <n> in the command represents the output connector and you can specify 1, 2, or 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, and "4" represents the BARS connector.

:OUTPut<n>:SIGNal BB|BB\_FREF|BB\_NO\_FREF|SYNC|BLANKING|  
SUBCARRIER|H\_DRIVE|V\_DRIVE|FREF| PAL\_PULSE  
(n=1,2) BB|BB\_NO\_FREF|CB100\_PER|CB75\_PER|CB\_SMPTE|  
FF40PER|CB100\_OR|CB75\_OR|OTHER\_ONE| OTHER\_TWO (n=4)

Sets the signal available from the BLACK 1, BLACK 2, or BARS output. The <n> in the command represents the output connector and you can specify 1, 2, or 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, and "4" represents the BARS connector.

If "1" or "2" is specified for the connector type, the choices are BB (black burst), BB\_FREF (black burst with field reference), BB\_NO\_FREF (black burst no field reference), SYNC (composite sync), BLANKING (composite blanking), SUBCARRIER (subcarrier), H\_DRIVE (H drive), V\_DRIVE (V drive), FREF (Color Frame ID), or PAL PULSE (PAL pulse).

If "4" is specified for the connector type, the choices are BB (black burst), BB\_FREF (black burst with field reference), BB\_NO\_FREF (black burst no field reference), CB100PER (100% color (or colour) bars), CB75PER (75% color (or colour) bars), CB\_100\_OR (100% colour bars over red), CB\_75\_OR (75% colour bars over red), CB\_SMPTE (SMPTE color bars), FF40PER (40% flat field), OTHER\_ONE (Other 1), or OTHER\_TWO (Other 2).

:OUTPut<n>:SIGNa1

Returns the current output signal for the BLACK 1, BLACK 2, or BARS output. The <n> in the command represents the output connector and you can specify 1, 2, or 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, and "4" represents the BARS connector.

:OUTPut<n>:OVERlay:BLINK:STATE ON|OFF

Turns the text blinking mode on or off. You can also use 1 or 0 instead of ON or OFF. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:OVERlay:BLINK:STATE?

Returns the current state of the text blinking mode. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:OVERlay:BLINK:PERiod <numeric\_value>

Sets the blinking interval of the text blinking mode. You can set the value as 0.5 seconds or 1.0 seconds. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:OVERlay:BLINK:PERiod?

Returns the blinking interval of the text blinking mode. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:TEXT:STATE ON|OFF

Turns the text overlay on the video signal on or off. You can also use 1 or 0 instead of ON or OFF. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:TEXT:STATE?

Returns the current text overlay state. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:TEXT:DATA <string>

Sets the current string for the text overlay mode. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector. The text string may contain up to 18 characters.

:OUTPut<n>:TEXT:DATA?

Returns the current string for the text overlay mode. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:TEXT:POSition:HORizontal <numeric\_value>

Sets the text horizontal position in the video signal. The unit is percent of active picture width. You can set the position from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of the numeric value. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:TEXT:POSition:HORizontal?

Returns the current text horizontal position in the video signal. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:TEXT:POSition:VERTical <numeric\_value>

Sets the text vertical position in the video signal. The unit is percent of active picture height. You can set the position from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of the numeric value. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:TEXT:POSition:VERTical?

Returns the current text vertical position in the video signal. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:TEXT:SAVE

Saves the current text and its display position to the signal file. There are no arguments. The <n> in the command represents the output connector and you can specify 3 or 4. "3" represents the SIGNAL connector and "4" represents the BARS connector.

:OUTPut<n>:APL:MODE

APL\_OFF | APL\_HIGH | APL\_LOW | APL\_BOUNCE | BOUNCE

Sets the output mode of the APL signal. Refer to *Operating Basics* in the TG8000 User Manual for detailed information about each mode. You can only specify "3" (SIGNAL connector) for the <n>.

:OUTPut<n>:APL:MODE?

Returns the current output mode of the APL signal. You can specify only "3" (SIGNAL connector) for the <n>.

:OUTPut<n>:APL:PERiod <numeric\_value>

Sets the time interval between two signals when they are output in the bounce modes. You can set the value from 0.5 seconds to 2.0 seconds in 0.5 seconds steps. You can specify only "3" (SIGNAL connector) for the <n>.

:OUTPut<n>:APL:PERiod

Returns the time interval between two signals when they are output in the bounce modes. You can specify only "3" (SIGNAL connector) for the <n>.

## SENSE commands

Use these commands to adjust the timing offset of each output relative to the internal reference signal (frame reset signal).

Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the timing offset range.

### Command tree

|             |                 |
|-------------|-----------------|
| :SENSe<n>   |                 |
| :CORRection |                 |
| :MDElay     |                 |
| :HORizontal | <numeric_value> |
| :STEP       | <numeric_value> |
| :VERTical   | <numeric_value> |
| :STEP       | <numeric_value> |

### Command description

:SENSe<n>:CORRection:MDElay:HORizontal <numeric\_value>

Sets the horizontal timing offset for the specified output. The timing resolution is clock-cycles. The unit is microseconds. You can use UP, DOWN, or DEF instead of the numeric values. See page 2-2 for additional detail on UP, DOWN, and DEF. If the argument exceeds the horizontal time value, then the vertical offset is adjusted to accommodate the requested offset. The <n> in the command represents the output connector and you can specify from 1 through 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, "3" represents the SIGNAL connector, and "4" represents the BARS connector.

:SENSe<n>:CORRection:MDElay:HORizontal?

Returns the horizontal timing offset of the specified output. The <n> in the command represents the output connector and you can specify from 1 through 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, "3" represents the SIGNAL connector, and "4" represents the BARS connector.

**:SENSe<n>:CORRection:MDElay:HORizontal:STEP <numeric\_value>**

Sets the step increment used by the UP or DOWN commands. The unit is microseconds. You can use UP, DOWN, or DEF instead of the numeric values. The <n> in the command represents the output connector and you can specify from 1 through 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, "3" represents the SIGNAL connector, and "4" represents the BARS connector.

**:SENSe<n>:CORRection:MDElay:HORizontal:STEP?**

Returns the step increment used by the UP or DOWN commands. The <n> in the command represents the output connector and you can specify from 1 through 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, "3" represents the SIGNAL connector, and "4" represents the BARS connector.

**:SENSe<n>:CORRection:MDElay:VERTical <numeric\_value>**

Sets the vertical timing offset of the specified output. The argument can be a floating point value that is translated into integer lines with a horizontal offset. You can use UP, DOWN, or DEF instead of a numeric value. The <n> in the command represents the output connector and you can specify from 1 through 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, "3" represents the SIGNAL connector, and "4" represents the BARS connector.

**:SENSe<n>:CORRection:MDElay:VERTical?**

Returns the vertical timing offset of the specified output. The <n> in the command represents the output connector and you can specify from 1 through 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, "3" represents the SIGNAL connector, and "4" represents the BARS connector.

**:SENSe<n>:CORRection:MDElay:VERTical:STEP <numeric\_value>**

Sets the step increment used by the UP or DOWN commands. You can use MIN, MAX, or DEF instead of the numeric values. The <n> in the command represents the output connector and you can specify from 1 through 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, "3" represents the SIGNAL connector, and "4" represents the BARS connector.

**:SENSe<n>:CORRection:MDElay:VERTical:STEP?**

Returns the step increment used by the UP or DOWN commands. The <n> in the command represents the output connector and you can specify from 1 through 4. "1" represents the BLACK 1 connector, "2" represents the BLACK 2 connector, "3" represents the SIGNAL connector, and "4" represents the BARS connector.

# AVG7 Analog Video Generator module remote commands

This section describes the remote commands used to control the AVG7 Analog Video Generator module remotely. The commands to the module are divided into the following three groups:

- MASS MEMORY commands (Refer to the *TG8000 Multiformat Test Signal Generator User Manual*)
- OUTPUT commands
- SENSE commands

## MASS MEMORY commands

Two MASS MEMORY commands are listed here for your reference. You can use these to load and query the output test signal. Detailed information for using these commands are located in the *TG8000 Multiformat Test Signal Generator User Manual*.

**:MMEMory:LOAD:SIGNAL <module\_name>,<signal\_name>**

**:MMEMory:LOAD:SIGNAL <slot\_number>,<signal\_name>**

Loads a signal into the specified module.

**:MMEMory:SIGNAL:ACTIVE? <slot\_number>|<module\_name>**

Returns the current output signal of the specified module.

## OUTPUT commands

Use these commands to control the output parameters of the module. These include output status and circle/text/logo overlay.

### Command tree

**:OUTPut<n>**

|               |          |
|---------------|----------|
| <b>:STATE</b> | ON   OFF |
|---------------|----------|

|                |  |
|----------------|--|
| <b>:CIRCLE</b> |  |
|----------------|--|

|               |          |
|---------------|----------|
| <b>:STATE</b> | ON   OFF |
|---------------|----------|

|                  |                 |
|------------------|-----------------|
| <b>:DIAMeter</b> | <numeric_value> |
|------------------|-----------------|

|                  |  |
|------------------|--|
| <b>:POSITION</b> |  |
|------------------|--|

|                    |                 |
|--------------------|-----------------|
| <b>:HORIZONTAL</b> | <numeric_value> |
|--------------------|-----------------|

|                  |                 |
|------------------|-----------------|
| <b>:VERTICAL</b> | <numeric_value> |
|------------------|-----------------|

|              |  |
|--------------|--|
| <b>:LOGO</b> |  |
|--------------|--|

|               |          |
|---------------|----------|
| <b>:STATE</b> | ON   OFF |
|---------------|----------|

|                 |  |  |
|-----------------|--|--|
| :POSition       |  |  |
| :HORizontal     |  | <numeric_value>                              |
| :VERTical       |  | <numeric_value>                              |
| :SElect         |  | <logo_name>                                  |
| :SAVE           |  |  |
| :TEXT           |  |  |
| :STATE          |  | ON   OFF                                     |
| :DATA           |  | <string>                                     |
| :POSition       |  |  |
| :HORizontal     |  | <numeric_value>                              |
| :VERTical       |  | <numeric_value>                              |
| :SAVE           |  |  |
| :OVERlay        |  |  |
| :BLINK          |  |  |
| :STATE          |  | ON   OFF                                     |
| :PERiod         |  | <numeric_value>                              |
| :APL            |  |  |
| :MODE           |  | APL_OFF   APL_HIGH  <br>APL_LOW   APL_BOUNCE |
| :PERiod         |  | <numeric_value>                              |
| :MOVE           |  |  |
| :HORizontal     |  | <numeric_value>                              |
| :VERTical       |  | <numeric_value>                              |
| :PERiod         |  | <numeric_value>                              |
| :RANDom[:STATE] |  | ON   OFF                                     |
| :VIDeo          |  |  |
| :CONFig         |  | YC   COMPOSITE                               |
| :SCH            |  | <numeric_value>                              |
| :SYNC           |  |  |
| :STATE          |  | ON   OFF                                     |

**Command description****:OUTPut<n>:STATE ON|OFF**

Turns the signal output of the specified channel on or off. The <n> in the command represents the output channel and you can specify 1, 2, or 3. You can use 1 or 0 instead of ON or OFF.

**:OUTPut<n>:STATE?**

Returns the current output state of the specified channel. The <n> in the command represents the output channel and you can specify 1, 2, or 3.

**:OUTPut1:CIRClE:STATE ON|OFF**

Turns the circle overlay on the video signal on or off. You can use 1 or 0 instead of ON or OFF.

**:OUTPut1:CIRClE:STATe?**

Returns the current circle overlay state.

**:OUTPut1:CIRClE:DIAMeter <numeric\_value>**

Sets the diameter of the displayed circle. The unit is the percent of active picture height. You can set the diameter from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:CIRClE:DIAMeter?**

Returns the diameter of the displayed circle.

**:OUTPut1:CIRClE:POSition:HORizontal <numeric\_value>**

Sets the horizontal position of the circle as it appears on the active signal. The unit is the percent of active picture width. You can set the position from -50% to +50% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:CIRClE:POSition:HORizontal?**

Returns the current horizontal position of the circle as it appears on the active signal.

**:OUTPut1:CIRClE:POSition:VERTical <numeric\_value>**

Sets the vertical position of the circle as it appears on the active signal. The unit is the percent of active picture height. You can set the position from -50% to +50% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:CIRClE:POSition:VERTical?**

Returns the current vertical position of the circle as it appears on the active signal.

**:OUTPut1:LOGO:STATe ON|OFF**

Turns the logo overlay on the video signal on or off. You can use 1 or 0 instead of ON or OFF.

**:OUTPut1:LOGO:STATe?**

Returns the current logo overlay state.

**:OUTPut1:LOGO:POSition:HORizontal <numeric\_value>**

Sets the horizontal position of the logo as it appears on the active signal. The unit is the percent of active picture width. You can set the position from -100% to 0% in 0.1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:LOGO:POSition:HORizontal?**

Returns the current horizontal position of the logo.

**:OUTPut1:LOGO:POSition:VERTical <numeric\_value>**

Sets the vertical position of the logo as it appears on the active signal. The unit is the percent of active picture height. You can set the position from -100% to 0% in 0.1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:LOGO:POSition:VERTical?**

Returns the current vertical position of the logo.

**:OUTPut1:LOGO:SElect <logo\_name>**

Selects the logo used for the logo overlay.

**:OUTPut1:LOGO:SElect?**

Returns the current logo used for the logo overlay.

**:OUTPut1:LOGO:SAVE**

Saves the current display position of the logo to the logo file. There are no arguments.

**:OUTPut1:TEXT:STATE ON|OFF**

Turns the text overlay on the video signal on or off. You can use 1 or 0 instead of ON or OFF.

**:OUTPut1:TEXT:STATE?**

Returns the current text overlay state.

**:OUTPut1:TEXT:DATA <string>**

Sets the current string for the text mode.

**:OUTPut1:TEXT:DATA?**

Returns the current string for the text mode.

**:OUTPut1:TEXT:POSition:HORizontal <numeric\_value>**

Sets the text horizontal position in the video signal. The unit is the percent of active picture width. You can set the position from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of the numeric value.

**:OUTPut1:TEXT:POSition:HORizontal?**

Returns the current text horizontal position in the video signal.

**:OUTPut1:TEXT:POSition:VERTical <numeric\_value>**

Sets the text vertical position in the video signal. The unit is the percent of active picture height. You can set the position from 0.0% to 100.0% in 1% steps. You can also use MIN, MAX, or DEF instead of the numeric value.

**:OUTPut1:TEXT:POSition:VERTical?**

Returns the current text vertical position in the video signal.

**:OUTPut1:TEXT:SAVE**

Saves the current text and its display position to the signal file. There are no arguments.

**:OUTPut1:OVERlay:BLINK:STATE ON|OFF**

Turns on or off the blinking mode for the logo, text, and circle overlay. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:OVERlay:BLINK:STATE?**

Returns the current state of the blinking mode for the logo, text, and circle overlay.

**:OUTPut1:OVERlay:BLINK:PERiod <numeric\_value>**

Sets the blinking interval of the blinking mode for the logo, text, and circle overlay. You can set the value as 0.5 seconds or 1.0 seconds.

**:OUTPut1:OVERlay:BLINK:PERiod?**

Returns the blinking interval of the blinking mode for the logo, text, and circle overlay.

**:OUTPut1:APL:MODE APL\_OFF|APL\_HIGH|APL\_LOW|APL\_BOUNCE|BOUNCE**

Sets the output mode of the APL signal. Refer to the *APL Submenu* section in the TG8000 User Manual for detailed information about the each mode.

**:OUTPut1:APL:MODE?**

Returns the current output mode of the APL signal.

**:OUTPut1:APL:PERiod <numeric\_value>**

Sets the time interval between two signals when they are output in the bounce modes. You can set the value from 0.5 seconds to 2.0 seconds in 0.5 seconds steps.

**:OUTPut1:APL:PERiod?**

Returns the time interval between two signals when they are output in the bounce modes.

**:OUTPut1:MOVE:HORizontal <numeric\_value>**

Sets the amount of horizontal scrolling in the moving picture mode. You can set the value from -252 to +252 in 4 samples steps.

**:OUTPut1:MOVE:HORizontal?**

Returns the amount of horizontal scrolling in the moving picture mode.

**:OUTPut1:MOVE:VERTical <numeric\_value>**

Sets the amount of vertical scrolling in the moving picture mode. You can set the value from -252 to +252 in 1 line steps.

**:OUTPut1:MOVE:VERTical?**

Returns the amount of vertical scrolling in the moving picture mode.

**:OUTPut1:MOVE:PERiod <numeric\_value>**

Sets the time interval between occurrences of the scrolling. You can set the value from 1 to 16 in 1 field steps.

**:OUTPut1:MOVE:PERiod?**

Returns the time interval between occurrences of the scrolling.

**:OUTPut1:MOVE:RANDOM:STATE ON|OFF**

Turns the random scrolling mode on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:MOVE:RANDOM:STATE?**

Returns the current state of the random scrolling mode.

**:OUTPut1:VIDeo:CONFig YC|COMPOSITE**

Sets the output channel configuration when a composite signal is being output. For YC, a Y signal, C signal, and composite signal will be assigned to CH1, CH2, and CH3 respectively. For COMPOSITE, a composite signal will be assigned to all the three channels.

**:OUTPut1:VIDeo:CONFig?**

Returns the current setting of the output channel configuration when a composite signal is being output.

**:OUTPut1:VIDeo:SCH <numeric\_value>**

Sets the SCH phase for a composite signal. You can set the value from -180 degrees to +180 degrees in 1 degree steps.

**:OUTPut1:VIDeo:SCH?**

Returns the current SCH phase setting.

**:OUTPut1:VIDeo:SYNC:STATE ON|OFF**

Sets whether or not a sync signal is multiplexed with the B and R signals when a GBR signal is being output. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:VIDeo:SYNC:STATE?**

Returns whether or not a sync signal is multiplexed with the B and R signals when a GBR signal is being output.

## SENSE commands

Use these commands to set the timing offset of the output signals relative to the internal reference signal (frame reset signal).

Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the setting range.

### Command tree

|             |                 |
|-------------|-----------------|
| :SENSe<n>   |                 |
| :CORRection |                 |
| :MDElay     |                 |
| :HORizontal | <numeric_value> |
| :STEP       | <numeric_value> |
| :VERTical   | <numeric_value> |
| :STEP       | <numeric_value> |

### Command description

:SENSe1:CORRection:MDElay:HORizontal <numeric\_value>

Sets the horizontal timing offset of the output signals. The timing resolution is clock-cycles. The units are microseconds. You can use UP, DOWN, or DEF instead of the numeric value. If the argument exceeds the horizontal time value, then the vertical offset is adjusted to accommodate the requested delay.

:SENSe1:CORRection:MDElay:HORizontal?

Returns the current horizontal timing offset of the output signals.

:SENSe1:CORRection:MDElay:HORizontal:STEP <numeric\_value>

Sets the step increment used by the UP or DOWN commands. The units are microseconds. You can use MIN, MAX, or DEF instead of a numeric value.

:SENSe1:CORRection:MDElay:HORizontal:STEP?

Returns the current step increment.

:SENSe1:CORRection:MDElay:VERTical <numeric\_value>

Sets the vertical timing offset of the output signals. The argument can be a floating point value that is translated into integer lines with a horizontal offset. You can use UP, DOWN, or DEF instead of a numeric value.

:SENSe1:CORRection:MDElay:VERTical?

Returns the current vertical timing offset of the output signals.

`:SENSe1:CORRection:MDElay:VERTical:STEP <numeric_value>`

Sets the step increment used by the UP or DOWN commands. You can use MIN, MAX, or DEF instead of a numeric value.

`:SENSe1:CORRection:MDElay:VERTical:STEP`

Returns the current step increment.

# AWVG7 Analog Wideband Video Generator module remote commands

This section describes the remote commands used to control the AWVG7 Analog Wideband Video Generator module remotely. The commands to the module are divided into the following three groups:

- MASS MEMORY commands (Refer to the *TG8000 Multiformat Test Signal Generator User Manual*)
- OUTPUT commands
- SENSE commands

## MASS MEMORY commands

Two MASS MEMORY commands are listed here for your reference. You can use these to load and query the output test signal. Detailed information for using these commands are located in the *TG8000 Multiformat Test Signal Generator User Manual*.

**:MMEMory:LOAD:SIGNal** <module\_name>,<signal\_name>

**:MMEMory:LOAD:SIGNal** <slot\_number>,<signal\_name>

Loads a signal into the specified module.

**:MMEMory:SIGNal:ACTive** <slot\_number>|<module\_name>

Returns the current output signal of the specified module.

## OUTPUT commands

Use these commands to control the output parameters of the module. These include output status and circle/text/logo overlay.

### Command tree

**:OUTPut<n>**

|               |          |
|---------------|----------|
| <b>:STATe</b> | ON   OFF |
|---------------|----------|

|                |  |
|----------------|--|
| <b>:CIRCle</b> |  |
|----------------|--|

|               |          |
|---------------|----------|
| <b>:STATe</b> | ON   OFF |
|---------------|----------|

|                  |                 |
|------------------|-----------------|
| <b>:DIAMeter</b> | <numeric_value> |
|------------------|-----------------|

|                  |  |
|------------------|--|
| <b>:POSition</b> |  |
|------------------|--|

|                    |                 |
|--------------------|-----------------|
| <b>:HORizontal</b> | <numeric_value> |
|--------------------|-----------------|

|                  |                 |
|------------------|-----------------|
| <b>:VERTical</b> | <numeric_value> |
|------------------|-----------------|

|                 |  |                 |
|-----------------|--|-----------------|
| :LOGO           |  |                 |
| :STATE          |  | ON   OFF        |
| :POSition       |  |                 |
| :HORizontal     |  | <numeric_value> |
| :VERTical       |  | <numeric_value> |
| :SElect         |  | <logo_name>     |
| :SAVE           |  |                 |
| :TEXT           |  |                 |
| :STATE          |  | ON   OFF        |
| :DATA           |  | <string>        |
| :POSition       |  |                 |
| :HORizontal     |  | <numeric_value> |
| :VERTical       |  | <numeric_value> |
| :SAVE           |  |                 |
| :OVERlay        |  |                 |
| :BLINK          |  |                 |
| :STATE          |  | ON   OFF        |
| :PERiod         |  | <numeric_value> |
| :MOVE           |  |                 |
| :HORizontal     |  | <numeric_value> |
| :VERTical       |  | <numeric_value> |
| :PERiod         |  | <numeric_value> |
| :RANDom[:STATE] |  | ON   OFF        |
| :VIDeo          |  |                 |
| :SYNC           |  |                 |
| :STATE          |  | ON   OFF        |

## Command description

:OUTPut<n>:STATE ON|OFF

Turns the signal output of the specified channel on or off. The <n> in the command represents the output channel and you can specify 1, 2, or 3. You can use 1 or 0 instead of ON or OFF.

:OUTPut<n>:STATE?

Returns the current output state of the specified channel. The <n> in the command represents the output channel and you can specify 1, 2, or 3.

:OUTPut1:CIRClE:STATE ON|OFF

Turns the circle overlay on the video signal on or off. You can use 1 or 0 instead of ON or OFF.

:OUTPut1:CIRClE:STATE?

Returns the current circle overlay state.

**:OUTPut1:CIRClE:DIAMeter <numeric\_value>**

Sets the diameter of the displayed circle. The unit is the percent of active picture height. You can set the diameter from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:CIRClE:DIAMeter?**

Returns the diameter of the displayed circle.

**:OUTPut1:CIRClE:POSition:HORizontal <numeric\_value>**

Sets the horizontal position of the circle as it appears on the active signal. The unit is the percent of active picture width. You can set the position from -50% to +50% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:CIRClE:POSition:HORizontal?**

Returns the current horizontal position of the circle as it appears on the active signal.

**:OUTPut1:CIRClE:POSition:VERTical <numeric\_value>**

Sets the vertical position of the circle as it appears on the active signal. The unit is the percent of active picture height. You can set the position from -50% to +50% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:CIRClE:POSition:VERTical?**

Returns the current vertical position of the circle as it appears on the active signal.

**:OUTPut1:LOGO:STATE ON|OFF**

Turns the logo overlay on the video signal on or off. You can use 1 or 0 instead of ON or OFF.

**:OUTPut1:LOGO:STATE?**

Returns the current logo overlay state.

**:OUTPut1:LOGO:POSition:HORizontal <numeric\_value>**

Sets the horizontal position of the logo as it appears on the active signal. The unit is the percent of active picture width. You can set the position from -100% to 0% in 0.1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:LOGO:POSition:HORizontal?**

Returns the current horizontal position of the logo.

**:OUTPut1:LOGO:POSition:VERTical <numeric\_value>**

Sets the vertical position of the logo as it appears on the active signal. The unit is the percent of active picture height. You can set the position from -100% to 0% in 0.1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:LOGO:POSition:VERTical?**

Returns the current vertical position of the logo.

**:OUTPut1:LOGO:SElect <logo\_name>**

Selects the logo used for the logo overlay.

**:OUTPut1:LOGO:SElect?**

Returns the current logo used for the logo overlay.

**:OUTPut1:LOGO:SAVe**

Saves the current display position of the logo to the logo file. There are no arguments.

**:OUTPut1:TEXT:STATE ON|OFF**

Turns the text overlay on the video signal on or off. You can use 1 or 0 instead of ON or OFF.

**:OUTPut1:TEXT:STATE?**

Returns the current text overlay state.

**:OUTPut1:TEXT:DATA <string>**

Sets the current string for the text mode.

**:OUTPut1:TEXT:DATA?**

Returns the current string for the text mode.

**:OUTPut1:TEXT:POSition:HORizontal <numeric\_value>**

Sets the text horizontal position in the video signal. The unit is the percent of active picture width. You can set the position from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of the numeric value.

**:OUTPut1:TEXT:POSition:HORizontal?**

Returns the current text horizontal position in the video signal.

**:OUTPut1:TEXT:POSition:VERTical <numeric\_value>**

Sets the text vertical position in the video signal. The unit is the percent of active picture height. You can set the position from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of the numeric value.

**:OUTPut1:TEXT:POSition:VERTical?**

Returns the current text vertical position in the video signal.

**:OUTPut1:TEXT:SAVE**

Saves the current text and its display position to the signal file. There are no arguments.

**:OUTPut1:OVERlay:BLINK:STATE ON|OFF**

Turns on or off the blinking mode for the logo, text, and circle overlay. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:OVERlay:BLINK:STATE?**

Returns the current state of the blinking mode for the logo, text, and circle overlay.

**:OUTPut1:OVERlay:BLINK:PERiod <numeric\_value>**

Sets the blinking interval of the blinking mode for the logo, text, and circle overlay. You can set the value as 0.5 seconds or 1.0 seconds.

**:OUTPut1:OVERlay:BLINK:PERiod?**

Returns the blinking interval of the blinking mode for the logo, text, and circle overlay.

**:OUTPut1:MOVE:HORizontal <numeric\_value>**

Sets the amount of horizontal scrolling in the moving picture mode. You can set the value from -252 to +252 in 4 samples steps.

**:OUTPut1:MOVE:HORizontal?**

Returns the amount of horizontal scrolling in the moving picture mode.

**:OUTPut1:MOVE:VERTical <numeric\_value>**

Sets the amount of vertical scrolling in the moving picture mode. You can set the value from -252 to +252 in 1 line steps.

**:OUTPut1:MOVE:VERTical?**

Returns the amount of vertical scrolling in the moving picture mode.

**:OUTPut1:MOVE:PERiod <numeric\_value>**

Sets the time interval between occurrences of the scrolling. You can set the value from 1 to 16 in 1 field steps.

**:OUTPut1:MOVE:PERiod?**

Returns the time interval between occurrences of the scrolling.

**:OUTPut1:MOVE:RANDOM:STATE ON|OFF**

Turns the random scrolling mode on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:MOVE:RANDOM:STATE?**

Returns the current state of the random scrolling mode.

**:OUTPut1:VIDeo:SYNc:STATe ON|OFF**

Sets whether or not a sync signal is multiplexed with the B and R signals when a GBR signal is being output. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:VIDeo:SYNc:STATe?**

Returns whether or not a sync signal is multiplexed with the B and R signals when a GBR signal is being output.

## SENSE commands

Use these commands to set the timing offset of the output signals relative to the internal reference signal (frame reset signal).

Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the setting range.

### Command tree

|                        |                              |
|------------------------|------------------------------|
| <b>:SENSe&lt;n&gt;</b> |                              |
| <b>:CORRection</b>     |                              |
| <b>:MDElay</b>         |                              |
| <b>:HORizontal</b>     | <b>&lt;numeric_value&gt;</b> |
| <b>:STEP</b>           | <b>&lt;numeric_value&gt;</b> |
| <b>:VERTical</b>       | <b>&lt;numeric_value&gt;</b> |
| <b>:STEP</b>           | <b>&lt;numeric_value&gt;</b> |

### Command description

**:SENSe1:CORRection:MDElay:HORizontal <numeric\_value>**

Sets the horizontal timing offset of the output signals. The timing resolution is clock-cycles. The units are microseconds. You can use UP, DOWN, or DEF instead of the numeric value. See page 2-2 for additional detail on UP, DOWN, and DEF. If the argument exceeds the horizontal time value, then the vertical offset is adjusted to accommodate the requested delay.

**:SENSe1:CORRection:MDElay:HORizontal?**

Returns the current horizontal timing offset of the output signals.

**:SENSe1:CORRection:MDElay:HORizontal:STEP <numeric\_value>**

Sets the step increment used by the UP or DOWN commands. The units are microseconds. You can use MIN, MAX, or DEF instead of a numeric value.

**:SENSe1:CORRection:MDElay:HORizontal:STEP?**

Returns the current step increment.

**:SENSe1:CORRection:MDElay:VERTical <numeric\_value>**

Sets the vertical timing offset of the output signals. The argument can be a floating point value that is translated into integer lines with a horizontal offset. You can use UP, DOWN, or DEF instead of a numeric value.

**:SENSe1:CORRection:MDElay:VERTical?**

Returns the current vertical timing offset of the output signals.

**:SENSe1:CORRection:MDElay:VERTical:STEP <numeric\_value>**

Sets the step increment used by the UP or DOWN commands. You can use MIN, MAX, or DEF instead of a numeric value.

**:SENSe1:CORRection:MDElay:VERTical:STEP?**

Returns the current step increment.

## BG7 Black Generator module remote commands

This section describes the command sets used for the BG7 Black Generator module remote operation. The commands for the module are divided into the following groups:

- OUTPUT commands
- SENSE commands

### OUTPUT commands

Use these commands to set the video standard and the kind of signal for the BLACK outputs.

---

**NOTE.** Use of the *OUTPUT4:TIMEcode* commands requires hardware version 1.2 or later and software version 5.1 or later.

---

#### Command tree

|            |  |
|------------|--|
| :OUTPut    |  |
| :CONFigure |  |
| :OUTPut<n> |  |
| :STANdard  | NTSC   NTSC_NSU   PAL  <br>HD1080_60I   HD1080_59I  <br>HD1080_50I   HD1080_24SF  <br>HD1080_23SF   HD1080_30P<br>  HD1080_29P   HD1080_25P<br>  HD1080_24P   HD1080_23P<br>  HD720_60P   HD720_59P  <br>HD720_50P |
| :OUTPUT4   |  |
| :TIMECode  |  |
| :STATus    |  |
| :SOURce    | DISable   TOD   COUNTER  |
| :SOURce    |  |
| :OFFSet    | <NR1>, <NR1>, <NR1>, <NR1>   |
| :OFFSet    |  |
| :VITc[1/2] |  |
| :STATe     | <BOOLEAN>  |
| :STATe     |  |
| :LINE      | <NR1>  |
| :LINE      |  |
| :DROPf     |  |

|                  |   |
|------------------|---|
| :STATE <BOOLEAN> |   |
| :STATE?          |   |
| :SIGNa1          | BB   BB_FREF   BB_10FID  <br>CB100PER   CB75PER   CB_SMPTE<br>  FF40PER   OTHER_ONE  <br>OTHER_TWO   BB_NO_FREF  <br>CB100_OR   CB75_OR |

**Command description****:OUTPut:CONFigure?**

Returns the availability of color bars signal output option (Option CB). "1" indicates that the option is available and "0" indicates the option is not available.

**:OUTPut<n>:STANdard**

NTSC|NTSC\_NSU|PAL|HD1080\_60I|HD1080\_59I|  
HD1080\_50I|HD1080\_24SF|HD1080\_23SF|  
HD1080\_30P|HD1080\_29P|HD1080\_25P|  
HD1080\_24P|HD1080\_23P|HD720\_60P|HD720\_59P| HD720\_50P

Sets the video standard for a specific BLACK output. The choices are NTSC, PAL, NTSC\_NSU (NTSC no setup), and HD1080\_60I to HD720\_50P. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

**:OUTPut<n>:STANdard**

Returns the video standard for a specific BLACK output. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

:OUTPut<n>:SIGNa1 BB|BB\_FREF|BB\_10FID|CB100PER|CB75PER|  
CB\_SMPTE|FF40PER|OTHER\_ONE|OTHER\_TWO|  
BB\_NO\_FREF|CB100\_OR|CB75\_OR

Sets what kind of signal is available from a specific BLACK output. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

If the standard is NTSC or NTSC\_NSU, the options are:

BB (black burst) or BB\_FREF (black burst with field reference).

With Option CB you can also select:

BB\_10FID (black burst with 10 field ID), CB100PER (100% color bars), CB75PER (75% color bars), CB\_SMPTE (SMPTE color bars), FF40PER (40% flat field), OTHER\_ONE (Other 1), or OTHER\_TWO (Other 2).

If the standard is PAL, the options are:

BB (black burst) or BB\_NO\_FREF (black burst no field reference).

With Option CB you can also select:

CB100PER (100% color bars), CB75PER (75% color bars) CB\_100\_OR (100% color bars over red), CB\_75\_OR (75% color bars over red), FF40PER (40% flat field), OTHER\_ONE (Other 1), or OTHER\_TWO (Other 2).

**:OUTPut<n>:SIGNal?**

Returns the current output signal. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

**:OUTPut4:TIMECode:STATUs?**

Returns the current time code settings.

**:OUTPut4:TIMECode:SOURce DISAbLe|TOD|COUNTER**

Sets time code source. Disable shuts off the time code output. TOD sets the time of day clock as the source. Counter sets the time code source to the program counter. See the GPS7 Synchronization and Timecode Module Remote Commands chapter, starting on page 2-92 for more information on the TOD setting.

**:OUTPut4:TIMECode:SOURce?**

Returns the current time code source setting.

**:OUTPut4:TIMECode:OFFSet <NR1>,<NR1>,<NR1>,<NR1>**

Sets the time code offset in hours, minutes, seconds, and frames (HH:MM:SS:FF).

**:OUTPut4:TIMECode:VITC[1/2]:STATe 0 | 1 (BOOLEAN)**

Enables or disables the insertion of a VITC. You can enable two time codes. Setting the state to 1 enables the time code. Setting the state to 0 disables the time code.

**:OUTPut4:TIMECode:LINE <NR1>**

Sets the line number on which the VITC is located. For NTSC output, the line number range is 10-20. For PAL output, the line number range is 6-22. For HD output, the line number range is 7-40.

**:OUTPut4:TIMECode:LINE?**

Returns the line number on which the VITC is located.

**:OUTPut4:TIMECode:DROPF:STATe 0 | 1 (BOOLEAN)**

Enables or disables the use of Drop Frame time code.

**:OUTPut4:TIMECode:DROPF:STATe?**

Returns the Drop Frame time code state. A setting of 0 means drop frame time code is not used. A setting of 1 means drop frame time code is used.

## SENSE commands

Use these commands to adjust the timing offset of the BLACK outputs relative to the internal reference signal (frame reset signal).

Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the timing offset range.

### Command tree

|             |                 |
|-------------|-----------------|
| :SENSe<n>   |                 |
| :CORRection |                 |
| :MDElay     |                 |
| :HORizontal | <numeric_value> |
| :STEP       | <numeric_value> |
| :VERTical   | <numeric_value> |
| :STEP       | <numeric_value> |

### Command description

:SENSe<n>:CORRection:MDElay:HORizontal <numeric\_value>

Sets the horizontal timing offset of a specific BLACK output. The timing resolution is clock-cycles. The unit is microseconds. You can use UP, DOWN, or DEF instead of the numeric values. See page 2-2 for additional detail on UP, DOWN, and DEF. If the argument exceeds the horizontal time value, then the vertical offset is adjusted to accommodate the requested offset. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

:SENSe<n>:CORRection:MDElay:HORizontal?

Returns the horizontal timing offset of a specific BLACK output. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

:SENSe<n>:CORRection:MDElay:HORizontal:STEP <numeric\_value>

Sets the step increment used by the UP or DOWN commands. The unit is microseconds. You can use UP, DOWN, or DEF instead of the numeric values. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

:SENSe<n>:CORRection:MDElay:HORizontal:STEP?

Returns the step increment used by the UP or DOWN commands. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

:SENSe<n>:CORRection:MDElay:VERTical <numeric\_value>

Sets the vertical timing offset of a specific BLACK output. The argument can be a floating point value that is translated into integer lines with a horizontal offset. You can use UP, DOWN, or DEF instead of a numeric value. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

**:SENSe<n>:CORRection:MDElay:VERTical?**

Returns the vertical timing offset of a specific BLACK output. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

**:SENSe<n>:CORRection:MDElay:VERTical:STEP <numeric\_value>**

Sets the step increment used by the UP or DOWN commands. You can use MIN, MAX, or DEF instead of the numeric values. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

**:SENSe<n>:CORRection:MDElay:VERTical:STEP?**

Returns the step increment used by the UP or DOWN commands. The <n> in the command represents the connector number. You can use any connector number from 1 through 4.

# DVG7 Digital Video Generator module remote commands

This section describes the remote commands used to control the DVG7 Digital Video Generator module remotely. The commands to the module are divided into the following three groups:

- MASS MEMORY commands (Refer to the *TG8000 Multiformat Test Signal Generator User Manual*)
- OUTPUT commands
- SENSE commands

## MASS MEMORY commands

Two MASS MEMORY commands are listed here for your reference. You can use these to load and query the output test signal. Detailed information for using these commands are located in the *TG8000 Multiformat Test Signal Generator User Manual*.

**:MMEMory:LOAD:SIGNal** <module\_name>,<signal\_name>

**:MMEMory:LOAD:SIGNal** <slot\_number>,<signal\_name>

Loads a signal into the specified module.

**:MMEMory:SIGNal:ACTive** <slot\_number>|<module\_name>

Returns the current output signal of the specified module.

## OUTPUT commands

Use these commands to control the output parameters of the module. These include embedded audio and circle/text/logo overlay.

### Command tree

**:OUTPut**<n>

**:CIRCl**e

**:STATe** ON | OFF

**:DIAMeter** <numeric\_value>

**:POSition**

**:HORizontal** <numeric\_value>

**:VERTical** <numeric\_value>

**:EAUDio**

**:CHANne**l<n>

**:AMPLitude** <numeric\_value>

|                 |                         |
|-----------------|-------------------------|
| :FREQuency      | <numeric_value>         |
| :CLICk          | OFF   1   2   3   4     |
| :GROup<n>       |                         |
| :STATe          | ON   OFF                |
| :PREemphasis    | OF F   CD   CCITt       |
| :NBITS          | 20   24                 |
| :SAMPLIng       | FRAME   NOFRame   ASYNc |
| :LOGO           |                         |
| :STATe          | ON   OFF                |
| :POSition       |                         |
| :HORizontal     | <numeric_value>         |
| :VERTical       | <numeric_value>         |
| :SElect         | <logo_name>             |
| :SAVe           |                         |
| :MOVE           |                         |
| :HORizontal     | <numeric_value>         |
| :VERTical       | <numeric_value>         |
| :PERiod         | <numeric_value>         |
| :RANDom[:STATe] | ON   OFF                |
| :OVERlay        |                         |
| :BLINK          |                         |
| :STATe          | ON   OFF                |
| :PERiod         | <numeric_value>         |
| :TEXT           |                         |
| :DATA           | <string>                |
| :POSition       |                         |
| :HORizontal     | <numeric_value>         |
| :VERTical       | <numeric_value>         |
| :SAVe           |                         |
| :VIDeo          |                         |
| :Y              |                         |
| :STATe          | ON   OFF                |
| :PB             |                         |
| :STATe          | ON   OFF                |
| :PR             |                         |
| :STATe          | ON   OFF                |
| :NBITS          | 8   10                  |
| :ED             |                         |
| :STATe          | ON OFF                  |
| :AVTiming       |                         |

| :STATE    | ON   OFF                     |
|-----------|------------------------------|
| :STANDARD | D2_NTSC   D1_NTSC   D1_PAL   |
| :SIGNAL   | BLACK   GRAY   FF50P   WHITE |

**Command description**

**:OUTPut1:CIRClE:STATE ON|OFF**

Turns the circle overlay on the video signal on or off. You can use 1 or 0 instead of ON or OFF.

**:OUTPut1:CIRClE:STATE?**

Returns the current circle overlay state.

**:OUTPut1:CIRClE:DIAMeter <numeric\_value>**

Sets the diameter of the displayed circle. The unit is percent of active picture height. You can set the diameter from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:CIRClE:DIAMeter?**

Returns the diameter of the displayed circle.

**:OUTPut1:CIRClE:POSition:HORizontal <numeric\_value>**

Sets the horizontal position of the circle as it appears on the active signal. The unit is percent of active picture width. You can set the position from -50% to +50% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:CIRClE:POSition:HORizontal?**

Returns the current horizontal position of the circle as it appears on the active signal.

**:OUTPut1:CIRClE:POSition:VERTical <numeric\_value>**

Sets the vertical position of the circle as it appears on the active signal. The unit is percent of active picture height. You can set the position from -50% to +50% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:CIRClE:POSition:VERTical?**

Returns the current vertical position of the circle as it appears on the active signal.

**:OUTPut<n>:EAUDio:CHANnel<m>:AMPLitude <numeric\_value>**

Sets the amplitude of a specific embedded audio channel for the selected outputs. You can set the amplitude from -60 dBFS to 0 dBFS in 1 dBFS steps. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:CHANne1<m>:AMPLitude?**

Returns the current amplitude of a specific embedded audio channel for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:CHANne1<m>:FREQuency <numeric\_value>**

Sets the frequency of a specific embedded audio channel for the selected outputs. The frequency choices are -1, 0, 50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1000, 1200, 1500, 1600, 2000, 2400, 3000, 3200, 4000, 4800, 5000, 6000, 8000, 9600, 10000, 12000, 15000, 16000, or 20000. For -1, the output of the audio data is disabled. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:CHANne1<m>:FREQuency?**

Returns the current frequency of a specific embedded audio channel for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:CHANne1<m>:CLICk 0|1|2|3|4**

Sets the audio click of a specific audio channel for the selected outputs. You can select 0, 1 (second), 2 (seconds), 3 (seconds) or 4 (seconds). When 1, 2, 3 or 4 is selected, the audio click becomes valid. Audio Tone is turned off for 0.25 seconds around the time of the click. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:CHANne1<m>:CLICk?**

Returns the current audio click settings of a specific audio channel for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:GRoup<m>:STATe ON|OFF**

Turns on or off the output of a specific audio group for the selected outputs. You can also use 1 or 0 instead of ON or OFF. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GRoup<m>:STATe?**

Returns the current output state of a specific audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GRoup<m>:PREemphasis OFF|CD|CCITT**

Turns the preemphasis bits in the audio signal of a specific embedded audio group for the selected outputs on or off. The signal itself does not have preemphasis, but you can set the bits in order to check other equipment. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GRoup<m>:PREemphasis?**

Returns the current preemphasis bits settings of a specific embedded audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GRoup<m>:NBITS 20|24**

Sets the sample bits of a specific embedded audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GRoup<m>:NBITS?**

Returns the current sample bits of a specific embedded audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GROup<m>:SAMPLIng FRAME|NOFrame|ASYNc**

Sets the sampling alignment status bits in the audio signal of a specific embedded audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GROup<m>:SAMPLIng?**

Returns the current sampling alignment status bits settings of a specific embedded audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut1:LOGO:STATe ON|OFF**

Turns the logo overlay display on the video signal on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:LOGO:STATe?**

Returns the current logo overlay state.

**:OUTPut1:LOGO:POSition:HORizontal <numeric\_value>**

Sets the horizontal position of the logo as it appears on the active signal. The unit is percent of active picture width. You can set the position from -100% to 0% in 0.1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:LOGO:POSition:HORizontal?**

Returns the current horizontal position of the logo.

**:OUTPut1:LOGO:POSition:VERTical <numeric\_value>**

Sets the vertical position of the logo as it appears on the active signal. The unit is percent of active picture height. You can set the position from -100% to 0% in 0.1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:LOGO:POSition:VERTical?**

Returns the current vertical position of the logo.

**:OUTPut1:LOGO:SElect <logo\_name>**

Selects the logo used for the logo overlay.

**:OUTPut1:LOGO:SElect?**

Returns the current logo used for the logo overlay.

**:OUTPut1:LOGO:SAVe**

Saves the current display position of the logo to the logo file. There are no arguments.

**:OUTPut1:MOVE:HORizontal <numeric\_value>**

Sets the amount of horizontal scrolling in the moving picture mode. You can set the value from -252 to +252 in 4 samples steps.

**:OUTPut1:MOVE:HORizontal?**

Returns the amount of horizontal scrolling in the moving picture mode.

**:OUTPut1:MOVE:VERTical <numeric\_value>**

Sets the amount of vertical scrolling in the moving picture mode. You can set the value from -252 to +252 in 1 line steps.

**:OUTPut1:MOVE:VERTical?**

Returns the amount of vertical scrolling in the moving picture mode.

**:OUTPut1:MOVE:PERiod <numeric\_value>**

Sets the time interval between occurrences of the scrolling. You can set the value from 1 to 16 in 1 field steps.

**:OUTPut1:MOVE:PERiod?**

Returns the time interval between occurrences of the scrolling.

**:OUTPut1:MOVE:RANDOM:STATE ON|OFF**

Turns the random scrolling mode on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:MOVE:RANDOM:STATE?**

Returns the current state of the random scrolling mode.

**:OUTPut1:OVERlay:BLINK:STATE ON|OFF**

Turns on or off the blinking mode for the logo, text, and circle overlay. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:OVERlay:BLINK:STATE?**

Returns the current state of the blinking mode for the logo, text, and circle overlay.

**:OUTPut1:OVERlay:BLINK:PERiod <numeric\_value>**

Sets the blinking interval of the blinking mode for the logo, text, and circle overlay. You can set the value as 0.5 seconds or 1.0 seconds.

**:OUTPut1:OVERlay:BLINK:PERiod?**

Returns the blinking interval of the blinking mode for the logo, text, and circle overlay.

**:OUTPut1:TEXT:STATe ON|OFF**

Turns the text overlay display on the video signal on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:TEXT:STATe?**

Returns the current text overlay state.

**:OUTPut1:TEXT:DATA <string>**

Sets the current string for the text mode.

**:OUTPut1:TEXT:DATA?**

Returns the current string for the text mode.

**:OUTPut1:TEXT:POSition:HORizontal <numeric\_value>**

Sets the text horizontal position in the video signal. The unit is percent of active picture width. You can set the position from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of the numeric value.

**:OUTPut1:TEXT:POSition:HORizontal?**

Returns the current text horizontal position in the video signal.

**:OUTPut1:TEXT:POSition:VERTical <numeric\_value>**

Sets the text vertical position in the video signal. The unit is percent of active picture height. You can set the position from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of the numeric value.

**:OUTPut1:TEXT:POSition:VERTical?**

Returns the current text vertical position in the video signal.

**:OUTPut1:TEXT:SAVe**

Saves the current text and its display position to the signal file. There are no arguments.

**:OUTPut1:VIDeo:Y:STATe ON|OFF**

Turns the Y component of the serial digital video signals on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:VIDeo:Y:STATe?**

Returns the current output state of the Y component of the serial digital video signals.

**:OUTPut1:VIDeo:PB:STATe ON|OFF**

Turns the P<sub>B</sub> component of the serial digital video signals on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:VIDeo:PB:STATe?**

Returns the current output state of the P<sub>B</sub> component of the serial digital video signals.

**:OUTPut1:VIDeo:PR:STATe ON|OFF**

Turns the P<sub>R</sub> component of the serial digital video signals on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:VIDeo:PR:STATe?**

Returns the current output state of the P<sub>R</sub> component of the serial digital video signals.

**:OUTPut<n>:VIDeo:NBITs 8|10**

Sets the video resolution for the selected output. The options are 8 bits or 10 bits. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors.

**:OUTPut<n>:VIDeo:NBITs?**

Returns the current video resolution for the selected outputs. The options are 8 bits or 10 bits. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors.

**:OUTPut<n>:VIDeo:EDH:STATe ON|OFF**

Turns Error Detection and Handling insertion for the selected outputs on or off. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors.

**:OUTPut1:VIDeo:EDH:STATe?**

Returns the current Error Detection and Handling insertion status.

**:OUTPut<n>:VIDeo:EDH:STATe?**

Returns the current Error Detection and Handling insertion status for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors.

**:OUTPut1:VIDeo:AVTiming:STATe ON|OFF**

Turns the output mode for an audio/video timing measurement on or off. Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the mode. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:VIDeo:AVTiming:STATe?**

Returns the current output mode setting for an audio/video timing measurement.

**:OUTPut2:STANDard D2\_NTSC|D1\_NTSC|D1\_PAL**

Sets the video standard for the serial digital black signals output from the BLACK connectors. The choices are D2\_NTSC (525-143 format), D1\_NTSC (525-270 format), or D1\_PAL (625-270 format). This command is only available if Option BK is installed.

**:OUTPut<n>:STANDard?**

Returns the video standard for the selected output. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors.

**:OUTPut2:SIGNal BLACK|GRAY|FF50P|WHITE**

Sets the type of the serial digital black signals output from the BLACK connectors. The options are BLACK (serial digital black signal), GRAY (40% flat field signal), FF50P (50% flat field signal), or WHITE (100% flat field signal). This command is only available if Option BK is installed.

**:OUTPut2:SIGNal?**

Returns the current serial digital black signals output from the BLACK connectors. This command is only available if Option BK is installed.

**:OUTPut:CONFigure?**

Returns the availability of serial digital black signal output option (Option BK). "1" indicates that the option is available and "0" indicates that the option is not available.

## SENSE commands

Use these commands to set the timing offset of the SIGNAL outputs and the BLACK outputs (Option BK only) relative to the internal reference signal (frame reset signal).

Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the setting range.

**Command tree**

|             |                 |
|-------------|-----------------|
| :SENSe<n>   |                 |
| :CORRection |                 |
| :MDElay     |                 |
| :HORizontal | <numeric_value> |
| :STEP       | <numeric_value> |
| :VERTical   | <numeric_value> |
| :STEP       | <numeric_value> |

**Command description**

:SENSe<n>:CORRection:MDElay:HORizontal <numeric\_value>

Sets the horizontal timing offset of the selected outputs. The timing resolution is clock-cycles. The units are microseconds. You can use UP, DOWN, or DEF instead of the numeric value. See page 2-2 for additional detail on UP, DOWN, and DEF. If the argument exceeds the horizontal time value, then the vertical offset is adjusted to accommodate the requested delay. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

:SENSe<n>:CORRection:MDElay:HORizontal

Returns the current horizontal timing offset of the selected outputs. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

:SENSe<n>:CORRection:MDElay:HORizontal:STEP <numeric\_value>

Sets the step increment used by the UP or DOWN commands. The units are microseconds. You can use MIN, MAX, or DEF instead of a numeric value. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

:SENSe<n>:CORRection:MDElay:HORizontal:STEP

Returns the current step increment. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

:SENSe<n>:CORRection:MDElay:VERTical <numeric\_value>

Sets the vertical timing offset of the selected outputs. The argument can be a floating point value that is translated into integer lines with a horizontal offset. You can use UP, DOWN, or DEF instead of a numeric value. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

:SENSe<n>:CORRection:MDElay:VERTical

Returns the current vertical timing offset of the selected outputs. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

**:SENSe<n>:CORRection:MDElay:VERTical:STEP <numeric\_value>**

Sets the step increment used by the UP or DOWN commands. You can use MIN, MAX, or DEF instead of a numeric value. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

**:SENSe<n>:CORRection:MDElay:VERTical:STEP?**

Returns the current step increment. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

# GPS7 GPS Synchronization and Timecode module remote commands

This section describes the remote commands used to control the GPS7 GPS Synchronization and Timecode module remotely. The commands to the module are divided into the following groups:

- INPUT commands
- SOURCE commands
- OUTPUT commands
- SENSE commands
- CONFIGURE commands

---

**NOTE.** Commands which control generator lock (Genlock) features are not supported by GPS7 modules that do not have a REF IN connector.

---

## INPUT commands

Use these commands to control the input parameters of the module.

### Command tree

|           |  |
|-----------|--|
| :INPut    |  |
| :STAtus   |  |
| :REF      | GPS   INTERNAL   NTSC Burst<br>  SMPTE318M   PAL Burst  <br>1080 60i   1080 59i   1080<br>50i   1080 23sF   1080 24sF<br>  1080 30p   1080 29p  <br>1080 25p   1080 24p   1080<br>23p   720 50p   720 60p  <br>720 59p |
| :FOM      | No Signal   Bad Signal  <br>Locked   |
| :TOD      | YYYY-MM-DD HH:MM:SS  |
| :UTC      | YYYY-MM-DD HH:MM:SS  |
| :PCOUnter | YYYY-MM-DD HH:MM:SS  |
| :SIG      | <numeric_value>  |
| :SAT      | <NR1>/<NR1>  |
| :ANTenna  | POWER OFF   OPEN   SHORT  <br>NOMINAL  |
| :DIAG     |  |

|             |  |
|-------------|--|
| :STATUS     | <string>   |
| :GLOCK      | <string>   |
| :GENlock    | INTERNAL   ABSENT  <br>UNLOCKED   LOCKED   NLOCK     |
| :STATUS?    | <string>   |
| :SOURCE     | GPS   INTERNAL   NBURST  <br>N318M   PBURST   HDSYNC |
| :SOURCE?    |  |
| :LLOSS      |  |
| :ACTION     | INTERNAL   STAY                                      |
| :ACTION?    |  |
| :RECOVERY   | JAM   FAST   STAY                                    |
| :RECOVERY?  |  |
| :SWARNING   |  |
| :THRESHOLD  | <NR1> 0, 1, 2, ..,10                                 |
| :THRESHOLD? |  |
| :ANTENNA    |  |
| :POWER      | OFF   DC3V   DC5V                                    |
| :POWER?     |  |
| :POSITION   | FIXED   MOBILE                                       |
| :POSITION?  |  |
| :GPS        |  |
| :ACQUIRE    |  |

**Command description****:INPUT:STATUS:REF**

Returns the time reference in use. If GPS is the selected reference and cannot be detected, No Signal is returned.

**:INPUT:STATUS:FOM**

Returns the Figure of Merit (quality of GPS signal) value. See the *GPS7 GPS Synchronization and Timecode Module* chapter of the *TG8000 Multifomat Test Signal Generator User Manual* for additional information.

**:INPUT:STATUS:TOD**

Returns the local time of day in the GPS7 module. This time includes any time zone offset correction that has been entered by the user and any applied leap second correction.

**:INPUT:STATUS:UTC**

Returns the UTC (Coordinated Universal Time) in the GPS7 module. This time does not include any local time zone offset.

**:INPut:STAtus:PCOUnter**

Returns the program time.

**:INPut:STAtus:SIG**

Returns the GPS signal strength.

**:INPut:STAtus:SAT**

Returns two numbers characterizing the GPS satellite status. The numbers are returned in the form "XX/XX". The first number represents the number of satellites from which the receiver is getting good "fix" information; the second number is the number of satellites that are in view (which may be larger than the first number because the receiver may not be getting good fix information from all the satellites).

**:INPut:STAtus:ANTenna**

Returns the antenna connection status. Connection status can be Power Off, Open, Short, or Nominal.

**:INPut:STAtus:DIAG:STAtus**

Returns a string containing all GPS DIAG menu display items, separated by a semicolon. The full list of returned values is:

- Temperature
- Oscillator Phase and DAC values
- Oscillator lock state
- Power supply readings
- +5V, +8V, -5V
- Phase detect ramp value (these values are used for factory diagnostic analysis)
- Up: A and B
- Down: A and B

**:INPut:STAtus:DIAG:GLOCK**

Returns a string containing all Genlock DIAG menu display items, separated by a semicolon. The full list of returned values is:

- Stuck Bits - Status is indicated by "H" for high, "L" for low, and "-" for OK.
- Shorted Bits - Status is indicated by "S" for shorted (always in pairs) and "-" for OK.
- Genlock Signal Amplitude min/max

**:INPut:STaTus:GENlock**

---

**NOTE.** This query is not supported by GPS7 modules that do not have a REF IN connector.

---

Returns genlock reference status. The possible responses are INTERNAL, ABSent, UNLOCKed, LOCKed, or NLOCK (near loss of lock).

**:INPut:STaTus:GENlock:STaTus**

---

**NOTE.** This query is not supported by GPS7 modules that do not have a REF IN connector.

---

Returns a string containing amplitude and VITC information for the genlock source. The VITC information is returned as Absent or as a line number. A returned line number indicates the line on which the VITC information was found.

**:INPut:SOURce GPS |INTERNAL | NBUrSt|N318M|PBURst|HDSYnc**

---

**NOTE.** The arguments NBUrSt, N318M, PBURst, and HDSYnc are not supported by GPS7 modules that do not have a REF IN connector.

---

Sets the video reference source.

**:INPut:SOURce**

Returns the video reference source setting.

**:INPut:LLOSS:ACTion**

Sets the Loss of Lock action setting. The action can be set to switch to internal or stay at current frequency when loss of lock occurs.

**:INPut:LLOSS:ACTion**

Returns the Loss Lock action setting.

**:INPut:LLOSS:RECOvery**

Sets the Holdover Recovery action setting. The action can be set to Jam Phase, Fast Slew, or Stay Legal. When a loss of lock occurs, this setting specifies the method used to synchronize the time when lock is achieved. Recovery methods are Jam Phase, Fast Slew, and Stay Legal (SMPTE specified).

**:INPut:LLOSS:RECOvery**

Returns the Holdover Recovery action setting.

**:INPut:SWARning:THREShold**

Sets the Figure of Merit (quality of GPS signal) value that triggers warning indicators. Threshold can be set to integer values, from 1 to 11.

**:INPut:SWARning:THREShold**

Returns the Figure of Merit value that triggers warning indicators.

**:ANTenna:POWer**

Sets the power level supplied to the antenna.

**:ANTenna:POWer?**

Returns the antenna power setting.

**:ANTenna:POSition FIXED | MOBILE**

Sets the GPS module configuration that optimizes the system for either fixed position or mobile (remote van) operation.

**:ANTenna:POSition?**

Returns the antenna position setting.

**:GPS:ACQuire**

Forces manual position acquisition. This is a set only command.

## SOURCE commands

Use these commands to control the source parameters of the module.

### Command tree

|                    |                            |
|--------------------|----------------------------|
| <b>:SOURce</b>     |                            |
| <b>:CORRection</b> |                            |
| <b>:MDElay</b>     |                            |
| <b>:HORizontal</b> | <NRf>                      |
| <b>:STEP</b>       | <NRf>   MIN   MAX   DEF    |
| <b>:VERTical</b>   | <NR1>                      |
| <b>:STEP</b>       | <NR1>                      |
| <b>:TIMESet</b>    |                            |
| <b>:OFFSet</b>     | HH:MM, HH:MM               |
| <b>:OFFSet?</b>    | HH:MM, HH:MM               |
| <b>:TOD</b>        |                            |
| <b>:SOURce</b>     | GPS INternal   VITc   LTC  |
| <b>:SOURce?</b>    | GPS  INternal   VITc   LTC |
| <b>:TIME</b>       | HH:MM:SS                   |

|             |   |
|-------------|---|
| :TIME?      | HH:MM:SS  |
| :DATE       | YYYY-MM-DD  |
| :DATE?      | YYYY-MM-DD  |
| :MODE       | FOLLOW   ONCE   NOW                               |
| :MODE?      |   |
| :AUTO       |   |
| :STATE      | OFF   ONCE   RECUR                                |
| :STATE?     | OFF   ONCE   RECUR                                |
| :OFFSet     | HH:MM, HH:MM                                      |
| :OFFSet?    | HH:MM, HH:MM                                      |
| :DATE       | YYYY-MM-DD  |
| :DATE?      | YYYY-MM-DD  |
| :TIME       | HH:MM:SS  |
| :TIME?      | HH:MM:SS  |
| :SDate      | <weekNo>, <weekDay>, <Month>                      |
| :EDate      | <weekNo>, <weekDay>, <Month>                      |
| :STIME      | HH:MM:SS  |
| :ETIME      | HH:MM:SS  |
| :PCounter   |   |
| :INITialize | Set only  |
| :TIME       |   |
| :INITial    | HH:MM:SS  |
| :INITial    | HH:MM:SS  |
| :JAMSync    |   |
| :STATE      | 0   1   |
| :STATE      | 0   1   |
| :EXECute    | Set only  |
| :TIME       | HH:MM:SS  |
| :TIME?      | HH:MM:SS  |
| :LEAPsec    |   |
| :SOURCE     | LOCAL   UTC                                       |
| :SOURCE     |   |
| :EXECute    | Set only  |
| :TIME       | <numeric_value>, <numeric_value>, <numeric_value> |
| :TIME       |   |
| :ALARM      |   |
| :STATE      | 0   1   |
| :STATE?     |   |

|               |   |
|---------------|---|
| :TIME         | <numeric_value>,<numeric_value>,<numeric_value>                   |
| :TIME?        |   |
| :LLOSS        |   |
| :GPO          |   |
| :MDElay       | <Nr1>,<Nr1>,<Nr1><br>(HH:MM:SS)                                   |
| :MDElay       |   |
| :BLACK        |   |
| :MDElay       | <Nr1>,<Nr1>,<Nr1><br>(HH:MM:SS)                                   |
| :MDElay?      |   |
| :NLLOSS       |   |
| :GPO          |   |
| :MDElay       | <Nr1>,<Nr1>,<Nr1><br>(HH:MM:SS)                                   |
| :MDElay?      |   |
| :NOGL         |   |
| :GPO          |   |
| :MDElay       | <Nr1>,<Nr1>,<Nr1><br>(HH:MM:SS)                                   |
| :MDElay?      |   |
| :SWARning     |   |
| :GPO          |   |
| MDElay        | <numeric_value>,<numeric_value>,<numeric_value>                   |
| MDElay?       |   |
| :GPIO         |   |
| :INPut        | RESET_COUNT   REACQ_SAT   JAM                                     |
| :INPut?       |   |
| :OUTPut[1/2]  | NONE   SIG_WARN   LOCK_LOSS   ALARM_TIME   NEAR_LLOS   NO_GENLOCK |
| :OUTPut[1/2]? |   |
| :STATus       | String<br>(OUTPUT2,OUTPUT1,INPUT)><br>:= "0,0,0", ."1,1,1"        |

### Command description :SOURCE:CORREction:MDElay:HORizontal <NR1>

Sets the horizontal timing offset of the selected source. The timing resolution is clock-cycles. The units are microseconds. See Table 2-3 for the delay ranges.

**Table 3: GPS7 source horizontal offset ranges**

| Standard / Frame rate | Range (sample clock cycles)  |
|-----------------------|------------------------------|
| NTSC                  | $\pm 3432$ (54 MHz clock)    |
| PAL                   | $\pm 3456$ (54 MHz clock)    |
| 1080 60i              | $\pm 2200$ (74.25 MHz clock) |
| 1080 59.94i           | $\pm 2200$ (74.18 MHz clock) |
| 1080 50i              | $\pm 2640$ (74.25 MHz clock) |
| 1080 24 sF            | $\pm 2750$ (74.25 MHz clock) |
| 1080 23.98 sF         | $\pm 2750$ (74.18 MHz clock) |
| 1080 30p              | $\pm 2200$ (74.25 MHz clock) |
| 1080 29.97p           | $\pm 2200$ (74.18 MHz clock) |
| 1080 25p              | $\pm 2640$ (74.25 MHz clock) |
| 1080 24p              | $\pm 2750$ (74.25 MHz clock) |
| 1080 23.98p           | $\pm 2750$ (74.18 MHz clock) |
| 720 60p               | $\pm 1650$ (74.25 MHz clock) |
| 720 59.94p            | $\pm 1650$ (74.18 MHz clock) |

**:SOURCE:CORREction:MDElay:HORizontal?**

Returns the current horizontal timing offset of the selected source.

**:SOURCE:CORREction:MDElay:HORizontal:STEP**

Sets the horizontal timing offset up/down step increment in units of microseconds. You can use "MIN", "MAX", or "DEF" instead of numeric values.

**:SOURCE:CORREction:MDElay:VERTical**

Sets the vertical timing offset of the genlock signal relative to the internal reference signal, in units of lines. Range: NTSC  $\pm 525$ , PAL - 625, HD - 562, or  $\pm 375$  (720p).

**:SOURCE:CORREction:MDElay:VERTical:STEP**

Sets the vertical timing offset up/down step increment in units of lines. You can also use "MIN", "MAX" or "DEF" instead of numeric values.

**:SOURCE:TIMESet:OFFSet <numeric\_value>,<numeric\_value>  
(HH:MM)**

Sets the global time offset (from system TOD). This command can be used to adjust time for a time zone.

**:SOURCE:TIMESet:OFFSet?**

Returns the global time offset.

:SOURCE:TIMESet:TOD:SOURCE INTERNAL | GPS | VITC | LTC

---

**NOTE.** The arguments *VITC* and *LTC* are not supported by GPS7 modules that do not have a *REF IN* connector.

---

Sets the source for the mainframe time of day.

:SOURCE:TIMESet:TOD:SOURCE?

Returns the source setting for the mainframe time of day.

:SOURCE:TIMESet:TOD:TIME

<numeric\_value>,<numeric\_value>,<numeric\_value> (HH:MM:SS)

Sets the global mainframe time of day. This setting has no effect if the TOD source is set to GPS.

:SOURCE:TIMESet:TOD:TIME?

Returns the global mainframe time of day.

:SOURCE:TIMESet:TOD:DATE

<numeric\_value>,<numeric\_value>,<numeric\_value> (YYYY:MM:DD)

Sets the global mainframe date.

:SOURCE:TIMESet:TOD:DATE?

Returns the global mainframe date.

:SOURCE:TIMESet:TOD:MODE FOLLOW | ONCE | NOW

---

**NOTE.** This command is not supported by GPS7 modules that do not have a *REF IN* connector.

---

Sets the timecode synchronization method for VITC. Select *FOLLOW* to continually synchronize the timecode. Select *ONCE* to synchronize the timecode only once when lock is achieved. Select *NOW* to synchronize the timecode when the *EXECute* command is set.

:SOURCE:TIMESet:TOD:MODE:EXECute

---

**NOTE.** This command is not supported by GPS7 modules that do not have a *REF IN* connector.

---

Initiates an immediate timecode synchronization.

:SOURCE:TIMESet:AUTO:STATE OFF | ONCE | RECUR

Sets the automatic time offset function.

**:SOURCE:TIMESet:AUTO:STATE?**

Returns the setting of the automatic time offset function -OFF | ONCE | RECUR.

**:SOURCE:TIMESet:AUTO:OFFSet <numeric\_value>,<numeric\_value> (HH:MM)**

Sets the offset value to use for the scheduled automatic offset. In AUTO:STATE RECUR mode, the numeric offset value must always be positive; the sign should be ignored. In AUTO:STATE ONCE mode, the offset value can be positive or negative.

**:SOURCE:TIMESet:AUTO:OFFSet?**

Returns the offset value to use for the scheduled automatic offset.

**:SOURCE:TIMESet:AUTO:DATE <numeric\_value>,<numeric\_value>,<numeric\_value> (YYYY:MM:DD)**

Sets the date when the automatic offset will occur when the AUTO:STATE is set to ONCE.

**:SOURCE:TIMESet:AUTO:DATE?**

Returns the date when an automatic offset is scheduled to occur.

**:SOURCE:TIMESet:AUTO:TIME <numeric\_value>,<numeric\_value>,<numeric\_value> (HH:MM:SS)**

Sets the time when the automatic offset will occur when the AUTO:STATE is set to ONCE.

**:SOURCE:TIMESet:AUTO:TIME?**

Returns the time of day when an automatic offset should occur.

**:SOURCE:TIMESet:AUTO:SDATE <weekNo>,<weekDay>,<Month>**

Sets the date when the DST offset value is to be applied when the AUTO:STATE is set to the RECUR mode.

- Week Number: FIRST / SECOND / THIRD / FOURTH / LAST
- Week Day: SUN / MON / TUE / WED / THU / FRI / SAT
- Month: JAN / FEB / MAR / APR / MAY / JUN / JUL / AUG / SEP / OCT / NOV / DEC

**:SOURCE:TIMESet:AUTO:EDATE <weekNo>,<weekDay>,<Month>**

Sets the date when the DST offset value is to be removed when the AUTO:STATE is set to the RECUR mode.

- Week Number: FIRST / SECOND / THIRD / FOURTH / LAST
  - Week Day: SUN / MON / TUE / WED / THU / FRI / SAT
  - Month: JAN / FEB / MAR / APR / MAY / JUN / JUL / AUG / SEP / OCT / NOV / DEC
- :SOURCE:TIMESet:AUTO:STIME <numeric\_value>, <numeric\_value>, <numeric\_value> (HH:MM:SS)**
- Sets the time when the DST offset value is to be applied when the AUTO:STATE is set to the RECUR mode.
- :SOURCE:TIMESet:AUTO:ETIME <numeric\_value>, <numeric\_value>, <numeric\_value> (HH:MM:SS)**
- Sets the date when the DST offset value is to be removed when the AUTO:STATE is set to the RECUR mode.
- :SOURCE:TIMESet:PCOUNTER:INITialize**
- Sets the global program counter. Any module output (GPS7, BG7, or HDVG7) that can put timecode on the video signal can be configured to use the Program Time counter as its source. This is a set only command.
- :SOURCE:TIMESet:PCOUNTER:TIME:INITial <numeric\_value>, <numeric\_value>, <numeric\_value> (HH:MM:SS)**
- Sets the time for the program counter.
- :SOURCE:TIMESet:PCOUNTER:TIME:INITial?**
- Returns the program counter initial time setting.
- :SOURCE:TIMESet:JAMSync:STATE 0 | 1**
- Sets the timecode jam sync state. A setting of 1 enables automatic jam sync at the specified time.
- :SOURCE:TIMESet:JAMSync:STATE?**
- Returns the timecode auto jam sync state. A returned value of 1 means auto jam sync is enabled. A returned value of 0 means auto jam sync is disabled.
- :SOURCE:TIMESet:JAMSync:EXECute**
- Immediately initiates a jam sync. This is a set-only command.
- :SOURCE:TIMESet:JAMSync:TIME <numeric\_value>, <numeric\_value>, <numeric\_value> (HH:MM:SS)**
- Sets the time when an automated jam sync should occur.
- :SOURCE:TIMESet:JAMSync:TIME?**
- Returns the time when an automatic jam sync is set to occur.
- :SOURCE:TIMESet:LEAPsec:SOURCE Local | UTC**

Sets the time source for leap second adjustment. If UTC is selected, a leap second will be applied at 00:00:00 UTC. If the source is set to local, you can specify the time to apply the leap second adjustment.

**:SOURCE:TIMESet:LEAPsec:SOURce?**

Returns the time source for the leap second adjustment.

**:SOURCE:TIMESet:LEAPsec:TIME**  
**<numeric\_value>,<numeric\_value>,<numeric\_value> (HH:MM:SS)**

Sets the local time when a leap second will be added. The source must be set to LOCAL for this setting to apply.

**:SOURCE:TIMESet:LEAPsec:TIME?**

Returns the time setting when a leap second will be applied.

**:SOURCE:TIMESet:ALARM:STATE 0 | 1**

Enables and disables the alarm timer. The alarm timer is used to the GPI ground closure. This feature can be used to drive a tally light or similar indicator at a specific time in a program.

**:SOURCE:TIMESet:ALARM:STATE?**

Returns the enabled/disabled state of the alarm timer.

**:SOURCE:TIMESet:ALARM:TIME**  
**<numeric\_value>,<numeric\_value>,<numeric\_value> (HH:MM:SS)**

Sets the time at which the alarm timer triggers a GPI ground closure.

**:SOURCE:TIMESet:ALARM:TIME?**

Returns the time at which the alarm timer is set to trigger a GPI ground closure.

**:SOURCE:TIMESet:LLOSS:GPO:MDElay**  
**<numeric\_value>,<numeric\_value>,<numeric\_value> (HH:MM:SS)**

Sets a delay time for the GPI alarm to report a loss of lock condition.

**:SOURCE:TIMESet:LLOSS:GPO:MDElay?**

Returns the delay time for the GPI alarm to report a loss of lock condition.

**:SOURCE:TIMESet:LLOSS:BLACK:MDElay**  
**<numeric\_value>,<numeric\_value>,<numeric\_value> (HH:MM:SS)**

Sets a delay time for the black2 output to be blanked on loss of lock.

**:SOURCE:TIMESet:LLOSS:BLACK:MDElay?**

Returns the delay time setting for blanking the black2 output on loss of lock.

**:SOURCE:TIMESet:NLLOSS:GPO:MDElay**  
**<numeric\_value>,<numeric\_value>,<numeric\_value> (HH:MM:SS)**

---

**NOTE.** *This command is not supported by GPS7 modules that do not have a REF IN connector.*

---

Sets a delay time for the GPI alarm to report a near loss of lock condition (Genlock only).

**:SOURCE:TIMESet:NLLOSS:GPO:MDElay?**

Returns the delay time for the GPI alarm to report a near loss of lock condition (Genlock only).

**:SOURCE:TIMESet:NOGL:GPO:MDElay**  
**<numeric\_value>,<numeric\_value>,<numeric\_value> (HH:MM:SS)**

---

**NOTE.** *This command is not supported by GPS7 modules that do not have a REF IN connector.*

---

Sets a delay time for the GPI alarm to report no genlock input.

**:SOURCE:TIMESet:NOGL:GPO:MDElay?**

Returns the delay time for the GPI alarm to report no genlock input.

**:SOURCE:TIMESet:SWARning:GPO:MDElay**  
**<numeric\_value>,<numeric\_value>,<numeric\_value> (HH:MM:SS)**

Set the delay between when a signal warning is detected, and when it is reported on the GPI output.

**:SOURCE:TIMESet:SWARning:GPO:MDElay?**

Returns the delay time between when a signal warning is detected, and when it is reported on the GPI output.

**:SOURCE:GPIo:INPut RESET\_COUNT | REACQ\_SAT | JAM**

Sets the action to take when the input pin on the GPI (General Purpose Interface) connector is asserted. The choices are: RESET\_COUNT - reset the program time counter back to initial time; REACQ\_SAT - trigger the reacquire satellite position; and JAM - trigger a jam sync.

**:SOURCE:GPIo:INPut?**

Returns the GPI action to be taken when the input pin on the GPI connector is asserted.

:SOURCE:GPIO:OUTPut[1/2] NONE | SIG\_WARN | LOCK\_LOSS |  
ALARM\_TIME | NEAR\_LLOS | NO\_GENLOCK

**NOTE.** The arguments *NEAR\_LLOS* and *NO\_GENLOCK* are not supported by GPS7 modules that do not have a REF IN connector.

Sets the condition that causes the output pin to go high. The choices available are: NONE - no action will trigger the output pin to go high; SIG\_WARN - output goes high when the signal warning alarm is triggered; LOCK\_LOSS - output goes high when the loss of lock alarm is triggered. A loss of lock alarm is triggered when the GPS signal falls below the user defined threshold after the waiting time has been exceeded; ALARM\_TIME - A time of day or counter alarm is triggered for one second when the specified time is reached on the specified counter; NEAR\_LLOS - output goes high when the near loss of lock alarm is triggered (Genlock only). A loss of lock alarm is triggered when the signal falls below the threshold after the waiting time has been exceeded; NO\_GENLOCK - output goes high when no Genlock signal is detected. A no genlock alarm is triggered when no genlock signal is detected for the specified waiting time.

:SOURCE:GPIO:OUTPut[1/2]?

Returns the action that causes the GPI connector output pin to assert low.

:SOURCE:GPIO:STATUS?

Returns the module GPI status. This is a query-only command. The command returns a string. The returned string is in this form: <OUTPUT2, OUTPUT1, INPUT>. The values for each string element are 0 or 1. For example, a returned string might be "0,0,0" or "1,1,1". A value of 0 means OFF. A value of 1 means ON (inverted hardware status).

## OUTPUT commands

Use these commands control the output parameters of the module.

### Command tree

:OUTPut1

:STATE 0 | 1

:STATE

:OUTPut<1/2/3>

|               |  |
|---------------|--|
| :STANDARD     | NTSC   PAL   NTSC_NSU  <br>HD1080_60I   HD1080_59I  <br>HD1080_50I   HD1080_24SF   HD1080_23SF   HD1080_29P   HD1080_25P  <br>HD1080_24P   HD1080_23P  <br>HD720_60P   HD720_59P  <br>HD720_50P   CW_10MHZ |
| :STANDARD?    |  |
| :SIGNAL       | BB   BB_FREF   BB_NO_REF   |
| :TIMECODE     |  |
| :SOURCE       | DISable, TOD, COUNTER  |
| :SOURCE?      |  |
| :OFFSET       | <NR1>, <NR1>, <NR1><br>(HH:MM:SS)  |
| :OFFSET?      |  |
| :VITC[1/2]    |  |
| :STATE        | 0   1  |
| :STATE?       |  |
| :LINE         | <NR1> (NTSC: 10-20, PAL:<br>6-22, HD: 7-40)  |
| :LINE?        |  |
| :DROPF        |  |
| :STATE        | 0   1  |
| :STATE?       |  |
| :OUTPUT3      |  |
| :LLOSS        |  |
| :STATE        | 0   1  |
| :STATE?       |  |
| :OUTPUT<4>    |  |
| :LTC[1/2/3/4] |  |
| :SOURCE       | DISable   TOD   PCOUNTER   |
| :SOURCE?      |  |
| :OFFSET       | <NR1>, <NR1>, <NR1>, <NR1><br>(HH:MM:SS:FF)  |
| :OFFSET?      |  |
| :TYPE         | N23_FPS   N24_FPS   N25_FPS  <br>N30_FPS   D30_FPS   |
| :TYPE?        |  |
| :LEVEL        | <NRf> (0.5 .. 5.0 in 0.5V<br>increments)   |
| :LEVEL?       |  |
| :MDELAY       | <NRf> ms   |
| :MDELAY?      |  |

|         |                     |
|---------|---------------------|
| :STATE  | 0   1               |
| :OUTPut | POS_V   NEG_V   OFF |
| :LOOP   | 0   1               |
| :LOOP?  |                     |

## Command description :OUTPut1:STATE 0 | 1

**NOTE.** This command is not supported by GPS7 modules that do not have a REF IN connector.

Sets the Black1 output. Select 1 to enable the Black1 output. Select 0 to disable the Black1 output.

:OUTPut1:STATE?

Returns the Black1 output state.

:OUTPut[1/2/3]:STANDARD

NTSC|PAL|NTSC\_NSU|HD1080\_60I|HD1080\_59I| HD1080\_50I|  
HD1080\_24SF|HD1080\_23SF|HD1080\_30P|HD1080\_29P|  
HD1080\_25P|HD1080\_24P| HD1080\_23P|HD720\_60P|HD720\_59P|  
HD720P\_50P|CW\_10MHZ

Sets the video standard for the serial digital black signals output from the BLACK connectors. This command is only available if Option BK is installed.

:OUTPut[1/2/3]:STANDARD?

Returns the video standard for the serial digital black signals output from the BLACK connectors. This command is only available if Option BK is installed.

:OUTPut[1/2/3]:SIGNAl BB | BB\_FREF | BB\_NO\_REF

Sets the Black Output signal. The selections are BB: Black burst; BB\_FREF: Black burst with field reference; and BB\_NO\_REF: Black burst with no field reference.

If the output standard (OUTPut<1/2/3>:STANDARD) is set for HD rates or CW\_10MHZ (Black 3 only), the command returns an ERROR.

If the output standard is set to PAL, then the BB and BB\_FREF settings output a black burst signal with field reference. The BB\_NO\_REF setting outputs a black burst signal with no field reference.

If the output standard is set to NTSC or NTSC\_NSU, then the BB\_FREF setting outputs a black burst signal with field reference. The BB and BB\_NO\_REF settings output a black burst signal with no field reference.

:OUTPut[1/2/3]:TIMECode:SOURCe DISAbLe|TOD|COUNTER

Sets timecode source. Disable shuts off the timecode output. TOD sets the time of day clock as the source. Counter sets the timecode source to the program counter.

**:OUTPut[1/2/3]:TIMECode:SOURce?**

Returns the current timecode source setting.

**:OUTPut[1/2/3]:TIMECode:OFFSet <NR1>,<NR1>,<NR1>,<NR1>**

Sets the timecode offset in hours, minutes, seconds, and frames (HH:MM:SS:FF).

**:OUTPut[1/2/3]:TIMECode:VITc[1/2]:STATE 0 | 1**

Enables or disables the insertion of a VITC. You can enable two timecodes. Setting the state to 1 enables the timecode. Setting the state to 0 disables the timecode.

**:OUTPut[1/2/3]:TIMECode:VITc[1/2]:STATE?**

Returns the VITC insertion state.

**:OUTPut[1/2/3]:TIMECode:LINE**

Sets the line number on which the VITC is located. For NTSC output, the line number range is 10-20. For PAL output, the line number range is 6-22. For HD output, the line number range is 7-40.

**:OUTPut[1/2/3]:TIMECode:LINE?**

Returns the line number on which the VITC is located.

**:OUTPut[1/2/3]:DROPf 0 | 1**

Enables or disables the use of Drop Frame timecode.

**:OUTPut[1/2/3]:DROPf?**

Returns the Drop Frame timecode state. A setting of 0 means drop frame timecode is not used. A setting of 1 means drop frame timecode is used.

**:OUTPut[2]:LLOSS:STATE 0 | 1**

Sets the Black 2 signal to go to 0 V DC if a Loss of Lock condition occurs. Using 1 enables the function. Using 0 means the Black 2 signal will not change due to Loss of Lock.

**:OUTPut[2]:LLOSS:STATE?**

Returns the setting for Black 2 to go to 0 V DC on Loss of Lock.

**:OUTPut4:LTC[1/2/3/4]:SOURce DISAbLe | TOD | PCOUnter**

Sets linear timecode output source. DISAbLe shuts off the timecode output. TOD sets the time of day clock as the source. PCOUnter sets the timecode source to the program counter.

:OUTPut4:LTC[1/2/3/4]:SOURce?

Returns the current linear timecode source setting.

:OUTPut4:LTC[1/2/3/4]:OFFSet <NR1>,<NR1>,<NR1>,<NR1>

Sets the linear timecode offset in hours, minutes, seconds, and frames (HH:MM:SS:FF).

:OUTPut4:LTC[1/2/3/4]:OFFSet?

Returns the linear timecode offset in hours, minutes, seconds, and frames (HH:MM:SS:FF).

:OUTPut4:LTC[1/2/3/4]:TYPE N23\_FPS|N24\_FPS|N25\_FPS|N30\_FPS|D30\_FPS

Sets the linear timecode type.

:OUTPut4:LTC[1/2/3/4]:TYPE

Returns the type of linear timecode output.

:OUTPut4:LTC[1/2/3/4]:LEVEl <numeric\_value>

Sets the voltage level of the linear timecode signal. The value specified must be in floating point format. The range is from 0.5 to 5.0 volts, in 0.5 volt increments.

:OUTPut4:LTC[1/2/3/4]:LEVEl?

Returns the voltage level of the linear timecode signal.

:OUTPut4:LTC[1/2/3/4]:MDElAy <Numeric\_value>

Sets the delay for the linear timecode. The value specified must be in floating point format. Units are milliseconds.

:OUTPut4:LTC[1/2/3/4]:MDElAy

Returns the delay setting for the linear timecode. Units are milliseconds.

:OUTPut4:LTC[1]:STATE 0 | 1

1 - set LTC(1) as input. 0 - set LTC(1) as output (if allowed); meaning that LTC1 is an output, if LTC is not selected as a TOD source. (Only valid for LTC(1) and when GPS7 module has an RF IN connector.)

## SENSE commands

Use these commands to adjust the timing offset of the BLACK outputs relative to the internal reference signal (frame reset signal).

### Command tree

|             |                                |
|-------------|--------------------------------|
| :SENSe<n>   | 1 2 3                          |
| :CORRection |                                |
| :MDELaY     |                                |
| :HORizontal | <numeric_value> floating point |
| :STEP       | <numeric_value>                |
| :STEP       |                                |
| :FIne       | <numeric value>                |
| :FIne       |                                |
| :VERTical   | <numeric_value>                |
| :STEP       | <numeric_value>                |

### Command description

:SENSe<n>:CORRection:MDELaY:HORizontal <numeric\_value>

Sets the horizontal timing offset of the selected outputs. The timing resolution is clock-cycles. The units are microseconds. If the argument exceeds the horizontal time value, then the vertical offset is adjusted to accommodate the requested delay. The <n> in the command represents the output connector. "1" represents the BLACK1 connector, "2" represents the BLACK2 connector, and "3" represents the BLACK3 connector. See Table 2-4 for the delay ranges.

**Table 4: GPS7 output horizontal offset ranges**

| Standard / Frame rate | Range (sample clock cycles) |
|-----------------------|-----------------------------|
| NTSC                  | ± 3432 (54 MHz clock)       |
| PAL                   | ± 3456 (54 MHz clock)       |
| 1080 60i              | ± 2200 (74.25 MHz clock)    |
| 1080 59.94i           | ± 2200 (74.18 MHz clock)    |
| 1080 50i              | ± 2640 (74.25 MHz clock)    |
| 1080 24sF             | ± 2750 (74.25 MHz clock)    |
| 1080 23.98sF          | ± 2750 (74.18 MHz clock)    |
| 1080 30p              | ± 2200 (74.25 MHz clock)    |
| 1080 29.97p           | ± 2200 (74.18 MHz clock)    |
| 1080 25p              | ± 2640 (74.25 MHz clock)    |
| 1080 24p              | ± 2750 (74.25 MHz clock)    |
| 1080 23.98p           | ± 2750 (74.18 MHz clock)    |

**Table 4: GPS7 output horizontal offset ranges (cont.)**

| Standard / Frame rate | Range (sample clock cycles)  |
|-----------------------|------------------------------|
| 720 60p               | $\pm 1650$ (74.25 MHz clock) |
| 720 59.94p            | $\pm 1650$ (74.18 MHz clock) |
| 720 50p               | $\pm 1980$ (74.25 MHz clock) |

**:SENSe<n>:CORRection:MDELay:HORizontal?**

Returns the current horizontal timing offset of the selected outputs. The <n> in the command represents the output connector. "1" represents the BLACK1 connector, "2" represents the BLACK2 connector, and "3" represents the BLACK3 connector.

**:SENSe<n>:CORRection:MDELay:HORizontal:STEP <numeric\_value>**

Increments the horizontal timing offset in steps. The step increment is not user definable, but varies depending on the standard specified (OUTput<n>:STANdard). For NTSC/PAL, the increment is 1/54 MHz. For HD frame rates, the increment is 1/74.18 MHz or 1/74.25 MHz, depending on the frame rate (see Table 2-4). You can specify the number of steps using a floating point numeric value. You can also use the UP or DOWN commands. You can use MIN, MAX, or DEF instead of a numeric value. The <n> in the command represents the output connector. "1" represents the BLACK1 connector, "2" represents the BLACK2 connector, and "3" represents the BLACK3 connector.

**:SENSe<n>:CORRection:MDELay:HORizontal:STEP?**

Returns the current step increment. The <n> in the command represents the output connector. "1" represents the BLACK1 connector, "2" represents the BLACK2 connector, and "3" represents the BLACK3 connector.

**:SENSe<n>:CORRection:MDELay:HORizontal:FINE <numeric\_value>**

Increments the horizontal timing offset in fine steps. For NTSC and PAL, the valid range for the argument is -10.00 to +10.00 in steps of 0.10. For HD, the valid range for the argument is -7.00 to +7.00 in steps of 0.10.

**:SENSe<n>:CORRection:MDELay:HORizontal:FINE?**

Returns the horizontal timing offset in fine steps.

**:SENSe<n>:CORRection:MDELay:VERTical <numeric\_value>**

Sets the vertical timing offset of the selected outputs. The argument must be an integer value. The range of value for the argument is shown in Table 2-5. You can use UP, DOWN, or DEF instead of a numeric value. See page 2-2 for additional detail on UP, DOWN, and DEF. The <n> in the command represents the output connector. "1" represents the BLACK1 connector, "2" represents the BLACK2 connector, and "3" represents the BLACK3 connector.

**Table 5: GPS7 vertical timing offset ranges**

| Standard / frame rate |      | Range      |
|-----------------------|------|------------|
| NTSC                  |      | $\pm 525$  |
| PAL                   |      | $\pm 1250$ |
| HD                    | 1080 | $\pm 562$  |
|                       | 720  | $\pm 375$  |

**:SENSe<n>:CORRection:MDElay:VERTical**

Returns the current vertical timing offset of the selected outputs. The <n> in the command represents the output connector. "1" represents the BLACK1 connector, "2" represents the BLACK2 connector, and "3" represents the BLACK3 connector.

**:SENSe<n>:CORRection:MDElay:VERTical:STEP <numeric\_value>**

Sets the step increment used by the UP or DOWN commands. You can use MIN, MAX, or DEF instead of a numeric value. See page 2-2 for additional detail on MIN, MAX, and DEF. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

# HD3G7 3 Gb/s SDI Video Generator module remote commands

This section describes the commands used to remotely control the HD3G7 3 Gb/s SDI Video Generator module. The commands are divided into the following groups:

- OUTPUT commands (Refer to the HD3G7 section of the TG8000 User Manual for restrictions on which standards are supported for each output mode.)
- SENSE commands
- DIAGNOSTIC commands

## OUTPUT commands

Use these commands control the output parameters of the module.

**NOTE.** The *OUTPUT1* commands affect both of the BNC module connectors in the same way. Output 1 is always identical to Output 2.

### Command tree

:OUTPut1

:ALPHa

COPY\_YG | FF\_0P | FF\_10P |  
FF\_20P | FF\_30P | FF\_40P |  
FF\_50P | FF\_60P | FF\_70P |  
FF\_80P | FF\_90P FF\_100P

:ANC

:OUTMode

<DIS | CONT | SING>

:OUTMode?

:PARItY

MAN | AUTO

:PARItY?

:LiNe

<NR1>, <NR1>

:LiNe?

:SAmPle

<NR1: sample>

:SAmPle?

:DiD

<HEX>

:DiD?

:SDiD

<HEX>

:SDiD?

:DBN

<HEX>

|             |                           |
|-------------|---------------------------|
| :DBN?       |                           |
| :DC         | <NR1> {0-254}             |
| :DC?        |                           |
| :UDW        |                           |
| :INDEX      | <NR1> {0-254}             |
| :INDEX?     |                           |
| :SET        | <NR1:INDEX>, <NR2:UDW>    |
| :SET?       |                           |
| :CLEAR      |                           |
| :CS         |                           |
| :MANual     | <HEX>                     |
| :MANual?    |                           |
| :AUTO       |                           |
| :STATE      | 0 1                       |
| :STATE?     |                           |
| :AUTO?      |                           |
| :VC         | <LUMA CHRO>               |
| :VC?        |                           |
| :LOCation   | <LINKA LINKB>             |
| :LOCation?  |                           |
| :FIELD      |                           |
| :FIELD?     |                           |
| :DATA?      |                           |
| :BLACK      | <0 1>                     |
| :BLACK?     |                           |
| :CONVert    |                           |
| :STATE?     |                           |
| :DHD        | <SIG_SIG SIG_BLK BLK_SIG> |
| :DHD?       |                           |
| :EAUDio     |                           |
| :AGROup     | 1 2 3 4                   |
| :STATE      | 0 1                       |
| :STATE?     |                           |
| :SAMPLing   | <FRAM NOFR ASYNC>         |
| :SAMPLing?  |                           |
| :CHANne1    | 1 2 3 4                   |
| :AMPLitude  | <numeric_value>           |
| :AMPLitude? |                           |
| :FREQuency  | <numeric_value>           |
| :FREQuency? |                           |

|                |   |
|----------------|---|
| :CLICk         | 0 1 2 3 4   |
| :CLICk?        |   |
| :MODE          | ACTive INACTive MUTE  |
| :MODE?         |   |
| :ORIGin        | <string>  |
| :ORIGin?       |   |
| :BGROup        | 1 2 3 4   |
| :STATe         | 0 1   |
| :STATe?        |   |
| :SAMPLing      | <FRAM NOFR ASYNc>   |
| :SAMPLing?     |   |
| :CHANne1       | 1 2 3 4   |
| :AMPLitude     | <numeric_value>   |
| :AMPLitude?    |   |
| :FREQuency     | <numeric_value>   |
| :FREQuency?    |   |
| :CLICk         | 0 1 2 3 4   |
| :CLICk?        |   |
| :MODE          | ACTive INACTive MUTE  |
| :MODE?         |   |
| :DATA?         |   |
| :SYNThesizer   |   |
| :CINema        |   |
| :PROJector     | <NR1> {1-32}  |
| :PROJector?    |   |
| :STATe         | GEN CONV  |
| :STATe?        |   |
| :SIGNa1        | COLBAR_100P COLBAR_75P COLBAR_SMPTE <br>FF_0P FF_10P FF_20P FF_30P FF_40P <br>FF_50P FF_60P FF_70P FF_80P FF_90P <br>FF_100P LIN_5STEP LIN_RAMP <br>MON_RED MON_75RED MON_GREEN <br>MON_75GREEN MON_BLUE MON_75BLUE <br>MON_CONV PULSE_2T30 SDI_EQU SDI_PLL <br>SDI_MTX |
| :SIGNa1?       |   |
| :SIGNa1:LIST?  |   |
| :SIGNa1:COUNT? |   |
| :SIGNa1:BUILd? |   |
| :SIGNa1:LOAD   | <signal name>   |
| :SIGNa1:LOAD?  |   |

|              |   |
|--------------|---|
| :MODE        | MODE_3GA MODE_3GB MODE_3GB_2K <br>MODE_3GA_2K MD_720_3GA MD_2X1080_HD <br>MD_2X720_HD MD_1080_HD MD_720_HD  |
| :MODE?       |   |
| :STANDARD    | HD1080_60P HD1080_59P HD1080_50P <br>HD1080_60I HD1080_59I HD1080_50I <br>HD1080_30P HD1080_29P HD1080_25P <br>HD1080_24P HD_1080_23 HD1080_30SF <br>HD1080_29SF HD1080_25SF HD1080_24SF <br>HD1080_23SF <br>HD720_60P HD720_5994P HD720_50P <br>HD720_30P HD720_2997P HD720_25P <br>HD720_24P HD720_2398P <br>TK1080_23P TK1080_23SF TK1080_24P <br>TK1080_24SF TK1080_25P TK1080_25SF <br>TK1080_29P TK1080_29SF TK1080_30P <br>TK1080_30SF |
| :STANDARD?   |   |
| :SAMPLING    |   |
| :SELECT      | GBR444_12B GBR444_10B GBR444A_10B <br>YCB444_12B YCB444_10B YCB444A_10B <br>YCB422_12B YCB422_10B YCB422A_12B <br>XYZ444_2K   |
| :SAMPLING?   |   |
| :VIDEO       |   |
| :Y           |   |
| :STATE       | ON OFF  |
| :STATE?      |   |
| :PB          |   |
| :STATE       | ON OFF  |
| :STATE?      |   |
| :PR          |   |
| :STATE       | ON OFF  |
| :STATE?      |   |
| :AVTIMING    |   |
| :STATE       | ON OFF  |
| :STATE?      |   |
| :EFILTER     | ON OFF  |
| :EFILTER?    |   |
| :STATE       | ON OFF  |
| :STATE?      |   |
| :MOVE        |   |
| :HORIZONTAL  | <numeric_value>   |
| :HORIZONTAL? |   |

|             |   |
|-------------|---|
| :VERTical   | <numeric_value>   |
| :VERTical?  |   |
| :PERiod     | <numeric_value>   |
| :PERiod?    |   |
| :RANDom     |   |
| :STATe      | ON OFF  |
| :STATe?     |   |
| :TIMECode   |   |
| :SOURce     | <TOD PCOUNTER> (if GPS7 is present)<br><PCOUNTER> (if no GPS7 is present) |
| :SOURce?    |   |
| :OFFSet     | <NR1>, <NR1>, <NR1>, <NR1><br>(HH:MM:SS:FF)                               |
| :OFFSet?    |   |
| :DROP       |   |
| :STATe      | <0 1>   |
| :STATe?     |   |
| :LTC        |   |
| :STATe      | <0 1>   |
| :STATe?     |   |
| :AVITC      |   |
| :STATe      | <0 1>   |
| :STATe?     |   |
| :INITial    | <NR1>, <NR1>, <NR1>, <NR1><br>(HH:MM:SS:FF)                               |
| ;INITial?   |   |
| :SET        |   |
| :DATA?      |   |
| :TRIGger    | SYS_CLOCK PXL_CLOCK <br>FRM_PULSE LINE_PULSE                              |
| :TRIGger?   |   |
| :VPID       |   |
| :STATe      | 0 1   |
| :STATe?     |   |
| :ZONE       |   |
| :FREQuency  |   |
| :FREQuency? |   |
| :AMPLitude  |   |
| :AMPLitude? |   |
| :K          |   |

|            |
|------------|
| :K?        |
| :KX        |
| :KX?       |
| :KXSQ      |
| :KXSQ?     |
| :KXT       |
| :KXT?      |
| :KXY       |
| :KXY?      |
| :KY        |
| :KY?       |
| :KYSQ      |
| :KYSQ?     |
| :KYT       |
| :KYT?      |
| :KT        |
| :KT?       |
| :KTSQ      |
| :KTSQ?     |
| :WAVE      |
| :WAVE?     |
| :SAVE      |
| :TReSet    |
| :STaTe 0 1 |
| :STaTe?    |
| :ViDeo     |
| :Y         |
| :STaTe 0 1 |
| :STaTe?    |
| :PB        |
| :STaTe 0 1 |
| :STaTe?    |
| :PR        |
| :STaTe 0 1 |
| :STaTe?    |
| :DATa?     |

### Command description

:OUTPut1:ALPha COPY\_YG|FF\_0P|FF\_10P|FF\_20P|FF\_30P|FF\_40P|FF\_50P|FF\_60P|FF\_70P|FF\_80P|FF\_90P|FF\_100P|

Sets the alpha channel signal. The choices are COPY\_YG (fills the alpha channel with Y or G data from the input signal), FF\_0P (0% Flat Field), FF\_10P (10% Flat field), FF\_20P (20% Flat field), FF\_30P (30% Flat field), FF\_40P (40% Flat field), FF\_50P (50% Flat field), FF\_60P (60% Flat field), FF\_70P (70% Flat field), FF\_80P (80% Flat field), FF\_90P (90% Flat field), and FF\_100P (100% Flat field).

:OUTPut1:ALPHA?

Returns the current alpha channel signal.

:OUTPut1:ANC:OUTMode <DIS|CONT|SING>

Sets the ancillary payload output mode. The choices are DIS (disable), CONT (continuous), and SING (single packet).

:OUTPut1:ANC:OUTMode

Returns the ancillary payload output mode setting.

:OUTPut1:ANC:PARity <MAN|AUTO>

Sets the ancillary payload parity. The choices are AUTO (automatic) and MAN (manual).

:OUTPut1:ANC:PARity?

Returns the ancillary payload parity setting.

:OUTPut1:ANC:LINE <NR1>,<NR1>

Sets the line on which the ancillary payload starts. Two values are required; the first value is for the Field 1 line number and the second value is for the Field 2 line number. If only a single value is sent, an error will be returned.

:OUTPut1:ANC:LINE?

Returns the line on which the ancillary payload starts.

:OUTPut1:ANC:SAMPle <NR1>

Sets the ancillary payload sample start location. The default value is 1928.

:OUTPut1:ANC:SAMPle?

Returns the ancillary payload sample start setting.

:OUTPut1:ANC:DID <HEX>

Sets the ancillary payload Data Identifier. The data identifier range is from 1 to 255 (FF hex). The Data Identifier should be followed by either a Secondary Data Identifier (SDID) or a Data Block Number (DBN) followed by a Data Count (DC). The Data Count value is followed by User Data Words (UDW), which are followed by a checksum value.

You can send both 8-bit and 10-bit words. A query returns an 8-bit or 10-bit word depending on the ANC:PARITY setting in the instrument. If you send 10-bit word when the Parity is Auto(8-bit), the instrument masks the value. The DID value should be in Hex (preceded by #H as shown in below).

:OUTP1:ANC:DID #HFE

:OUTP1:ANC:DID #H2FF

:OUTPut1:ANC:DID?

Returns the ancillary payload Data Identifier.

:OUTPut1:ANC:SDID <HEX>

Sets the ancillary payload Secondary Data Identifier. The Secondary Data Identifier is valid only if the DID is less than 80 hex.

You can send both 8-bit and 10-bit words. A query returns an 8-bit or 10-bit word depending on the ANC:PARITY setting in the instrument. If you send a 10-bit word when the Parity is Auto (8-bit), the instrument masks the value. The SDID value should be in Hex (preceded by #H, as shown in below).

:OUTP1:ANC:SDID #HFE

:OUTP1:ANC:SDID #H2FF

:OUTPut1:ANC:SDID?

Returns the ancillary payload Secondary Data Identifier.

:OUTPut1:ANC:DBN <HEX>

Sets the ancillary payload Data Block Number.

You can send both 8-bit and 10-bit words. A query returns an 8-bit or 10-bit word depending on the ANC:PARITY setting in the instrument. If you send a 10-bit word when the Parity is Auto (8-bit), the instrument masks the value. The DBN value should be in Hex (preceded by #H, as shown in below).

:OUTP1:ANC:DBN #HFE

:OUTP1:ANC:DBN #H2FF

:OUTPut1:ANC:DBN?

Returns the ancillary payload Data Block Number.

:OUTPut1:ANC:DC <NR1> {0-254}

Sets the ancillary payload Data Count. The DC value determines how many payload data (UDW) can be set.

:OUTPut1:ANC:DC?

Returns the ancillary payload Data Count. The data count indicates how many user data words should follow.

**:OUTPut1:ANC:UDW:INDEX <NR1> {0-254}**

Sets the User Data Word (UDW) location.

**:OUTPut1:ANC:UDW:INDEX?**

Returns the UDW location where the :SET command puts its value and returns its value.

**:OUTPut1:ANC:UDW:SET <NR1:INDEX>,<NR2:UDW>**

Sets the location for and value of a User Data Word. The SET command takes two arguments - first one is the index and second one is the UDW value. The index argument (NR1) specifies the location where the UDW value (NR2) will be set. The UDW value should be in Hex (preceded by #H, as shown in below).

When Parity is set to 8-bit ( Auto):

**:OUTP1:ANC:UDW #HFE ()**

When parity is set to 10 bits (Manual):

**:OUTP1:ANC:UDW #H2FF**

**:OUTPut1:ANC:UDW:SET?**

Returns the value of the UDW value from the location that was earlier set by the OUTP1:ANC:UDW:INDEX command.

**:OUTPut1:ANC:UDW:CLEAR**

Clears the ancillary payload User Data Words values (setting them to 0x00).

**:OUTPut1:ANC:CS:MANua1 <HEX>**

Sets the ancillary payload checksum manually to the value specified. The available range is 0x000 - 0x3FF in 10-bit edit mode.

**:OUTPut1:ANC:CS:MANua1?**

Returns the value specified for the ancillary payload checksum.

**:OUTPut1:ANC:CS:AUTO:STATE 0|1**

Enables or disables the automatic checksum calculation for the ancillary payload user data words.

**:OUTPut1:ANC:CS:AUTO:STATE?**

Returns the state of the automatic checksum calculation (enabled or disabled).

**:OUTPut1:ANC:CS:AUTO?**

Returns the automatically calculated checksum for the ancillary payload user data words.

**:OUTPut1:ANC:VCH <LUMA|CHRO>**

Sets the video channel for the ancillary payload to either Luma or Chroma. Luma is the default value.

:OUTPut1:ANC:VCH?

Returns the video channel for the ancillary payload.

:OUTPut1:ANC:LOCation <LINKA|LINKB>

Sets the location for the ancillary payload.

:OUTPut1:ANC:LOCation?

Returns the location for the ancillary payload.

:OUTPut1:ANC:FIELD <0|1|2>

This command is applicable for interlaced and segmented frame formats. This command sets the ancillary payload either on Field 1 or Field 2 or both on Field 1 & 2. The meaning of the arguments is : 0 = Field 1, 1= Field 2, and 2= Both Field1 & 2.

The Line numbers where Field1 and Field2 payload data is inserted can be set using the two arguments (ln1, ln2) in the OUTP1:ANC:LINE command.

:OUTPut1:ANC:FIELD

Returns the field on which the ancillary payload is set.

:OUTPut1:ANC:DATA?

Returns the ancillary data settings as a single block of data. Data is returned as a sequence of integers, with parameters separated by commas. Data is returned in the following order (line breaks are inserted here for ease of reading):

<Line1>,  
<Line2>,  
<Sample>,  
<Video Channel>,  
<Link Loc>,  
<Parity>,  
<Output Mode>,  
<DID>,  
<SDID>,  
<CS>,  
<Auto CS Selection>,  
<Field Selection>

:OUTPut1:BLACK <0|1>

Sets the secondary output. If not set, the secondary output uses the same test pattern as the primary output.

:OUTPut1:BLACK?

Returns the secondary output setting

**:OUTPut1:CONVert:STATE?**

Returns the standard and sampling structure information for the current conversion.

**:OUTPut1:DHD <SIG\_SIG|SIG\_BLK|BLK\_SIG>**

Sets the 2xHD stream content. SIG\_SIG sets the stream content to Test Signal/Test Signal. SIG\_BLK and BLK\_SIG set the stream content to Test Signal/Black and Black/Test Signal respectively.

**:OUTPut1:DHD?**

Returns the 2xHD stream content setting.

**:OUTPut1:EAUDio:AGROup[n]:STATE 0|1**

Enables or disables embedded audio for Link A group n, where n=1-4.

**:OUTPut1:EAUDio:AGROup[n]:STATE**

Returns the status of embedded audio for Link A group 1-4.

**:OUTPut1:EAUDio:AGROup[n]:SAMPLing <FRAM|NOFR|ASYN>**

Sets the sampling alignment status bits in the audio signal of a specific embedded audio group for the selected outputs. The choices are FRAM (Frame), NOFR (Frame without Frame Number), and ASYNC (Asynchronous). The [n] in the command represents the group number.

**:OUTPut1:EAUDio:AGROup[n]:SAMPLing?**

Returns the sampling alignment status bits in the audio signal of a specific embedded audio group for the selected outputs.

**:OUTPut1:EAUDio:AGROup[n]:CHANnel[x]:AMPLitude  
<numeric\_value>**

Sets the amplitude of a specific audio channel. The numeric value can range from -60 dBFS to 0 dBFS in 1 dBFS steps. The [n] in the command represents the group number. The [x] in the command represents the channel number. You can use any channel number from 1 through 4.

**:OUTPut1:EAUDio:AGROup[n]:CHANnel[x]:AMPLitude?**

Returns the amplitude of a specific audio channel. The [n] in the command represents the group number. The [x] in the command represents the channel number.

**:OUTPut1:EAUDio:AGROup[n]:CHANnel[x]:FREQuency  
<numeric\_value>**

Sets the frequency of a specific audio channel. The unit is Hertz. The choices are 10.0 - 20000.0 in steps of 0.5, default = 1000. The <n> in the command represents the channel number. You can use any channel number from 1 through 8.

`:OUTPut1:EAUDio:AGROup[n]:CHANne1[x]:FREQuency?`

Returns the frequency of a specific audio channel.

`:OUTPut1:EAUDio:AGROup[n]:CHANne1[x]:CLICk 0|1|2|3|4`

Sets the audio click of a specific audio channel. The choices are 1 second to 4 seconds, or off (0). When 1 to 4 is selected, the audio click becomes valid. When audio click is valid, audio tone is turned off for 0.25 seconds around the time of the click. The <x> in the command represents the channel number. You can use any channel number from 1 through 4.

`:OUTPut1:EAUDio:AGROup[n]:CHANne1[x]:CLICk`

Returns the audio click status of the specified audio channel.

`:OUTPut1:EAUDio:AGROup[n]:CHANne1[x]:MODE`

`ACTive|INACTive|MUTE`

Sets the mode of a specific audio channel. The choices are ACT (active), INAC (inactive), and MUTE (muted).

`:OUTPut1:EAUDio:AGROup[n]:CHANne1[x]:MODE?`

Returns the mode of a specific audio channel.

`:OUTPut1:EAUDio:AGROup[n]:CHANne1[x]:ORIGin <string>`

Sets the channel origin ID of up to four ASCII characters.

`:OUTPut1:EAUDio:AGROup[n]:CHANne1[x]:ORIGin?`

Returns the channel origin ID.

`:OUTPut1:EAUDio:BGRouP[n]:STATe 0|1`

Enables or disables embedded audio for Link B group n, where n=1-4.

`:OUTPut1:EAUDio:BGRouP[n]:STATe?`

Returns the status of embedded audio for Link B group 1-4.

`:OUTPut1:EAUDio:BGRouP[n]:SAMPLing <FRAM|NOFR|ASYN>`

Sets the sampling alignment status bits in the audio signal of a specific embedded audio group for the selected outputs. The choices are FRAM (Frame), NOFR (Frame without Frame Number), and ASYNC (Asynchronous). The [n] in the command represents the group number.

`:OUTPut1:EAUDio:BGRouP[n]:SAMPLing?`

Returns the sampling alignment status bits in the audio signal of a specific embedded audio group for the selected outputs.

:OUTPut1:EAUDio:BGROup[n]:CHANne1[x]:AMPLitude  
<numeric\_value>

Sets the amplitude of a specific audio channel. The numeric value can range from -60 dBFS to 0 dBFS in 1 dBFS steps. The [n] in the command represents the group number. The [x] in the command represents the channel number. You can use any channel number from 1 through 4.

:OUTPut1:EAUDio:BGROup[n]:CHANne1[x]:AMPLitude?

Returns the amplitude of a specific audio channel. The [n] in the command represents the group number. The [x] in the command represents the channel number.

:OUTPut1:EAUDio:BGROup[n]:CHANne1[x]:FREQuency  
<numeric\_value>

Sets the frequency of a specific audio channel. The unit is Hertz. The choices are 10.0 - 20000.0 in steps of 0.5, default = 1000. The <n> in the command represents the channel number. You can use any channel number from 1 through 4.

:OUTPut1:EAUDio:BGROup[n]:CHANne1[x]:FREQuency?

Returns the frequency of a specific audio channel.

:OUTPut1:EAUDio:BGROup[n]:CHANne1[x]:CLICk 0|1|2|3|4

Sets the audio click of a specific audio channel. The choices are 1 second to 4 seconds, or off (0). When 1 to 4 is selected, the audio click becomes valid. When audio click is valid, audio tone is turned off for 0.25 seconds around the time of the click. The <x> in the command represents the channel number. You can use any channel number from 1 through 4.

:OUTPut1:EAUDio:BGROup[n]:CHANne1[x]:CLICk

Returns the audio click status of the specified audio channel.

:OUTPut1:EAUDio:BGROup[n]:CHANne1[x]:MODE  
ACTive|INACTive|MUTE

Sets the mode of a specific audio channel. The choices are ACT (active), INAC (inactive), and MUTE (muted).

:OUTPut1:EAUDio:BGROup[n]:CHANne1[x]:MODE?

Returns the mode of a specific audio channel.

:OUTPut1:EAUDio:BGROup[n]:CHANne1[x]:ORIGin <string>

Sets the channel origin ID of up to four ASCII characters.

:OUTPut1:EAUDio:BGROup[n]:CHANne1[x]:ORIGin?

Returns the channel origin ID.

**:OUTPut1:EAUDio:DATA**

Returns the enhanced audio group settings as a single block of data. Data is returned in the following format (line breaks are inserted here for ease of reading):

```
Gr[0]Status, Gr[0]Sampling,
Ch[0]Frq, Ch[0]Amp, Ch[0]Click, Ch[0]State, Ch[0]Origin, Ch[1]Frq,
Ch[1]Amp, Ch[1]Click, Ch[1]State, Ch[1]Origin, Ch[2]Frq, Ch[2]Amp,
Ch[2]Click, Ch[2]State, Ch[2]Origin, Ch[3]Frq, Ch[3]Amp, Ch[3]Click,
Ch[3]State, Ch[3]Origin:
Gr[1]Status, Gr[1]Sampling,
Ch[0]Frq, Ch[0]Amp, Ch[0]Click, Ch[0]State, Ch[0]Origin, Ch[1]Frq,
Ch[1]Amp, Ch[1]Click, Ch[1]State, Ch[1]Origin, Ch[2]Frq, Ch[2]Amp,
Ch[2]Click, Ch[2]State, Ch[2]Origin, Ch[3]Frq, Ch[3]Amp, Ch[3]Click,
Ch[3]State, Ch[3]Origin:
Gr[2]Status, Gr[2]Sampling,
Ch[0]Frq, Ch[0]Amp, Ch[0]Click, Ch[0]State, Ch[0]Origin, Ch[1]Frq,
Ch[1]Amp, Ch[1]Click, Ch[1]State, Ch[1]Origin, Ch[2]Frq, Ch[2]Amp,
Ch[2]Click, Ch[2]State, Ch[2]Origin, Ch[3]Frq, Ch[3]Amp, Ch[3]Click,
Ch[3]State, Ch[3]Origin:
Gr[3]Status, Gr[3]Sampling,
Ch[0]Frq, Ch[0]Amp, Ch[0]Click, Ch[0]State, Ch[0]Origin, Ch[1]Frq,
Ch[1]Amp, Ch[1]Click, Ch[1]State, Ch[1]Origin, Ch[2]Frq, Ch[2]Amp,
Ch[2]Click, Ch[2]State, Ch[2]Origin, Ch[3]Frq, Ch[3]Amp, Ch[3]Click,
Ch[3]State, Ch[3]Origin:
```

Each setting is separated by "," (comma). Groups are separated by ":" (colon).

**:OUTPut1:MODE:MODE\_3GA|MODE\_3GA\_2K|MODE\_3GB|MODE\_3GB\_2K|  
MD\_720\_3GA|MD\_2X1080\_HD|MD\_2X720\_HD| MD\_1080\_HD|MD\_720\_HD**

Sets the output mode. The options are as follows

MODE\_3GA 3GA 1080 lines

MODE\_3GA\_2K 3GA 2K

MODE\_3GB 3GB 1080 lines

MODE\_3GB\_2K 3GB 2K

MD\_720\_3GA 3GA 720 lines

MD\_2X1080\_HD 2xHD 1080 lines

MD\_2X720\_HD 2xHD 720 lines

MD\_1080\_HD HD 1080 lines

MD\_720\_HD HD 720 lines

**:OUTPut1:MODE?**

Returns the current output mode.

**:OUTPut1:MOVE:HORizontal <numeric\_value>**

Sets the amount of horizontal scrolling in the moving picture mode. You can set the value from -252 to +252 samples.

**:OUTPut1:MOVE:HORizontal?**

Returns the amount of horizontal scrolling in the moving picture mode.

**:OUTPut1:MOVE:VERTical <numeric\_value>**

Sets the amount of vertical scrolling in the moving picture mode. You can set the value from -252 to +252 samples.

**:OUTPut1:MOVE:VERTical?**

Returns the amount of vertical scrolling in the moving picture mode.

**:OUTPut1:MOVE:PERiod <numeric\_value>**

Sets the time interval between occurrences of the scrolling. You can set the value from 1 to 16 frames.

**:OUTPut1:MOVE:PERiod?**

Returns the time interval between occurrences of the scrolling.

**:OUTPut1:MOVE:RANDom[:STATE] ON|OFF**

Turns the random scrolling mode on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:MOVE:RANDom[:STATE]?**

Returns the current state of the random scrolling mode.

**:OUTPut1:SAMPling: GBR444\_12B|GBR444\_10B|GBR444A\_10B|  
YCB444\_12B|YCB444\_10B|YCB444A\_10B|YCB422\_12B|  
YCB422\_10B|YCB422A\_12B|GBR444\_2K|XYZ444\_2K**

Sets the sampling structure for the output test signal. Arguments can be set based on what Format/Output Mode is set at that point. The options are as follows:

|             |                            |
|-------------|----------------------------|
| GBR444_12B  | 1080 4:4:4 GBR 12 bits     |
| GBR444_10B  | 1080 4:4:4 GBR 10 bits     |
| GBR444A_10B | 1080 4:4:4 GBR+A 10 bits   |
| YCB444_12B  | 1080 4:4:4 YCbCr 12 bits   |
| YCB444_10B  | 1080 4:4:4 YCbCr 10 bits   |
| YCB444A_10B | 1080 4:4:4 YCbCr+A 10 bits |
| YCB422_12B  | 1080 4:2:2 YCbCr 12 bits   |
| YCB422_10B  | 1080 4:2:2 YCbCr 10 bits   |

|             |                            |
|-------------|----------------------------|
| YCB422A_12B | 1080 4:2:2 YCbCr+A 12 bits |
| GBR444_2K   | 2K 4:4:4 GBR 12 bits       |
| XYZ444_2K   | 2K 4:4:4 XYZ 12 bits       |

The GBR444\_2K and XYZ444\_2K options are only available when any 2K format is selected by the :OUTPut1:STANdard command.

:OUTPut1:SAMPling?

Returns the sampling structure for the output test signal.

```
:OUTPut1:STANdard HD1080_60P|HD1080_59P|HD1080_50P|
HD1080_60I|HD1080_59I|HD1080_50I|HD1080_30P
HD1080_29P|HD1080_25P|HD1080_24P|HD1080_23P
HD1080_30SF|HD1080_29SF|HD1080_25SF|
HD1080_24SF|HD1080_23SF|HD720_60P|
HD720_59P|HD720_50P|HD720_30P|
HD720_29P|HD720_25P|HD720_24P|
HD720_23P|HD1080_24SF|HD1080_23SF|
HD720_60P|HD720_5994P|HD720_50P|
HD720_30P|HD720_2997P|HD720_25P| HD720_24P|HD720_2398P|
TK1080_23P|TK1080_23SF|TK1080_24P|
TK1080_24SF|TK1080_25P|TK1080_25SF|
TK1080_29P|TK1080_29SF|TK1080_30P| TK1080_30SF
```

Sets the video standard of the output signal. Arguments can be set based on what Output Mode is set at that point. TK1080\_XX arguments represent 2K video formats.

:OUTPut1:STANdard?

Returns the current video standard of the output signal.

:OUTPut1:SYNThesizer:CINema:PROJector <NR1> {1-54}

Sets the projector test pattern. The choices are as follows:

0 = 100% Color Bars

1 = SMPTE EG432-1 Color Accuracy

2= Step Black-White

3= Step Black-Dark Gray

6= Black Flat Field

7= White Flat Field

8= Black-to-White 1

9= Black-to-White 2

10= Black-to-White 3

11= Black-to-White 4  
12= Black-to-White 5  
13= Black-to-White 6  
14= Black-to-White 7  
15= Black-to-White 8  
16= Black-to-White 9  
17= Black-to-White 10  
18= Black-to-Gray 1  
19= Black-to-Gray 2  
20= Black-to-Gray 3  
21= Black-to-Gray 4  
22= Black-to-Gray 5  
23= Black-to-Gray 6  
24= Black-to-Gray 7  
25= Black-to-Gray 8  
26= Black-to-Gray 9  
27= Black-to-Gray 10  
28= Circle Zoneplate  
29= Diagonal Zoneplate  
30= Horizontal Sine Zoneplate  
31= Horizontal Sweep Zoneplate  
32= Vertical Sine Zoneplate  
33= V Sweep Zoneplate  
34= Custom-1 Zoneplate  
35= Custom-2 Zoneplate  
36= Red-1 Field  
37= Red-2 Field  
38= Green-1 Field  
39= Green-2 Field  
40= Blue-1 Field  
41= Blue-2 Field

42= Blue-2 Field  
43= Cyan-2 Field  
44= Magneta-1 Field  
45= Magenta-2 Field  
46= Yellow-1 Field  
47= Yellow-2 Field  
48= Convergence  
49= Checkerboard  
50= Production Aperture  
51= Window  
52= Equalizer Test  
53= PLL Test  
54= SDI Matrix

:OUTPut1:SYNThesizer:CINema:PROJector?

Returns the projector test pattern setting.

:OUTPut1:SYNThesizer:STATe GEN|CONV

Sets the synthesizer to generator or convergence mode.

:OUTPut1:SYNThesizer:STATe?

Returns the current synthesizer mode.

:OUTPut1:SYNThesizer:SIGNal

---

**NOTE.** The *SIGNal* and *SIGNal?* commands do not give full access to the test patterns available to this module. Use the *SIGNAL:COUNT*, *SIGNAL:LOAD*, and *SIGNAL:LIST* commands.

---

COLBAR\_100P|COLBAR\_75P|COLBAR\_SMPTE|FF\_0P|  
FF\_10P|FF\_20P|FF\_30P|FF\_40P|FF\_50P|  
FF\_60P|FF70\_P|FF\_80P|FF\_90P|FF\_100P|  
LIN\_5STEP|LIN\_10STEP|LIN\_RAMP|LIN\_SHALLOW\_RAMP|  
LIN\_GRAD\_RAMP|LIN\_VRAMP|  
MON\_RED|MON\_75RED|MON\_GREEN|MON\_75GREEN|MON\_BLUE|  
MON\_75BLUE|MON\_CONV| PULSE\_2T30|PULSE\_2T60|  
SDI\_EQU|SDI\_PLL|SDI\_MTX|  
ZP\_CIRCLE|ZP\_DIAG|ZP\_HSINE|ZP\_HSWEEP|ZP\_VSINE|  
ZP\_VSWEEP|ZP\_1\_CUSTOM|ZP\_2\_CUSTOM

Sets the HD test signal. Before sending this command, you need to set the :OUTPut<n>:SYNThesizer:STATe command to GEN. The options are as follows:

|                  |                            |
|------------------|----------------------------|
| COLBAR_100P      | 100% Color Bars            |
| COLBAR_75P       | 75% Color Bars             |
| COLBAR_SMPTE     | SMPTE RP219 Color Bars     |
| FF_0P            | 0% Flat Field              |
| FF_10P           | 10% Flat Field             |
| FF_20P           | 20% Flat Field             |
| FF_30P           | 30% Flat Field             |
| FF_40P           | 40% Flat Field             |
| FF_50P           | 50% Flat Field             |
| FF_60P           | 60% Flat Field             |
| FF_70P           | 70% Flat Field             |
| FF_80P           | 80% Flat Field             |
| FF_90P           | 90% Flat Field             |
| FF_100P          | 100% Flat Field            |
| LIN_5STEP        | 5 Step Staircase           |
| LIN_10STEP       | 10 Step Staircase          |
| LIN_RAMP         | Ramp                       |
| LIN_SHALLOW_RAMP | Shallow Ramp               |
| LIN_GRAD_RAMP    | Gradient Ramp              |
| LIN_VRAMP        | Valid Ramp                 |
| MON_RED          | 100% Red Field             |
| MON_75RED        | 75% Red Field              |
| MON_GREEN        | 100% Green Field           |
| MON_75GREEN      | 75% Green Field            |
| MON_BLUE         | 100% Blue Field            |
| MON_75BLUE       | 75% Blue Field             |
| MON_CONV         | Convergence                |
| PULSE_2T30       | 2T30 Pulse and Bar         |
| PULSE_2T60       | 2T60 Pulse and Bar         |
| SDI_EQU          | Equalizer Test             |
| SDI_PLL          | PLL Test                   |
| SDI_MTX          | SDI Matrix                 |
| ZP_CIRCLE        | Circle Zone Plate          |
| ZP_DIAG          | Diagonal Sine Zone Plate   |
| ZP_HSINE         | Diagonal Sine Zone Plate   |
| ZP_HSWEEP        | Horizontal Sine Zone Plate |

|             |                           |
|-------------|---------------------------|
| ZP_VSINE    | Vertical Sine Zone Plate  |
| ZP_VSWEEP   | Vertical Sweep Zone Plate |
| ZP_1_CUSTOM | Custom1 Zone Plate        |
| ZP_2_CUSTOM | Custom2 Zone Plate        |

**:OUTPut1:SYNThesizer:SIGNAL?**

Returns the current HD test signal.

**:OUTPut1:SYNThesizer:SIGNAL:LIST?**

Returns all available signals by name. The information of each signal is separated by colon ":".

**:OUTPut1:SYNThesizer:SIGNAL:COUNT?**

Returns how many parametric signals are present in the instrument.

**:OUTPut1:SYNThesizer:SIGNAL:LOAD**

Loads a parametric signal with specified signal name. A list of all available signals is found by using the SIGNAL:LIST? query.

**:OUTPut1:SYNThesizer:SIGNAL:LOAD**

Returns the current parametric signal.

**:OUTPut1:TIMECode:SOURce TOD|PCOUNTER**

Sets time code source. TOD sets the time of day clock as the source (available only if a GPS7 module is installed in the TG8000). PCOUNTER sets the time code source to the program counter (always available).

**:OUTPut1:TIMECode:SOURce?**

Returns the timecode source setting.

**:OUTPut1:TIMECode:OFFSet <NR1>,<NR1>,<NR1>,<NR1>  
(HH:MM:SS:FF)**

Sets the time code offset in hours, minutes, seconds, and frames (HH:MM:SS:FF).

**:OUTPut1:TIMECode:OFFSet?**

Returns the time code offset in hours, minutes, seconds, and frames (HH:MM:SS:FF). This setting is valid only if a GPS7 module is present.

**:OUTPut1:TIMECode:DROP:STATE <0|1>**

Enables or disables the use of Drop Frame timecode (for non-integer frame rate only). A setting of 0 means drop frame timecode is not used. A setting of 1 means drop frame timecode is used.

**:OUTPut1:TIMECode:DROP:STATE?**

Returns the Drop Frame timecode state.

**:OUTPut1:TIMECode:LTC:STATE <0|1>**

Enables or disables the use of Linear timecode. A setting of 0 means Linear timecode is not used. A setting of 1 means Linear timecode is used.

**:OUTPut1:TIMECode:LTC:STATE?**

Returns the Linear timecode state.

**:OUTPut1:TIMECode:AVITC:STATE <0|1>**

Enables or disables the insertion of a VITC. You can enable two timecodes. Setting the state to 1 enables the timecode. Setting the state to 0 disables the timecode.

**:OUTPut1:TIMECode:AVITC:STATE?**

Returns the VITC insertion state.

**:OUTPut1:TIMECode:INITial <NR1>,<NR1>,<NR1> (HH:MM:SS)**

Sets the initial time in hours, minutes, seconds (HH:MM:SS). This setting is valid only if *no* GPS7 module is present.

**:OUTPut1:TIMECode:INTial**

Returns the initial time setting.

**:OUTPut1:TIMECode:SET**

Applies the initial time setting. This setting is valid only if *no* GPS7 module is present.

**:OUTPut1:TIMECode:DATA?**

Returns the timecode data settings as a single block of data. Data is returned as a sequence of integers, with parameters separated by commas. Data is returned in the following format :

<Source>,< LTC state>,<VITC State>,<Drop State>,<HH>,<MM>,<SS>(  
Init Time)

**:OUTPut1:TRIGGER SYS\_CLOCK|PXL\_CLOCK|FRM\_PULSE|LINE\_PULSE**

Specifies the signal available at the TRIGGER output connector. The available choices are a low-jitter sample clock (~148 MHz), a pixel clock which runs at the parallel data clock rate (148.5 MHz or 148.36 MHz for 3G test signals and 74.25 MHz or 74.17 MHz for HD test signals), a frame pulse (once per video frame) or a line pulse (once per video line). FRM\_PULSE is a field-rate square wave when an interlace or segmented frame format is selected, otherwise it is a frame-rate pulse.

**:OUTPut1:TRIGGER?**

Returns the current signal type at the TRIGGER output connector.

**:OUTPut1:VIDeo:Y:STATe ON|OFF**

Turns the Y component of the digital video signal to on or off. You can use 1 or 0 instead of ON or OFF.

**:OUTPut1:VIDeo:Y:STATe**

Returns the current signal output state of the Y component of the digital video.

**:OUTPut1:VIDeo:PB:STATe <ON|OFF>**

Turns the P<sub>B</sub> component of the digital video signal to on or off. You can use 1 or 0 instead of ON or OFF.

**:OUTPut1:VIDeo:PB:STATe?**

Returns the current signal output state of the P<sub>B</sub> component of the digital video.

**:OUTPut1:VIDeo:PR:STATe <ON|OFF>**

Turns the P<sub>R</sub> component of the digital video signal to on or off. You can use 1 or 0 instead of ON or OFF.

**:OUTPut1:VIDeo:PR:STATe?**

Returns the current signal output state of the P<sub>R</sub> component of the digital video.

**:OUTPut1:VIDeo:AVTiming <0|1>**

Turns the output mode for an audio/video timing measurement on or off. Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the mode. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:VIDeo:AVTiming?**

Returns the current output mode setting for an audio/video timing measurement.

**:OUTPut1:VIDeo:EFILter:STATe <0|1>**

When set to 0, all edge filtering is disabled. Test signals with quick, large data transitions will exhibit ringing.

**:OUTPut1:VIDeo:EFILter:STATe**

Enabled = 1; Disabled = 0

**:OUTPut1:VPID:STATe <0|1>**

Sets the VPID (Video Payload IDentifier) state. 0 disables VPID. 1 enables VPID.

**:OUTPut1:VPID:STATe?**

Returns the VPID state.

**:OUTPut1:ZONE:FREQuency <NR1>**

Sets the zone plate frequency.

:OUTPut1:ZONE:FREQuency?

Returns the zone plate frequency.

:OUTPut1:ZONE:AMPLi tude

Sets the value of the zone plate amplitude.

:OUTPut1:ZONE:AMPLi tude?

Returns the value of the zone plate amplitude.

:OUTPut1:ZONE:K <NR1>

Sets the value of the K parameter (phase).

:OUTPut1:ZONE:K?

Returns the value of the K parameter.

:OUTPut1:ZONE:KX

Sets the value of the KX parameter (horizontal frequency).

:OUTPut1:ZONE:KX?

Returns the value of the KX parameter.

:OUTPut1:ZONE:KXSQ

Sets the value of the KXSQ parameter (horizontal sweep).

:OUTPut1:ZONE:KXSQ?

Returns the value of the KXSQ parameter.

:OUTPut1:ZONE:KXT

Sets the value of the KXT parameter (temporal channel horizontal frequency).

:OUTPut1:ZONE:KXT?

Returns the value of the KXT parameter.

:OUTPut1:ZONE:KXY

Sets the value of the KXY parameter (vertical channel horizontal frequency).

:OUTPut1:ZONE:KXY?

Returns the value of the KXY parameter.

:OUTPut1:ZONE:KY

Sets the value of the KY parameter (vertical channel frequency).

:OUTPut1:ZONE:KY?

Returns the value of the KY parameter.

:OUTPut1:ZONE:KYSQ

Sets the value of the KYSQ parameter (vertical sweep).

:OUTPut1:ZONE:KYSQ?

Returns the value of the KYSQ parameter.

:OUTPut1:ZONE:KYT

Sets the value of the KYT parameter (vertical channel vertical frequency).

:OUTPut1:ZONE:KYT?

Returns the value of the KYT parameter.

:OUTPut1:ZONE:KT

Sets the value of the KT parameter (temporal channel frequency).

:OUTPut1:ZONE:KT?

Returns the value of the KT parameter.

:OUTPut1:ZONE:KTSQ

Sets the value of the KTSQ parameter (temporal sweep).

:OUTPut1:ZONE:KTSQ?

Returns the value of the KTSQ parameter.

:OUTPut1:ZONE:WAVE <SINE|SQUARE|TRIANGLE>

Sets the waveform shape.

:OUTPut1:ZONE:WAVE?

Returns the selected waveform shape.

:OUTPut1:ZONE:SAVE

Saves the current settings as User Custom 1 or User Custom 2.

:OUTPut1:ZONE:TRESet:STATE <0|1>

Sets the Temporal dimension to stay constant or vary.

:OUTPut1:ZONE:TRESet:STATE?

Returns the Temporal parameter state.

:OUTPut1:ZONE:VIDEO:Y:STATE <0|1>

Enables or disables the Y/G/X color signal depending on the selected sampling structure (see the:OUTPut1:SAMPLing:SElect command).

:OUTPut1:ZONE:VIDEO:Y:STATE?

Returns the state of the Y/G/X color signal.

:OUTPut1:ZONE:VIDEO:PB:STATE <0|1>

Enables or disables the Cb/B/Y color signal depending on the selected sampling structure (see the:OUTPut1:SAMPling:SElect command).

:OUTPut1:ZONE:VIDEO:PB:STATE?

Returns the state of the Cb/B/Y color signal.

:OUTPut1:ZONE:VIDEO:PR:STATE <0|1>

Enables or disables the Cr/R/Z color signal depending on the selected sampling structure (see the:OUTPut1:SAMPling:SElect command).

:OUTPut1:ZONE:VIDEO:PR:STATE?

Returns the state of the Cr/R/Z color signal.

:OUTPut1:ZONE:DATA?

Returns the Zoneplate data settings as a single block of data. Data is returned as a sequence of integers, with parameters separated by commas. Data is returned in the following format:

<Amp>,<Freq>,<kx>,<kx2>,<kxy>,<ky>,<ky2>,<k>,<kxt>,<kyt>,<kt>,<kt2>,<Y>,<Pb>,<Pr>,<Waveform Shape>,<TReset>

## SENSE commands

Use these commands to set the timing of the HD3G7 module relative to the internal reference signal (frame reset signal).

### Command tree

|              |                 |
|--------------|-----------------|
| :SENSe1      |                 |
| :CORRection  |                 |
| :MDElay      |                 |
| :HORizontal  | <NR1>           |
| :HORizontal? |                 |
| :VERTical    | <NR1>           |
| :Relative    | <ANALog SERial> |

### Command description

:SENSe1:CORRection:MDElay:HORizontal <NR1>

Sets the horizontal timing offset of the selected outputs. The timing resolution is clock-cycles. The units are microseconds. See Table 2-6 for the delay ranges.

**Table 6: HD3G7 horizontal offset ranges**

| Standard / Frame rate | Range $\mu$ s<br>( $\pm 1$ video line) | Resolution                       |
|-----------------------|--|----------------------------------|
| 1080 60p              | 14.814                                 | .0067 $\mu$ s (148.5 MHz clock)  |
| 1080 59.94p           | 14.829                                 | .0067 $\mu$ s (148.36 MHz clock) |
| 1080 50p              | 17.778                                 | .0067 $\mu$ s (148.5 MHz clock)  |
| 1080 60i              | 29.629                                 | .0135 $\mu$ s (74.25 MHz clock)  |
| 1080 59.94i           | 29.659                                 | .0135 $\mu$ s (74.18 MHz clock)  |
| 1080 50i              | 35.556                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 1080 30p / sF         | 29.629                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 1080 29.97p / sF      | 29.659                                 | .0135 $\mu$ s (74.18 MHz clock)  |
| 1080 25p / sF         | 35.542                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 1080 24p / sF         | 37.037                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 1080 23.98p / sF      | 37.074                                 | .0135 $\mu$ s (74.18 MHz clock)  |
| 720 60p               | 22.222                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 720 59.94p            | 22.244                                 | .0135 $\mu$ s (74.18 MHz clock)  |
| 720 50p               | 26.667                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 720 30p               | 44.444                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 720 29.97p            | 44.489                                 | .0135 $\mu$ s (74.18 MHz clock)  |
| 720 25p               | 53.333                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 720 24p               | 55.555                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 720 23.98p            | 55.611                                 | .0135 $\mu$ s (74.18 MHz clock)  |

**:SENSe1:CORRection:MDElay:Horizonta1**

Returns the current horizontal timing offset of the selected outputs.

**:SENSe1:CORRection:MDElay:VERTical <NR1>**

Sets the vertical timing offset of the selected outputs. The units are lines. The range is  $\pm 562$  for 1080-line formats and  $\pm 375$  for 720-line formats.

**:SENSe1:CORRection:MDElay:RELative <ANALog|SERial>**

ANALog includes correction for the delay through a standard D to A converter; SERial omits this correction.

## DIAGNOSTIC commands

Use these commands to perform diagnostics on the module. The command readouts also appear on the front panel of the instrument.

### Command tree

|   |
|---|
| :DIAGnostic                               |
| :CCRC                                     |
| :CLEAR                                    |
| :POWER?                                   |
| :DDS                                      |
| :DATA?                                    |
| :GPI                                      |
| :INPut<1/2/3>                             |
| [ :STATE ]?                               |
| :OUTPut                                   |
| [ :STATE ]                      <boolean> |
| :FPGA                                     |
| :KEYBoard                                 |
| [ :TEST ]?                                |
| :LOCK                                     |
| :TEMPerature?                             |
| :YCRC                                     |

### Command description

:DIAGnostic:CCRC?

Returns the number of input C CRC errors since clear.

:DIAGnostic:CLEAR

Trigger only. If the value is set to 1, the command clears the CRC counts and resets them to zero.

:DIAG:DATA?

Returns the Diagnostics data settings as a single block of data. Data is returned as a series of strings, with parameters separated by commas. Data is returned in the following format:

<Temp>,<FPGA>,<Lock>,<DDS>,<YCRC>,<CCRC>,<Power>

:DIAGnostic:DDS?

Returns the phase lock status of the DDS0 and DDS1 circuits.

:DIAGnostic:FPGA?

Returns the current FPGA version.

**:DIAGnostic:KEYBoard[:TEST]?**

Initiates a front panel keyboard test and returns PASS or FAIL as appropriate. This command requires front panel interaction by the user to complete the test.

**:DIAGnostic:LOCK?**

Returns the status of the JIT, FLEX0, and FLEX1 circuits where 0 indicates locked and 1 indicates unlocked.

**:DIAGnostic:PLL[:STATE]?**

Returns the current PLL lock status for each of the three clocks: 12.288:<st> 54:<st> 74.25: <st> 74.176:<st> where st can be 1k for lock or un for unlock.

**:DIAGnostic:POWER?**

Returns a string with eight supply voltage values.

**:DIAGnostic:TEMPerature?**

Returns the current temperature of the circuit board or FPGA in degrees Celsius.

**:DIAGnostic:YCRC?**

Returns the number of input Y CRC errors since clear.

# HDLG7 HD Dual Link Video Generator module remote commands

This section describes the remote commands used to control the HDLG7 HD Dual Link Video Generator module remotely. The commands to the module are divided into the following two groups:

- OUTPUT commands
- SENSE commands

## OUTPUT commands

Use these commands control the output parameters of the module.

### Command tree

|                 |  |
|-----------------|--|
| :OUTPut1        |  |
| :ALPHA          | COPY_YG FF_OP FF_10P FF_20P FF_30P FF_40P FF_50P FF_60P FF_70P FF_80P FF_90P FF_100P |
| :CONVert        |  |
| :BLACKwhite     | ON OFF   |
| :LINK           |  |
| :AUDio          | 0 1 2  |
| :STATE?         |  |
| :MOVE           |  |
| :HORizontal     | <numeric_value>  |
| :VERTical       | <numeric_value>  |
| :PERiod         | <numeric_value>  |
| :RANDom[:STATE] | ON OFF   |
| :SAMPLing       |  |

|             |   |
|-------------|---|
| :SElect     | GBR444_12B GBR444_10B GBR444A_10B <br>YCB444_12B YCB444_10B YCB444A_10B <br>YCB422_12B YCB422_10B YCB422A_12B <br>GBR444_2K XYZ444_2K<br>:STANDARD<br>HD1080_60P HD1080_59P HD1080_50P <br>HD1080_60I HD1080_59I HD1080_50I <br>HD1080_30P HD1080_29P HD1080_25P <br>HD1080_24P HD1080_23P HD1080_24SF <br>HD1080_23SF TK1556_14SF TK1556_15SF <br>TK1556_17SF TK1556_18SF TK1080_23SF <br>TK1080_24SF TK1080_25SF TK1080_29SF <br>TK1080_30SF TK1080_23P TK1080_24P <br>TK1080_25P TK1080_29P TK1080_30P |
| :SYNthesize |   |
| :CINema     |   |
| :COLOR      | RGB PROJ  |
| :GRAD       |   |
| :HORizontal | <16, 17, 18, ... , 1912,<br>1913>   |
| :VERTical   | <16, 17, 18, ... , 2880>  |
| :PROJector  | <0, 1, 2, ... , 46, 47>   |
| :CATalog?   |   |
| :STATE      | ON OFF  |
| :SIGNal     | COLBAR_100P COLBAR_75P COLBAR_SMPTE <br>FF_0P FF_10P FF_20P FF_30P FF_40P <br>FF_50P FF_60P FF_70P FF_80P FF_90P <br>FF_100P LIN_5STEP LIN_RAMP LIN_VRAMP <br>MON_RED MON_75RED MON_GREEN <br>MON_75GREEN MON_BLUE MON_75BLUE <br>MON_CONV PULSE_2T30 SDI_EQU SDI_PLL <br>SDI_MTX   |

**Command description**

:OUTPut1:ALPHA COPY\_YG|FF\_0P|FF\_10P|FF\_20P|FF\_30P|FF\_40P|  
FF\_50P|FF\_60P|FF\_70P|FF\_80P|FF\_90P|FF\_100P|

Sets the alpha channel signal. The choices are COPY\_YG (fills the alpha channel with Y or G data from the input signal), FF\_0P (0% Flat Field), FF\_10P (10% Flat field), FF\_20P (20% Flat field), FF\_30P (30% Flat field), FF\_40P (40% Flat field), FF\_50P (50% Flat field), FF\_60P (60% Flat field), FF\_70P (70% Flat field), FF\_80P (80% Flat field), FF\_90P (90% Flat field), and FF\_100P (100% Flat field).

:OUTPut1:ALPHA?

Returns the current alpha channel signal.

:OUTPut1:CONVert:BLACKwhite ON|OFF

Turns the black and white mode on or off. When the current color space is GBR, G data is copied to B and R field for getting a black and white display. When the color space is YCbCr, the command has no effect.

`:OUTPut1:CONVert:BLACkwhite?`

Returns the current black and white mode status.

`:OUTPut1:CONVert:LINK:AUDio 0|1|2`

Sets which link to place embedded audio on the input signal. The choices are 0 (Link A only), 1 (Link B only), and 2 (Link A and Link B).

`:OUTPut1:CONVert:LINK:AUDio?`

Returns the link to place embedded audio on the input signal.

`:OUTPut1:CONVert:STATe?`

Returns the video standard and sampling structure information from the second line of the status display.

`:OUTPut1:MOVE:HORizontal <numeric_value>`

Sets the amount of horizontal scrolling in the moving picture mode. You can set the value from -252 to +252 in 4 samples steps.

`:OUTPut1:MOVE:HORizontal?`

Returns the amount of horizontal scrolling in the moving picture mode.

`:OUTPut1:MOVE:VERTical <numeric_value>`

Sets the amount of vertical scrolling in the moving picture mode. You can set the value from -252 to +252 in 1 line steps.

`:OUTPut1:MOVE:VERTical?`

Returns the amount of vertical scrolling in the moving picture mode.

`:OUTPut1:MOVE:PERiod <numeric_value>`

Sets the time interval between occurrences of the scrolling. You can set the value from 1 to 16 in 1 field steps.

`:OUTPut1:MOVE:PERiod?`

Returns the time interval between occurrences of the scrolling.

`:OUTPut1:MOVE:RANDom[:STATe] ON|OFF`

Turns the random scrolling mode on or off. You can also use 1 or 0 instead of ON or OFF.

`:OUTPut1:MOVE:RANDom[:STATe]?`

Returns the current state of the random scrolling mode.

```
:OUTPut1:SAMPling:SElect GBR444_12B|GBR444_10B|GBR444A_10B|
YCB444_12B|YCB444_10B|YCB444A_10B|
YCB422_12B|YCB422_10B|YCB422A_12B| GBR444_2K|XYZ444_2K
```

Sets the sampling structure for the output test signal. The options are as follows:

|             |                            |
|-------------|----------------------------|
| GBR444_12B  | 1080 4:4:4 GBR 12 bits     |
| GBR444_10B  | 1080 4:4:4 GBR 10 bits     |
| GBR444A_10B | 1080 4:4:4 GBR+A 10 bits   |
| YCB444_12B  | 1080 4:4:4 YCbCr 12 bits   |
| YCB444_10B  | 1080 4:4:4 YCbCr 10 bits   |
| YCB444A_10B | 1080 4:4:4 YCbCr+A 10 bits |
| YCB422_12B  | 1080 4:2:2 YCbCr 12 bits   |
| YCB422_10B  | 1080 4:2:2 YCbCr 10 bits   |
| YCB422A_12B | 1080 4:2:2 YCbCr+A 12 bits |
| GBR444_2K   | 2K 4:4:4 GBR 12 bits       |
| XYZ444_2K   | 2K 4:4:4 XYZ 12 bits       |

The GBR444\_2K and XYZ444\_2K options are only available when any 2K format is selected by the :OUTPut1:STANdard command.

```
:OUTPut1:SAMPling:SElect?
```

Returns the current sampling structure.

```
:OUTPut1:STANdard
HD1080_60P|HD1080_59P|HD1080_50P|HD1080_60I|
HD1080_59I|HD1080_50I|HD1080_30P|HD1080_29P|
HD1080_25P|HD1080_24P|HD1080_23P|HD1080_24SF|
HD1080_23SF|TK1556_14SF|TK1556_15SF|
TK1556_17SF|TK1556_18SF|TK1080_23SF|
TK1080_24SF|TK1080_25SF|TK1080_29SF|
TK1080_30SF|TK1080_23P|TK1080_24P|TK1080_25P|
TK1080_29P|TK1080_30P
```

Sets the video standard of the output signal. TK1556\_xx and TK1080\_xx arguments represent 2K video formats.

```
:OUTPut1:STANdard?
```

Returns the current video standard.

```
:OUTPut1:SYNThsize:CINema:COLOr RGB|PROJ
```

Sets the 2K test signal color space. The choices are RGB (Rec.709 Test pattern) and PROJ (Projector Test Pattern).

```
:OUTPut1:SYNThsize:CINema:COLOr?
```

Returns the current 2K test signal color space.

`:OUTPut1:SYNThsize:CINema:GRAD:HORizontal <16, 17, 18, ... ,1913>`

Sets the start offset of the Horizontal Gradient projector test pattern. You can set the value from 16 to 1913 in 1 level steps.

`:OUTPut1:SYNThsize:CINema:GRAD:HORizontal?`

Returns the current start offset of the Horizontal Gradient projector test pattern.

`:OUTPut1:SYNThsize:CINema:GRAD:VERTical <16, 17, 18, ... , 2880>`

Sets the start offset of the Vertical Gradient projector test pattern. For the 2048 x 1080 format, you can set the value from 16 to 2880 in 1 level steps. For the 2048 x 1556 format, you can set the value from 16 to 2405 in 1 level steps.

`:OUTPut1:SYNThsize:CINema:GRAD:VERTical?`

Returns current start offset of the Vertical Gradient projector test pattern.

`:OUTPut1:SYNThsize:CINema:PROJector <0, 1, 2, ..., 46, 47>`

Sets the projector test pattern. Before sending this command, set the `:OUTPut1:SYNThsize:STATE` command to ON and `:OUTPut1:SYNThsize:CINema:COLOr` to PROJ. The possible settings are:

|                            |                           |
|----------------------------|---------------------------|
| 0: Color Bar Patch-1       | 24: Black to Gray Step-7  |
| 1: Color Bar Patch-2       | 25: Black to Gray Step-8  |
| 2: Step Black-White        | 26: Black to Gray Step-9  |
| 3: Step Black-Dark Gray    | 27: Black to Gray Step-10 |
| 4: Horizontal Gradient     | 28: Red-1 Field           |
| 5: Vertical Gradient       | 29: Red-2 Field           |
| 6: Black Flat Field        | 30: Green-1 Field         |
| 7: White Flat Field        | 31: Green-2 Field         |
| 8: Black to White Step-1   | 32: Blue-1 Field          |
| 9: Black to White Step-2   | 33: Blue-2 Field          |
| 10: Black to White Step-3  | 34: Cyan-1 Field          |
| 11: Black to White Step-4  | 35: Cyan-2 Field          |
| 12: Black to White Step-5  | 36: Magenta-1 Field       |
| 13: Black to White Step-6  | 37: Magenta-2 Field       |
| 14: Black to White Step-7  | 38: Yellow-1 Field        |
| 15: Black to White Step-8  | 39: Yellow-2 Field        |
| 16: Black to White Step-9  | 40: GRID                  |
| 17: Black to White Step-10 | 41: Checkboard            |
| 18: Black to Gray Step-1   | 42: Aspect Ratio          |

|                          |                           |
|--------------------------|---------------------------|
| 19: Black to Gray Step-2 | 43: Window                |
| 20: Black to Gray Step-3 | 44: Equalizer Test        |
| 21: Black to Gray Step-4 | 45: PLL Test              |
| 22: Black to Gray Step-5 | 46: SDI Matrix            |
| 23: Black to Gray Step-6 | 47: Black (response only) |

#### :OUTPut1:SYNThesize:CINema:PROJector

Returns the current projector test pattern number. If an HD test signal is selected, 47 (Black) is returned.

#### :OUTPut1:SYNThesize:CINema:PROJector:CATaLog

Lists all the projector test patterns.

#### :OUTPut1:SYNThesize:STATe ON|OFF

Turns the generator mode on or off.

#### :OUTPut1:SYNThesize:STATe

Returns the current generator mode status.

#### :OUTPut1:SYNThesize:SIGNaL

COLBAR\_100P|COLBAR\_75P|COLBAR\_SMPTE|  
 FF\_0P|FF\_10P|FF\_20P|FF\_30P|FF\_40P|  
 FF\_50P|FF\_60P|FF70\_P|FF\_80P|FF\_90P|  
 FF\_100P|LIN\_5STEP|LIN\_RAMP|LIN\_VRAMP|  
 MON\_RED|MON\_75RED|MON\_GREEN|  
 MON\_75GREEN|MON\_BLUE|MON\_75BLUE|  
 MON\_CONV|PULSE\_2T30|SDI\_EQU|SDI\_PLL| SDI\_MTX

Sets the HD test signal. Before sending this command, you need to set the :OUTPut1:SYNThesize:STATe command to ON. The options are as follows:

|              |                        |
|--------------|------------------------|
| COLBAR_100P  | 100% Color Bars        |
| COLBAR_75P   | 75% Color Bars         |
| COLBAR_SMPTE | SMPTE RP219 Color Bars |
| FF_0P        | 0% Flat Field          |
| FF_10P       | 10% Flat Field         |
| FF_20P       | 20% Flat Field         |
| FF_30P       | 30% Flat Field         |
| FF_40P       | 40% Flat Field         |
| FF_50P       | 50% Flat Field         |
| FF_60P       | 60% Flat Field         |
| FF_70P       | 70% Flat Field         |
| FF_80P       | 80% Flat Field         |
| FF_90P       | 90% Flat Field         |

|             |                    |
|-------------|--------------------|
| FF_100P     | 100% Flat Field    |
| LIN_5STEP   | 5 Step Staircase   |
| LIN_RAMP    | Ramp               |
| LIN_VRAMP   | Valid Ramp         |
| MON_RED     | 100% Red Field     |
| MON_75RED   | 75% Red Field      |
| MON_GREEN   | 100% Green Field   |
| MON_75GREEN | 75% Green Field    |
| MON_BLUE    | 100% Blue Field    |
| MON_75BLUE  | 75% Blue Field     |
| MON_CONV    | Convergence        |
| PULSE_2T30  | 2T30 Pulse and Bar |
| SDI_EQU     | Equalizer Test     |
| SDI_PLL     | PLL Test           |
| SDI_MTX     | SDI Matrix         |

:OUTPut1:SYNThesize:SIGNal

Returns the current HD test signal.

## SENSE commands

Use these commands to set the timing offset of the LINK B outputs relative to the LINK A outputs.

Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the setting range.

### Command tree

|                             |
|-----------------------------|
| :SENSe1                     |
| :CORRection                 |
| :MDElay                     |
| :HORizontal <numeric_value> |

### Command description

:SENSe1:CORRection:MDElay:HORizontal <numeric\_value>

Sets the horizontal timing offset of the LINK B outputs. The timing resolution is clock-cycles. The units are microseconds.

:SENSe1:CORRection:MDElay:HORizontal?

Returns the current horizontal timing offset of the LINK B outputs.

## Command examples

This section shows some examples of using remote commands to generate dual link signals and to set the timing offset of the LINK B outputs.

### Generating dual link signals from converted input

To output dual link signals from a converted input where the source test signal is 1080 59.94i standard, 100% Color Bars from the HDVG7 module in slot 4. The HDLG7 module is in slot 3, the sampling structure is "GBR 4:4:4 10 bits," and alpha channel data of 10% Flat Field is inserted:

```
INST:SEL "HDVG7:4"
INST: NSEL 4;:MMEM:LOAD:SIGN 4, "/1080 59.94i/COLOR
BAR/100%^Color Bars"
INST:SEL "HDLG7:3"
OUTP1:SYNT:STAT OFF
OUTP1:SAMP:SEL GBR444A_10B
OUTP1:ALPH FF_10P
```

### Generating synthesized dual link signals

To generate dual link signals where the HDLG7 module is in slot 3, the video standard is 1080 59.94i, the test signal is 100% Color Bars, the sampling structure is "1080 YCbCr 4:4:4 10 bits," and no alpha channel data is inserted:

```
INST:SEL "HDLG7:3"
OUTP1:SYNT:STAT ON
OUTP1:STAN HD1080_59I
OUTP1:SYNT:SIGN COLBAR_100P
OUTP1:SAMP:SEL YCB444_10B
```

### Generating synthesized projector test patterns

To generate projector test patterns where the video standard is 2K 1080 24p and the test pattern is Black to Gray Step-8:

```
OUTP1:STAN TK1080_24P
OUTP1:SYNT:CINE:COLO PROJ
OUTP1:SYNT:CINE:PROJ 25
```

You can list all the projector test patterns and their numbers by using the :OUTP1:SYNT:CINE:PROJ:CAT? command.

**Setting timing offset of link  
b relative to link a**

To set the timing offset of the LINK B outputs to 0.0269 ms from the LINK A outputs:

`SENS1:CORR:MDEL:HOR 0.0269`

# HDVG7 HDTV Digital Video Generator module remote commands

This section describes the remote commands used to control the HDVG7 HDTV Digital Video Generator module remotely. The commands to the module are divided into the following three groups:

- MASS MEMORY commands (Refer to the *TG8000 Multiformat Test Signal Generator User Manual*)
- OUTPUT commands
- SENSE commands

## MASS MEMORY commands

Two MASS MEMORY commands are listed here for your reference. You can use these to load and query the output test signal. Detailed information for using these commands are located in the *TG8000 Multiformat Test Signal Generator User Manual*.

**:MMEMory:LOAD:SIGNal** <module\_name>,<signal\_name>

**:MMEMory:LOAD:SIGNal** <slot\_number>,<signal\_name>

Loads a signal into the specified module.

**:MMEMory:SIGNal:ACTive** <slot\_number>|<module\_name>

Returns the current output signal of the specified module.

## OUTPUT commands

Use these commands control the output parameters of the module. These include embedded audio and circle/text/logo overlay.

### Command tree

**:OUTPut<n>**

**:CIRCl**e

**:STATe**

ON|OFF

**:DIAMeter**

<numeric\_value>

**:POSITi**on

**:HORizonta**l

<numeric\_value>

**:VERTica**l

<numeric\_value>

**:EAUDi**o

|                 |  |                     |
|-----------------|--|---------------------|
| :CHANnel<n>     |  |                     |
| :AMPLitude      |  | <numeric_value>     |
| :FREQuency      |  | <numeric_value>     |
| :CLICk          |  | OFF 1 2 3 4         |
| :GROup<n>       |  |                     |
| :STATe          |  | ON OFF              |
| :PREemphasis    |  | OFF CD CCITt        |
| :NBITS          |  | 20 24               |
| :SAMPLIng       |  | FRAME NOFRame ASYNc |
| :LOGO           |  |                     |
| :STATe          |  | ON OFF              |
| :POSition       |  |                     |
| :HORizontal     |  | <numeric_value>     |
| :VERTical       |  | <numeric_value>     |
| :SElect         |  | <logo_name>         |
| :SAVe           |  |                     |
| :MOVE           |  |                     |
| :HORizontal     |  | <numeric_value>     |
| :VERTical       |  | <numeric_value>     |
| :PERiod         |  | <numeric_value>     |
| :RANDom[:STATe] |  | ON OFF              |
| :OVERlay        |  |                     |
| :BLINK          |  |                     |
| :STATe          |  | ON OFF              |
| :PERiod         |  | <numeric_value>     |
| :TEXT           |  |                     |
| :STATe          |  | ON OFF              |
| :DATA           |  | <string>            |
| :POSition       |  |                     |
| :HORizontal     |  | <numeric_value>     |
| :VERTical       |  | <numeric_value>     |
| :SAVe           |  |                     |
| :VIDeo          |  |                     |
| :Y              |  |                     |
| :STATe          |  | ON OFF              |
| :PB             |  |                     |
| :STATe          |  | ON OFF              |
| :PR             |  |                     |
| :STATe          |  | ON OFF              |
| :AVTiming       |  |                     |

| :STATE    | ON OFF  |
|-----------|---|
| :STANDARD | HD1080_60I HD1080_59I HD1080_50I <br>HD1080_24SF HD1080_23SF HD1080_30P <br>HD1080_29P HD1080_25P HD1080_24P <br>HD1080_23P HD1035_60I HD1035_59I <br>HD720_60P HD720_59P HD720_50P <br>HD720_30P HD720_29P HD720_25P <br>HD720_24P HD720_23P |
| :SIGNAL   | BLACK GRAY FF50P WHITE  |

## Command description

:OUTPut1:CIRClE:STATE ON|OFF

Turns the circle overlay on the video signal on or off. You can use 1 or 0 instead of ON or OFF.

:OUTPut1:CIRClE:STATE?

Returns the current circle overlay state.

:OUTPut1:CIRClE:DIAMeter <numeric\_value>

Sets the diameter of the displayed circle. The unit is percent of active picture height. You can set the diameter from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

:OUTPut1:CIRClE:DIAMeter?

Returns the diameter of the displayed circle.

:OUTPut1:CIRClE:POSition:HORizontal <numeric\_value>

Sets the horizontal position of the circle as it appears on the active signal. The unit is percent of active picture width. You can set the position from -50% to +50% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

:OUTPut1:CIRClE:POSition:HORizontal?

Returns the current horizontal position of the circle as it appears on the active signal.

:OUTPut1:CIRClE:POSition:VERTical <numeric\_value>

Sets the vertical position of the circle as it appears on the active signal. The unit is percent of active picture height. You can set the position from -50% to +50% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

:OUTPut1:CIRClE:POSition:VERTical?

Returns the current vertical position of the circle as it appears on the active signal.

:OUTPut<n>:EAUDio:CHANnel<m>:AMPLitude <numeric\_value>

Sets the amplitude of a specific embedded audio channel for the selected outputs. You can set the amplitude from -60 dBFS to 0 dBFS in 1 dBFS steps. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:CHANne1<m>:AMPLitude?**

Returns the current amplitude of a specific embedded audio channel for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:CHANne1<m>:FREQuency <numeric\_value>**

Sets the frequency of a specific embedded audio channel for the selected outputs. The frequency choices are -1, 0, 50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1000, 1200, 1500, 1600, 2000, 2400, 3000, 3200, 4000, 4800, 5000, 6000, 8000, 9600, 10000, 12000, 15000, 16000, or 20000. For -1, the output of the audio data is disabled. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:CHANne1<m>:FREQuency?**

Returns the current frequency of a specific embedded audio channel for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:CHANne1<m>:CLICk 0|1|2|3|4**

Sets the audio click of a specific audio channel for the selected outputs. You can select 0, 1 (second), 2 (seconds), 3 (seconds) or 4 (seconds). When 1, 2, 3 or 4 is selected, the audio click becomes valid. Audio Tone is turned off for 0.25 seconds around the time of the click. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:CHANne1<m>:CLICk?**

Returns the current audio click settings of a specific audio channel for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the channel number and you can use any channel number from 1 through 16.

**:OUTPut<n>:EAUDio:GRoup<m>:STATe ON|OFF**

Turns the output of a specific audio group for the selected outputs on or off. You can also use 1 or 0 instead of ON or OFF. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GRoup<m>:STATe?**

Returns the current output state of a specific audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GRoup<m>:PREemphasIs OFF|CD|CCITt**

Turns the preemphasis bits on or off in the audio signal of a specific embedded audio group for the selected outputs. The signal itself does not have preemphasis, but you can set the bits in order to check other equipment. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GRoup<m>:PREemphasIs?**

Returns the current preemphasis bits settings of a specific embedded audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GRoup<m>:NBITs 20|24**

Sets the sample bits of a specific embedded audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

**:OUTPut<n>:EAUDio:GRoup<m>:NBITs?**

Returns the current sample bits of a specific embedded audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

:OUTPut<n>:EAUDio:GROup<m>:SAMPLIng FRAME|NOFrame|ASYNc

Sets the sampling alignment status bits in the audio signal of a specific embedded audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

:OUTPut<n>:EAUDio:GROup<m>:SAMPLIng?

Returns the current sampling alignment status bits settings of a specific embedded audio group for the selected outputs. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors. The <m> in the command represents the group number and you can use any channel number from 1 through 4.

:OUTPut1:LOGO:STATe ON|OFF

Turns the logo overlay display on the video signal on or off. You can also use 1 or 0 instead of ON or OFF.

:OUTPut1:LOGO:STATe?

Returns the current logo overlay state.

:OUTPut1:LOGO:POSition:HORIZontal <numeric\_value>

Sets the horizontal position of the logo as it appears on the active signal. The unit is percent of active picture width. You can set the position from -100% to 0% in 0.1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

:OUTPut1:LOGO:POSition:HORIZontal?

Returns the current horizontal position of the logo.

:OUTPut1:LOGO:POSition:VERTical <numeric\_value>

Sets the vertical position of the logo as it appears on the active signal. The unit is percent of active picture height. You can set the position from -100% to 0% in 0.1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

:OUTPut1:LOGO:POSition:VERTical?

Returns the current vertical position of the logo.

**:OUTPut1:LOGO:SElect <logo\_name>**

Selects the logo used for the logo overlay.

**:OUTPut1:LOGO:SElect?**

Returns the current logo used for the logo overlay.

**:OUTPut1:LOGO:SAVe**

Saves the current display position of the logo to the logo file. There are no arguments.

**:OUTPut1:MOVE:HORizontal <numeric\_value>**

Sets the amount of horizontal scrolling in the moving picture mode. You can set the value from -252 to +252 in 4 samples steps.

**:OUTPut1:MOVE:HORizontal?**

Returns the amount of horizontal scrolling in the moving picture mode.

**:OUTPut1:MOVE:VERTical <numeric\_value>**

Sets the amount of vertical scrolling in the moving picture mode. You can set the value from -252 to +252 in 1 line steps.

**:OUTPut1:MOVE:VERTical?**

Returns the amount of vertical scrolling in the moving picture mode.

**:OUTPut1:MOVE:PERiod <numeric\_value>**

Sets the time interval between occurrences of the scrolling. You can set the value from 1 to 16 in 1 field steps.

**:OUTPut1:MOVE:PERiod?**

Returns the time interval between occurrences of the scrolling.

**:OUTPut1:MOVE:RANDom[:STATE] ON|OFF**

Turns the random scrolling mode on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:MOVE:RANDom[:STATE]?**

Returns the current state of the random scrolling mode.

**:OUTPut1:OVERlay:BLINK:STATE ON|OFF**

Turns on or off the blinking mode for the logo, text, and circle overlay. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:OVERlay:BLINK:STATE?**

Returns the current state of the blinking mode for the logo, text, and circle overlay.

**:OUTPut1:OVERlay:BLINK:PERiod <numeric\_value>**

Sets the blinking interval of the blinking mode for the logo, text, and circle overlay. You can set the value as 0.5 seconds or 1.0 seconds.

**:OUTPut1:OVERlay:BLINK:PERiod?**

Returns the blinking interval of the blinking mode for the logo, text, and circle overlay.

**:OUTPut1:TEXT:STATe ON|OFF**

Turns the text overlay display on the video signal on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:TEXT:STATe?**

Returns the current text overlay state.

**:OUTPut1:TEXT:DATA <string>**

Sets the current string for the text mode.

**:OUTPut1:TEXT:DATA?**

Returns the current string for the text mode.

**:OUTPut1:TEXT:POSition:HORizontal <numeric\_value>**

Sets the text horizontal position in the video signal. The unit is percent of active picture width. You can set the position from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of the numeric value.

**:OUTPut1:TEXT:POSition:HORizontal?**

Returns the current text horizontal position in the video signal.

**:OUTPut1:TEXT:POSition:VERTical <numeric\_value>**

Sets the text vertical position in the video signal. The unit is percent of active picture height. You can set the position from 0% to 100% in 1% steps. You can also use MIN, MAX, or DEF instead of a numeric value.

**:OUTPut1:TEXT:POSition:VERTical?**

Returns the current text vertical position in the video signal.

**:OUTPut1:TEXT:SAVe**

Saves the current text and its display position to the signal file. There are no arguments.

**:OUTPut1:VIDeo:Y:STATe ON|OFF**

Turns the Y component of the serial digital video signals on or off. You can also use 1 or 0 instead of ON or OFF.

**:OUTPut1:VIDeo:Y:STATe?**

Returns the current Y component output state of the serial digital video signals.

:OUTPut1:VIDeo:PB:STATe ON|OFF

Turns the P<sub>B</sub> component of the serial digital video signals on or off. You can also use 1 or 0 instead of ON or OFF.

:OUTPut1:VIDeo:PB:STATe?

Returns the current P<sub>B</sub> component output state of the serial digital video signals.

:OUTPut1:VIDeo:PR:STATe ON|OFF

Turns the P<sub>R</sub> component of the serial digital video signals on or off. You can also use 1 or 0 instead of ON or OFF.

:OUTPut1:VIDeo:PR:STATe?

Returns the current output state of the P<sub>R</sub> component of the serial digital video signals.

:OUTPut1:VIDeo:AVTiming:STATe ON|OFF

Turns the output mode for an audio/video timing measurement on or off. Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the mode. You can also use 1 or 0 instead of ON or OFF.

:OUTPut1:VIDeo:AVTiming:STATe?

Returns the current output mode setting for an audio/video timing measurement.

:OUTPut2:STANdard

HD1080\_60I|HD1080\_59I|HD1080\_50I|HD1080\_24SF|  
HD1080\_23SF|HD1080\_30P|HD1080\_29P|HD1080\_25P|  
HD1080\_24P|HD1080\_23P|HD1035\_60I|HD1035\_59I|  
HD720\_60P|HD720\_59P|HD720P\_50P|HD720\_30P|  
HD720\_29P|HD720\_25P|HD720\_24P|HD720\_23P

Sets the video standard for the serial digital black signals output from the BLACK connectors. The choices are HD 1080\_60I to HD720\_23P. This command is only available if Option BK is installed.

:OUTPut<n>:STANdard?

Returns the video standard for the selected output. The <n> in the command represents the output connector type. "1" represents the SIGNAL connectors and "2" represents the optional BLACK connectors.

:OUTPut2:SIGNa1 BLACK|GRAY|FF50P|WHITE

Sets the type of the serial digital black signals output from the BLACK connectors. The options are BLACK (serial digital black signal), GRAY (40% flat field signal), FF50P (50% flat field signal), or WHITE (100% flat field signal). This command is only available if Option BK is installed.

**:OUTPut2:SIGNal?**

Returns the current serial digital black signals output from the BLACK connectors. This command is only available if Option BK is installed.

**:OUTPut4:TIMECode:SOURce DISable|TOD|COUNTER**

Sets time code source. Disable shuts off the time code output. TOD sets the time of day clock as the source. Counter sets the time code source to the program counter.

**:OUTPut4:TIMECode:SOURce?**

Returns the current time code source setting.

**:OUTPut4:TIMECode:OFFSet <NR1>,<NR1>,<NR1>,<NR1>**

Sets the time code offset in hours, minutes, seconds, and frames (HH:MM:SS:FF).

**:OUTPut4:TIMECode:LINE <NR1>**

Sets the line number on which the VITC is located. For NTSC output, the line number range is 10-20. For PAL output, the line number range is 6-22. For HD output, the line number range is 7-40.

**:OUTPut4:TIMECode:ATC:STATE 0 | 1 (BOOLEAN)**

Enables or disables the use of ancillary time code.

**:OUTPut4:TIMECode:ATC:STATE?**

Returns the ancillary time code state. A setting of 0 means ancillary time code is not used. A setting of 1 means ancillary time code is used.

**:OUTPut:CONFigure?**

Returns the availability of serial digital black signal output option (Option BK). "1" indicates that the option is available and "0" indicates that the option is not available.

## SENSE commands

Use these commands to set the timing offset of the SIGNAL outputs and the BLACK outputs (Option BK only) relative to the internal reference signal (frame reset signal).

Refer to *Operating Basics* in the TG8000 User Manual for detailed information about the setting range.

## Command tree

|                        |                 |
|------------------------|-----------------|
| <b>:SENSe&lt;n&gt;</b> |                 |
| <b>:CORRection</b>     |                 |
| <b>:MDElay</b>         |                 |
| <b>:HORizontal</b>     | <numeric_value> |
| <b>:STEP</b>           | <numeric_value> |
| <b>:VERTical</b>       | <numeric_value> |
| <b>:STEP</b>           | <numeric_value> |

## Command description

**:SENSe<n>:CORRection:MDElay:HORizontal <numeric\_value>**

Sets the horizontal timing offset of the selected outputs. The timing resolution is clock-cycles. The units are microseconds. You can use UP, DOWN, or DEF instead of the numeric value. See page 2-2 for additional detail on UP, DOWN, and DEF. If the argument exceeds the horizontal time value, then the vertical offset is adjusted to accommodate the requested delay. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

**:SENSe<n>:CORRection:MDElay:HORizontal**

Returns the current horizontal timing offset of the selected outputs. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

**:SENSe<n>:CORRection:MDElay:HORizontal:STEP <numeric\_value>**

Sets the step increment used by the UP or DOWN commands. The units are microseconds. You can use MIN, MAX, or DEF instead of a numeric value. See page 2-2 for additional detail on MIN, MAX, and DEF. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

**:SENSe<n>:CORRection:MDElay:HORizontal:STEP**

Returns the current step increment. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

**:SENSe<n>:CORRection:MDElay:VERTical <numeric\_value>**

Sets the vertical timing offset of the selected outputs. The argument can be a floating point value that is translated into integer lines with a horizontal offset. You can use UP, DOWN, or DEF instead of a numeric value. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

**:SENSe<n>:CORRection:MDElay:VERTical**

Returns the current vertical timing offset of the selected outputs. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

**:SENSe<n>:CORRection:MDElay:VERTical:STEP <numeric\_value>**

Sets the step increment used by the UP or DOWN commands. You can use MIN, MAX, or DEF instead of a numeric value. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

**:SENSe<n>:CORRection:MDElay:VERTical:STEP**

Returns the current step increment. The <n> in the command represents the type of output connector. "1" represents the SIGNAL connectors and "2" represents the BLACK connectors.

# SDI7 Dual Channel SD/HD/3G SDI Video Generator module remote commands

This section describes the commands used to remotely control the SDI7 Dual Channel SD/HD/3G SDI Video Generator module. The commands are divided into the following groups:

- OUTPUT commands (Refer to the SDI7 section of the TG8000 User Manual, Tektronix part number 071-3036-XX, for restrictions on which standards are supported for each output mode.)
- SENSE commands

## OUTPUT commands

Use these commands control the output parameters of the module.

### Command tree

|              |   |
|--------------|---|
| :OUTPut<1 2> |   |
| :ALPHA       | COPY_YG   FF_0P   FF_10P  <br>FF_20P   FF_30P   FF_40P  <br>FF_50P   FF_60P   FF_70P  <br>FF_80P   FF_90P   FF_100P |
| :ALPHA?      |   |
| :ANC         |   |
| :OUTMode     | DIS   CONT   SING   |
| :OUTMode?    |   |
| :PARity      | MAN   AUTO  |
| :PARity?     |   |
| :LINE        | <NR1>, <NR1>  |
| :LINE?       |   |
| :SAmple      | <NR1>   |
| :SAmple?     |   |
| :DID         | <Hexadecimal>   |
| :DID?        |   |
| :SDID        | <Hexadecimal>   |
| :SDID?       |   |
| :DBN         | <Hexadecimal>   |
| :DBN         |   |
| :DC <NR1>    |   |
| :DC          |   |

|                      |  |                             |
|----------------------|--|-----------------------------|
| :UDW                 |  |                             |
| :INDEX               |  | <NR1>                       |
| :INDEX?              |  |                             |
| :SET                 |  | <NR1:INDEX>,<NR2:UDW>       |
| :SET?                |  |                             |
| :CLEAR               |  |                             |
| :CS                  |  |                             |
| :MANual              |  | <Hexadecimal>               |
| :MANual?             |  |                             |
| :AUTO                |  |                             |
| :STATE               |  | <Boolean>                   |
| :STATE?              |  |                             |
| :AUTO?               |  |                             |
| :VCH                 |  | LUMA   CHRO                 |
| :VCH                 |  |                             |
| :LOCation            |  | LINKA   LINKB               |
| :LOCation?           |  |                             |
| :FIELD               |  | 0   1   2                   |
| :FIELD               |  |                             |
| :BLACK <Boolean>     |  |                             |
| :BLACK?              |  |                             |
| :DHD                 |  | SIG_SIG   SIG_BLK   BLK_SIG |
| :DHD                 |  |                             |
| :EAUDio              |  |                             |
| :<A B>GRouP<1 2 3 4> |  |                             |
| :STATE               |  | <Boolean>                   |
| :STATE               |  |                             |
| :SAMPLing            |  | FRAM   NOFR   ASYNC         |
| :SAMPLing            |  |                             |
| :CHANnel<1 2 3 4>    |  |                             |
| :AMPLitude           |  | <NR1>                       |
| :AMPLitude           |  |                             |
| :FREQuency           |  | <NR2>                       |
| :FREQuency           |  |                             |
| :CLICk               |  | 0   1   2   3   4           |
| :CLICk?              |  |                             |
| :MODE                |  | ACTIVE   INACTIVE   MUTE    |
| :MODE?               |  |                             |
| :ORIGIN              |  | <String>                    |
| :ORIGIN?             |  |                             |

|              |       |  |
|--------------|-------|--|
| :FRAMe       |       |  |
| :SElect      |       | <String>   |
| :MODE        |       | MD_SD   MD_1080_HD  <br>MD_720_HD   MODE_3GA  <br>MD_720_3GA   MODE_3GB  <br>MODE_3GA_2K   MODE_3GB_2K  <br>MD_2X1080_HD   MD_2X720_HD |
| :MODE?       |       |  |
| :MOVE        |       |  |
| :HORizontal  |       | <NR1>  |
| :HORizontal? |       |  |
| :VERTical    |       | <NR1>  |
| :VERTical?   |       |  |
| :PERiod      |       | <NR1>  |
| :PERiod?     |       |  |
| :RANDom      |       |  |
| :STATE       |       | <Boolean>  |
| :STATE ?     |       |  |
| :OVERlay     |       |  |
| :BLINK       |       |  |
| :STATE       |       | <Boolean>  |
| :STATE?      |       |  |
| :PERiod      |       | BLINK_FAST   BLINK_SLOW  |
| :PERiod?     |       |  |
| :BORDER      |       |  |
| :STATE       |       | <Boolean>  |
| :STATE?      |       |  |
| :CIRCLE      |       |  |
| :STATE       |       | <Boolean>  |
| :STATE?      |       |  |
| :DIAMeter    | <NR2> |  |
| :DIAMeter    |       |  |
| :POSition    |       |  |
| :HORizontal  |       | <NR2>  |
| :HORizontal? |       |  |
| :VERTical    |       | <NR2>  |
| :VERTical?   |       |  |
| :LOGO        |       |  |
| :STATE       |       | <Boolean>  |
| :STATE?      |       |  |
| :POSition    |       |  |

|              |  |
|--------------|--|
| :HORIZONTAL  | <NR2>  |
| :HORIZONTAL? |  |
| :VERTICAL    | <NR2>  |
| :VERTICAL?   |  |
| :SELECT      | <String>   |
| :SELECT      |  |
| :TEXT        |  |
| :STATE       | <Boolean>  |
| :STATE?      |  |
| :POSITION    |  |
| :HORIZONTAL  | <NR2>  |
| :HORIZONTAL? |  |
| :VERTICAL    | <NR2>  |
| :VERTICAL?   |  |
| :HEIGHT      | <NR2>  |
| :HEIGHT?     |  |
| :DATA        | <String>   |
| :DATA?       |  |
| :SOURCE      | <String>   |
| :SOURCE?     |  |
| :SAMPLING    | GBR444_10B   GBR444A_10B  <br>GBR444_12B   YCB444_10B  <br>YCB444A_10B   YCB444_12B  <br>YCB422_10B   YCB422_12B  <br>YCB422A_12B   XYZ444_12B   |
| :SAMPLING?   |  |
| :STANDARD    | SD525_59I   SD625_50I  <br>HD1080_60P   HD1080_59P<br>  HD1080_50P   HD1080_60I<br>  HD1080_59I   HD1080_50I  <br>HD1080_30P   HD1080_30SF  <br>HD1080_29P   HD1080_29SF<br>  HD1080_25P   HD1080_25SF<br>  HD1080_24P   HD1080_24SF<br>  HD1800_23P   HD1080_23SF<br>  HD720_60P   HD720_5994P<br>  HD720_50P   HD720_30P  <br>HD720_2997P   HD720_25P  <br>HD720_24P   HD720_2398P  <br>TK1080_30P   TK1080_30SF  <br>TK1080_29P   TK1080_29SF  <br>TK1080_25P   TK1080_25SF  <br>TK1080_24P   TK1080_24SF  <br>TK1800_23P   TK1080_23SF |
| :STANDARD?   |  |

|              |   |
|--------------|---|
| :SYNThesizer |   |
| :SIGNal      | ZP_CIRCLE   ZP_DIAG  <br>ZP_HSINE   ZP_HSWEEP<br> ZP_VSINE   ZP_VSWEEP  <br>ZP_1_CUSTOM   ZP_2_CUSTOM |
| :LOAD        | <String>  |
| :TIMECode    |   |
| :SOURce      | TOD PCOUNTER  |
| :SOURce?     |   |
| :OFFSet      | <NR1>,<NR1>,<NR1>,<NR1><br>(HH : MM : SS : FF)  |
| :OFFSet      |   |
| :DROP        |   |
| :STATE       | <Boolean>   |
| :STATE?      |   |
| :LTC         |   |
| :STATE       | <Boolean>   |
| :STATE?      |   |
| :AVITc       |   |
| :STATE       | <Boolean>   |
| :STATE       |   |
| :INITial     | <NR1>,<NR1>,<NR1> (HH : MM<br>: SS)   |
| :INITial?    |   |
| :SET         |   |
| :TRigger     | SYS_CLOCK   PXL_CLOCK  <br>FRM_PULSE   LINE_PULSE   |
| :TRigger?    |   |
| :VIDeo       |   |
| :Y           |   |
| :STATE       | <Boolean>   |
| :STATE?      |   |
| :PB          |   |
| :STATE       | <Boolean>   |
| :STATE?      |   |
| :PR          |   |
| :STATE       | <Boolean>   |
| :STATE?      |   |
| :AVTming     |   |
| :STATE       | <Boolean>   |
| :STATE       |   |

|             |                              |
|-------------|------------------------------|
| :EDH        | (Note: For SD formats only.) |
| :STATE      | <Boolean>                    |
| :STATE?     |                              |
| :EFILter    |                              |
| :STATE      | <Boolean>                    |
| :STATE?     |                              |
| :EFILter?   |                              |
| :VPID       |                              |
| :STATE      | <Boolean>                    |
| :STATE?     |                              |
| :ZONE       |                              |
| :FREQuency  | <NR2>                        |
| :FREQuency? |                              |
| :AMPLitude  | <NR2>                        |
| :AMPLitude? |                              |
| :K          | <NR2>                        |
| :K?         |                              |
| :KX         | <NR2>                        |
| :KX?        |                              |
| :KXSQ       | <NR2>                        |
| :KXSQ?      |                              |
| :KXT        | <NR2>                        |
| :KXT?       |                              |
| :KXY        | <NR2>                        |
| :KXY?       |                              |
| :KY         | <NR2>                        |
| :KY         |                              |
| :KYSQ       | <NR2>                        |
| :KYSQ       |                              |
| :KYT        | <NR2>                        |
| :KYT        |                              |
| :KT         | <NR2>                        |
| :KT?        |                              |
| :KTSQ       | <NR2>                        |
| :KTSQ       |                              |
| :WAVE       | SINE   SQUARE   TRIANGLE     |
| :WAVE?      |                              |
| :SAVE       | 1   2                        |
| :TReSet     |                              |
| :STATE      | <Boolean>                    |

|                  |
|------------------|
| :STATE?          |
| :VIDeo           |
| :Y               |
| :STATE <Boolean> |
| :STATE?          |
| :PB              |
| :STATE <Boolean> |
| :STATE?          |
| :PR              |
| :STATE <Boolean> |
| :STATE?          |

**Command description**

:OUTPut<1|2>:ALPHA COPY\_YG|FF\_0P|FF\_10P|FF\_20P|FF\_30P|FF\_40P|FF\_50P|FF\_60P|FF\_70P|FF\_80P|FF\_90P|FF\_100P

Sets the content of the alpha channel, which is present in certain 3G-SDI formats. Select COPY\_YG to fill the alpha channel with the same data values as the Y or G channel of the current test pattern, or select FF\_0P...FF\_100P to select a flat field value from 0% to 100%.

:OUTPut<1|2>:ALPHA?

Returns the current value for alpha channel data for the selected generator output.

:OUTPut<1|2>:ANC:OUTMode DIS|CONT|SING

Sets the user-defined ancillary data output mode of the selected generator output. The choices are DIS (disable), CONT (continuous), and SING (single packet).

:OUTPut<1|2>:ANC:OUTMode?

Returns the output mode setting of the user-defined ancillary data packet for the selected generator output.

:OUTPut<1|2>:ANC:PARity MAN|AUTO

Sets the parity of the user-defined ancillary data packet for the selected generator output. The choices are AUTO (automatic calculation) and MAN (manual setting). When AUTO is chosen, 8-bit values can be specified for the DID, SDID, DBN, and UDW words and the parity bits will be correctly encoded. When MAN is chosen, the complete 10-bit value must be specified for these words.

:OUTPut<1|2>:ANC:PARity?

Returns the parity setting of the user-defined ancillary data packet.

:OUTPut<1|2>:ANC:LINE <NR1>, <NR1>

Sets the line number(s) of the user-defined ancillary data packet for the selected generator output. Two values are required; the first value is for the Field 1 line number and the second value is for the Field 2 line number. For non-interlaced formats, use the same line number for both values.

:OUTPut<1|2>:ANC:LINE?

Returns the line numbers on which the user-defined ancillary data packet is located.

:OUTPut<1|2>:ANC:SAMPle <NR1>

Sets the starting sample number of the user-defined ancillary data packet for the selected generator output. For example, a value of 1928 represents the first sample of HANC data space for 1920 1080 formats.

:OUTPut<1|2>:ANC:SAMPle?

Returns the starting sample number where the user-defined ancillary data packet is located.

:OUTPut<1|2>:ANC:DID <Hexadecimal>

Sets the Data Identifier of the user-defined ancillary data packet for the selected generator output. Valid 8-bit values are in the range #H00 to #HFF, and valid 10-bit values are in the range from #H000 to #H3FF. The ANC:PARITY setting determines whether 8-bit values or 10-bit values are used.

:OUTPut<1|2>:ANC:DID?

Returns the Data Identifier value of the user-defined ancillary data packet.

:OUTPut<1|2>:ANC:SDID <Hexadecimal>

Sets the Secondary Data Identifier of the user-defined ancillary data packet for the selected generator output. Valid 8-bit values are in the range #H00 to #HFF, and valid 10-bit values are in the range from #H000 to #H3FF. The ANC:PARITY setting determines whether 8-bit values or 10-bit values are used. The SDID value is only used for Type 2 ancillary data, when the DID is in the range from #H00 to #H7F.

:OUTPut<1|2>:ANC:SDID?

Returns the Secondary Data Identifier value of the user-defined ancillary data packet.

:OUTPut<1|2>:ANC:DBN <Hexadecimal>

Sets the Data Block Number of the user-defined ancillary data packet for the selected generator output. Valid 8-bit values are in the range #H00 to #HFF, and valid 10-bit values are in the range from #H000 to #H3FF. The ANC:PARITY setting determines whether 8-bit values or 10-bit values are used. The DBN value is only used for Type 1 ancillary data, when the DID is in the range from #H80 to #HFF.

**:OUTPut<1|2>:ANC:DBN?**

Returns the Data Block Number value of the user-defined ancillary data packet.

**:OUTPut<1|2>:ANC:DC <NR1>?**

Returns the Data Count value of the user-defined ancillary data packet for the selected generator output. The DC value determines how many User Data Words (UDW) will be present in the packet. Valid DC values are in the range from 0 to 255.

**:OUTPut<1|2>:ANC:DC?**

Returns the Data Count value of the user-defined ancillary data packet.

**:OUTPut<1|2>:ANC:UDW:INDeX <NR1>**

Sets the index within the array of User Data Word (UDW) values for subsequent :ANC:UDW:SET? queries.

**:OUTPut<1|2>:ANC:UDW:INDeX?**

Returns the current index within the array of User Data Word (UDW) values. This value is updated by both :ANC:UDW:INDeX and :ANC:UDW:SET operations.

**:OUTPut<1|2>:ANC:UDW:SET <NR1>, <Hexadecimal>**

Sets the value of one User Data Word in the array used for the user-defined ancillary data packet. The SET command takes two arguments: the index and the data value. The index specifies the location within the array, from 0 to 255.

For the data value, valid 8-bit values are in the range #H00 to #HFF, and valid 10-bit values are in the range from #H000 to #H3FF. The ANC:PARITY setting determines whether 8-bit values or 10-bit values are used.

**:OUTPut<1|2>:ANC:UDW:SET?**

Returns the index and data value for one User Data Word in the array used for the user-defined ancillary data packet. The index location is set by a previous :ANC:UDW:SET or :ANC:UDW:INDeX command.

**:OUTPut<1|2>:ANC:UDW:CLear**

Clears all User Data Word values in the array used for the user-defined ancillary data packet. All data values are set to zero (#H00 in 8-bit notation or #H200 in 10-bit notation).

**:OUTPut<1|2>:ANC:CS:MANuaL <Hexadecimal>**

Sets the Checksum value of the user-defined ancillary data packet. Valid 10-bit values are in the range from #H000 to #H3FF. This command is only needed if the :ANC:CS:AUTO:STATE? value is false.

**:OUTPut<1|2>:ANC:CS:MANuaL?**

Returns the Checksum value of the user-defined ancillary data packet.

:OUTPut<1|2>:ANC:CS:AUTO:STATE <Boolean>

Enables or disables the automatic Checksum calculation for the user-defined ancillary data packet.

:OUTPut<1|2>:ANC:CS:AUTO:STATE?

Returns the state of the automatic Checksum calculation for the user-defined ancillary data packet.

:OUTPut<1|2>:ANC:CS:AUTO?

Returns the automatically-calculated Checksum value for the user-defined ancillary data packet.

:OUTPut<1|2>:ANC:VCH LUMA|CHRO

Sets the video channel for the location of the user-defined ancillary data packet to either Luma or Chroma. LUMA is the default value. The command is not necessary and has no effect for standard definition formats.

:OUTPut<1|2>:ANC:VCH?

Returns the video channel for the location of the user-defined ancillary data packet.

:OUTPut<1|2>:ANC:LOCation LINKA|LINKB

Sets the virtual link for the location of the user-defined ancillary data packet. This setting is only used for 3G-SDI formats.

:OUTPut<1|2>:ANC:LOCation?

Returns the virtual link for the location of the user-defined ancillary data packet.

:OUTPut<1|2>:ANC:FIELD 0|1|2

Sets the field number for the location of the user-defined ancillary data packet. This setting is only used for interlaced and segmented frame formats. Valid values are: 0 = Field 1, 1 = Field 2, and 2 = both Field 1 & 2.

:OUTPut<1|2>:ANC:FIELD?

Returns the field number for the location of the user-defined ancillary data packet.

:OUTPut<1|2>:BLACK <Boolean>

Enables or disables a black field for the active video of the second output (i.e. SIGNAL 1B or SIGNAL 2B) of the specified generator channel. When enabled, the second output is digital black (0% flat field); when disabled, the second output is a copy of the test pattern on the first output (i.e. same as SIGNAL 1A or SIGNAL 1B respectively). In either case, the ancillary data (embedded audio, time code, VPID, and user-defined data) will be the same for both outputs of the specified generator channel.

**:OUTPut<1|2>:BLACK?**

Returns the setting for the second output (i.e. SIGNAL 1B or SIGNAL 2B) of the specified generator channel.

**:OUTPut<1|2>:DHD SIG\_SIG|SIG\_BLK|BLK\_SIG**

Sets the stream content for dual-stream Level B 3G-SDI formats. This setting is only used when the :OUTPut<1|2>:MODE is set to MD\_2X1080\_HD or MD\_2X720\_HD.

SIG\_SIG sets the content of both streams to the currently selected test signal, SIG\_BLK sets the content of stream A to the currently selected test signal and stream B to black, and BLK\_SIG sets the content of stream A to black and stream B to the currently selected test signal.

**:OUTPut<1|2>:DHD?**

Returns the setting for the dual-stream contents for the selected generator output.

**:OUTPut<1|2>:EAUDio:<A|B>GROUP[n]:STATE <Boolean>**

Enables or disables the specified embedded audio group (1-4) of the specified virtual link (A or B). 3G-SDI formats include embedded audio groups in both link A and link B. Use the link A command for SD-SDI and HD-SDI formats.

For example, the following command enables group 1 of embedded audio on output 1 for all formats:

**:OUTPut1:EAUDio:AGROup1:STATE ON**

The following command disables group 4 of embedded audio on output 2 for link B of 3G-SDI formats:

**:OUTPut2:EAUDio:BGRoup4:STATE OFF**

**:OUTPut<1|2>:EAUDio:<A|B>GROUP[n]:STATE?**

Returns the status of the specified embedded audio group (1-4).

**:OUTPut<1|2>:EAUDio:<A|B>GROUP[n]:SAMPLing FRAM|NOFR|ASYN**

Sets the sampling alignment status bits for the specified embedded audio group (1-4) of the specified virtual link (A or B). The choices are FRAM (Frame), NOFR (Frame without Frame Number), and ASYN (Asynchronous).

:OUTPut<1|2>:EAUDio:<A|B>GROUp[n]:SAMPLing?

Returns the sampling alignment status bits for the specified embedded audio group (1-4) of the specified virtual link (A or B).

:OUTPut<1|2>:EAUDio:<A|B>GROUp[n]:CHANne1[x]:AMPLitude <NR1>

Sets the tone amplitude of the specified channel (1-4) of the specified embedded audio group (1-4) of the specified virtual link (A or B). The numeric value can range from -60 dBFS to 0 dBFS in 1 dBFS steps.

:OUTPut<1|2>:EAUDio:<A|B>GROUp[n]:CHANne1[x]:AMPLitude?

Returns the tone amplitude of the specified channel (1-4) of the specified embedded audio group (1-4) of the specified virtual link (A or B).

:OUTPut<1|2>:EAUDio:<A|B>GROUp[n]:CHANne1[x]:FREQuency <NR2>

Sets the tone frequency of the specified channel (1-4) of the specified embedded audio group (1-4) of the specified virtual link (A or B). The numeric value is the frequency in Hertz, between 10.0 and 20000.0 in steps of 0.5.

:OUTPut<1|2>:EAUDio:<A|B>GROUp[n]:CHANne1[x]:FREQuency?

Returns the tone frequency of the specified channel (1-4) of the specified embedded audio group (1-4) of the specified virtual link (A or B).

:OUTPut<1|2>:EAUDio:<A|B>GROUp[n]:CHANne1[x]:CLICK 0|1|2|3|4

Sets the audio click of the specified channel (1-4) of the specified embedded audio group (1-4) of the specified virtual link (A or B). The choices are 1 second to 4 seconds, or off (0). When enabled, the audio click will turn the tone off for 0.25 seconds and on for the selected duration.

:OUTPut<1|2>:EAUDio:<A|B>GROUp[n]:CHANne1[x]:CLICK?

Returns the audio click status of the specified channel (1-4) of the specified embedded audio group (1-4) of the specified virtual link (A or B).

:OUTPut<1|2>:EAUDio:<A|B>GROUp[n]:CHANne1[x]:MODE  
ACTive|INACTive|MUTE

Sets the mode of the specified channel (1-4) of the specified embedded audio group (1-4) of the specified virtual link (A or B). The choices are ACT (active), INAC (inactive), and MUTE (muted).

:OUTPut<1|2>:EAUDio:<A|B>GROUp[n]:CHANne1[x]:MODE?

Returns the mode of the specified channel (1-4) of the specified embedded audio group (1-4) of the specified virtual link (A or B).

:OUTPut<1|2>:EAUDio:<A|B>GROUp[n]:CHANne1[x]:ORIGin <string>

Sets the channel origin ID of the specified channel (1-4) of the specified embedded audio group (1-4) of the specified virtual link (A or B). The channel ID is a string of up to four ASCII characters.

**:OUTPut<1|2>:EAUDio:<A|B>GROup[n]:CHANne1[x]:ORIGin?**

Returns the channel origin ID string for the specified channel (1-4) of the specified embedded audio group (1-4) of the specified virtual link (A or B).

**:OUTPut<1|2>:FRAME:SELEct <string>**

Loads the selected frame picture pattern into memory for the specified generator output. The string argument is the name of a bitmap file found in the SDI7/PICTURE directory.

**:OUTPut<1|2>:MODE MD\_SD|MD\_1080\_HD|MD\_720\_HD|  
MODE\_3GA|MD\_720\_3GA|MODE\_3GB| MODE\_3GA\_2K|MODE\_3GB\_2K|  
MD\_2X1080\_HD|MD\_2X720\_HD**

Sets the output mode for the selected generator output. The options are as follows:

|              |   |
|--------------|---|
| MD_SD        | Standard Definition (270 Mb/s)          |
| MD_1080_HD   | High Definition (1.5 Gb/s), 1080 lines  |
| MD_720_HD    | High Definition (1.5 Gb/s), 720 lines   |
| MODE_3GA     | 3 Gb/s Level A, 1080 lines              |
| MD_720_3GA   | 3 Gb/s Level A, 720 lines               |
| MODE_3GB     | 3 Gb/s Level B, 1080 lines              |
| MODE_3GA_2K  | 3 Gb/s Level A, 2K (2048 1080)          |
| MODE_3GB_2K  | 3 Gb/s Level A, 2K (2048 1080)          |
| MD_2X1080_HD | 3 Gb/s "dual-stream" (2 HD), 1080 lines |
| MD_2X720_HD  | 3 Gb/s "dual-stream" (2 HD), 720 lines  |

**:OUTPut<1|2>:MODE?**

Returns the current output mode for the selected generator output.

**:OUTPut<1|2>:MOVE:HORizonta1 <NR1>**

Sets the amount of horizontal scrolling in the moving picture mode for the selected generator output. You can set the value from -252 to +252 samples in increments of 4 samples.

**:OUTPut<1|2>:MOVE:HORizonta1?**

Returns the amount of horizontal scrolling in the moving picture mode.

**:OUTPut<1|2>:MOVE:VERTica1 <NR1>**

Sets the amount of vertical scrolling in the moving picture mode for the selected generator output. You can set the value from -252 to +252 lines in increments of 1 line.

**:OUTPut<1|2>:MOVE:VERTica1?**

Returns the amount of vertical scrolling in the moving picture mode.

**:OUTPut<1|2>:MOVE:PERiod <NR1>**

Sets the time interval between occurrences of the scrolling in the moving picture mode for the selected generator output. You can set the value from 1 to 16 frames.

**:OUTPut<1|2>:MOVE:PERiod?**

Returns the time interval between occurrences of the scrolling in the moving picture mode.

**:OUTPut<1|2>:MOVE:RANDOM:STATE <Boolean>**

Enables or disables random scrolling of the moving picture mode for the selected generator output.

**:OUTPut<1|2>:MOVE:RANDOM:STATE?**

Returns the current state of the random scrolling mode for the selected generator output.

**:OUTPut<1|2>:OVERlay:BLINK:STATE <Boolean>**

Enables or disables the "blinking" mode for the text and circle overlays for the selected generator output.

**:OUTPut<1|2>:OVERlay:BLINK:STATE?**

Returns the state of the overlay blink mode for text and circle overlays.

**:OUTPut<1|2>:OVERlay:BLINK:PERiod BLINK\_FAST|BLINK\_SLOW**

Sets the blink rate for the text and circle overlays for the selected generator output. BLINK\_FAST corresponds to a period of approximately  $\frac{1}{2}$  second on and  $\frac{1}{2}$  second off, and BLINK\_SLOW corresponds to a period of approximately 1 second on and 1 second off.

**:OUTPut<1|2>:OVERlay:BLINK:PERiod?**

Returns the blink rate for text and circle overlays.

**:OUTPut<1|2>:OVERlay:BORDER:STATE <Boolean>**

Enables or disables the background border for the text and circle overlays for the selected generator output. When enabled, text overlays will appear as near-white text on a near-black background rectangle and circle overlays will appear as a thin near-white line within a wider near-black circle.

**:OUTPut<1|2>:OVERlay:BORDER:STATE?**

Returns the background border state for text and circle overlays.

**:OUTPut<1|2>:OVERlay:CIRCLE:STATE <Boolean>**

Enables or disables the circle overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:CIRCLE:STATE?**

Returns the circle overlay state for the selected generator output.

**:OUTPut<1|2>:OVERlay:CIRClE:DIAMeter <NR2>**

Sets the diameter of the circle overlay for the selected generator output. The value is expressed as a percentage of active picture height (%APH).

**:OUTPut<1|2>:OVERlay:CIRClE:DIAMeter?**

Returns the diameter of the circle overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:CIRClE:POSition:HORizontal <NR2>**

Sets the horizontal position of the circle overlay for the selected generator output. The circle overlay is drawn relative to center of the screen, with the horizontal position value indicating the percentage of active picture width (%APW) for the center of the circle.

A value of 0 indicates the horizontal center of the picture, -50.0 indicates the left edge of the picture, and 50.0 indicates the right edge of the picture.

**:OUTPut<1|2>:OVERlay:CIRClE:POSition:HORizontal?**

Returns the horizontal center position of the circle overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:CIRClE:POSition:VERTical <NR2>**

Sets the vertical position of the circle overlay of the selected generator output. The circle overlay is drawn relative to center of the screen, with the vertical position value indicating the percentage of active picture height (%APH) for the center of the circle.

A value of 0 indicates the vertical center of the picture, -50.0 indicates the top edge of the picture, and 50.0 indicates the bottom edge of the picture.

**:OUTPut<1|2>:OVERlay:CIRClE:POSition:VERTical?**

Returns the vertical center position of the circle overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:LOGO:STATE <Boolean>**

Enables or disables the logo overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:LOGO:STATE?**

Returns the logo overlay state for the selected generator output.

**:OUTPut<1|2>:OVERlay:LOGO:POSition:HORizontal <NR2>**

Sets the horizontal position of the logo overlay for the selected generator output. The logo overlay is drawn relative to the lower right corner of the image, with the horizontal position value indicating the percentage of active picture width (%APW) between the right edge of the logo image and the right edge of the active picture. Values are less than or equal to 0.

**:OUTPut<1|2>:OVERlay:LOGO:POSition:HORizontal?**

Returns the horizontal edge position of the logo overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:LOGO:POSition:VERTical <NR2>**

Sets the vertical position of the logo overlay for the selected generator output. The logo overlay is drawn relative to the lower right corner of the image, with the position value indicating the percentage of active picture height (%APH) between the bottom edge of the logo image and the bottom edge of the active picture. Values are less than or equal to 0.

**:OUTPut<1|2>:OVERlay:LOGO:POSition:VERTical?**

Returns the vertical edge position for the logo overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:LOGO:SElect <string>**

Loads the selected logo pattern into memory for the specified generator output. The string argument is the name of a bitmap file found in the SDI7/LOGO directory.

**:OUTPut<1|2>:OVERlay:LOGO:SElect?**

Returns the name of the current bitmap file used for the logo overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:TEXT:STATE <Boolean>**

Enables or disables the text overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:TEXT:STATE?**

Returns the text overlay state for the selected generator output.

**:OUTPut<1|2>:OVERlay:TEXT:POSition:HORizontal <NR2>**

Sets the horizontal position of the text overlay for the selected generator output. The text overlay is drawn relative to the upper left corner of the image, with the horizontal position value indicating the percentage of active picture width (%APW) between the left edge of the text box and the left edge of the active picture.

**:OUTPut<1|2>:OVERlay:TEXT:POSition:HORizontal?**

Returns the horizontal edge position of the text overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:TEXT:POSition:VERTical <NR2>**

Sets the vertical position of the text overlay for the selected generator output. The text overlay is drawn relative to the upper left corner of the image, with the position value indicating the percentage of active picture height (%APH) between the top edge of the text box and the top edge of the active picture.

**:OUTPut<1|2>:OVERlay:TEXT:POSition:VERTical?**

Returns the vertical edge position for the text overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:TEXT:HEIGHt <NR2>**

Sets the character height used for the text overlay for the selected generator output. The height is expressed in percent of active picture height (%APH). For example, a value of 5.0 corresponds to a character height of approximately 54 pixels for 1080-line HD formats and 36 pixels for 720-line HD formats.

**:OUTPut<1|2>:OVERlay:TEXT:HEIGHt?**

Returns the character height used for the text overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:TEXT:DATA <string>**

Sets the string used for the text overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:TEXT:DATA?**

Returns the string used for the text overlay for the selected generator output.

**:OUTPut<1|2>:OVERlay:TEXT:SOURce <string>**

Selects a text file whose contents are used for the text overlay for the selected generator output. The string argument is the name of a text file found in the SDI7/TEXT directory.

**:OUTPut<1|2>:OVERlay:TEXT:SOURce?**

Returns the name of the text file used for the text overlay for the selected generator output.

**:OUTPut<1|2>:SAMPling: GBR444\_10B|GBR444A\_10B|GBR444\_12B|YCB444\_10B|YCB444A\_10B|YCB444\_12B|YCB422\_10B|YCB422\_12B|YCB422A\_12B| XYZ444\_12B**

Sets the sampling structure for the specified generator output. Different sampling structures are only available for certain 3G-SDI output modes. SD-SDI and HD-SDI formats will always use 4:2:2 YCbCr 10-bit sampling. The options are as follows:

|             |                       |
|-------------|-----------------------|
| GBR444_10B  | 4:4:4 GBR 10 bits     |
| GBR444A_10B | 4:4:4 GBR+A 10 bits   |
| GBR444_12B  | 4:4:4 GBR 12 bits     |
| YCB444_10B  | 4:4:4 YCbCr 10 bits   |
| YCB444A_10B | 4:4:4 YCbCr+A 10 bits |
| YCB444_12B  | 4:4:4 YCbCr 12 bits   |
| YCB422_10B  | 4:2:2 YCbCr 10 bits   |
| YCB422_12B  | 4:2:2 YCbCr 12 bits   |

|             |                       |
|-------------|-----------------------|
| YCB422A_12B | 4:2:2 YCbCr+A 12 bits |
| XYZ444      | 4:4:4 XYZ 12 bits     |

:OUTPut<1|2>:SAMPling?

Returns the sampling structure for the specified generator output.

:OUTPut<1|2>:STANdard SD525\_59I|SD625\_50I|  
 HD1080\_60P|HD1080\_59P|HD1080\_50P|  
 HD1080\_60I|HD1080\_59I|HD1080\_50I|  
 HD1080\_30P|HD1080\_30SF| HD1080\_29P|HD1080\_29SF|  
 HD1080\_25P|HD1080\_25SF| HD1080\_24P|HD1080\_24SF|  
 HD1800\_23P|HD1080\_23SF| HD720\_60P|HD720\_5994P|HD720\_50P|  
 HD720\_30P|HD720\_2997P|HD720\_25P| HD720\_24P|HD720\_2398P|  
 TKHD1080\_30P|TKHD1080\_30SF| TKHD1080\_29P|TKHD1080\_29SF|  
 TKHD1080\_25P|TKHD1080\_25SF| TKHD1080\_24P|TKHD1080\_24SF|  
 TKHD1800\_23P|TKHD1080\_23SF

Sets the video standard (active image size, framing structure, and frame rate) for the specified generator output. Valid arguments for this command depend on the current output mode. The options are as follows:

|                     |  |
|---------------------|--|
| SDxxx_xxl           | Standard Definition interlaced formats |
| HD1080_xxP          | HD 1920 1080 progressive formats       |
| HD1080_xxl          | HD 1920 1080 interlaced formats        |
| HD1080_xxSF formats | HD 1920 1080 segmented frame           |
| HD720_xxP           | HD 1280 720 progressive formats        |
| TK1080_xxP          | "2K" 2048 1080 progressive formats     |
| TK1080_xxSF         | "2K" 2048 1080 segmented frame formats |

:OUTPut<1|2>:STANdard?

Returns the current video standard of specified generator output.

:OUTPut<1|2>:SYNThesizer:SIGNal ZP\_CIRCLE|ZP\_DIAG|ZP\_HSINE|  
 ZP\_HSWEEP|ZP\_VSINE|ZP\_VSWEEP| ZP\_1\_CUSTOM|ZP\_2\_CUSTOM

Selects a zone plate test pattern for the specified generator output. The options are as follows:

|           |                            |
|-----------|----------------------------|
| ZP_CIRCLE | Circle Zone Plate          |
| ZP_DIAG   | Diagonal Sine Zone Plate   |
| ZP_HSINE  | Diagonal Sine Zone Plate   |
| ZP_HSWEEP | Horizontal Sine Zone Plate |
| ZP_VSINE  | Vertical Sine Zone Plate   |
| ZP_VSWEEP | Vertical Sweep Zone Plate  |

|             |                    |
|-------------|--------------------|
| ZP_1_CUSTOM | Custom1 Zone Plate |
| ZP_2_CUSTOM | Custom2 Zone Plate |

**:OUTPut<1|2>:SYNThesizer:SIGNAL:LOAD <string>**

Loads the selected test signal for the specified generator output. The string argument corresponds to the name of the test pattern as seen from the front panel user interface. Some examples of preloaded test patterns are:

- 100% Color Bars
- Production Aperture
- Y Valid Ramp
- 0% Flat Field (Black)
- SDI Matrix

For a complete list of test patterns, refer to the SDI7 module section of the user manual.

**:OUTPut<1|2>:TIMECode:SOURceTOD|PCOUNTER**

Sets the source for ancillary time code for the specified generator output. TOD sets the time of day clock as the source (available only if a GPS7 module is installed in the TG8000). PCOUNTER sets the time code source to the program time counter (always available).

**:OUTPut<1|2>:TIMECode:SOURce?**

Returns the ancillary time code source setting for the specified generator output.

**:OUTPut<1|2>:TIMECode:OFFSet <NR1>,<NR1>,<NR1>,<NR1>**

Sets the ancillary time code offset for the specified generator output. The command argument is four numbers, representing the hours, minutes, seconds, and frames (HH:MM:SS:FF) of the offset. This setting is valid only if a GPS7 module is present in the same mainframe as the SDI7 module.

**:OUTPut<1|2>:TIMECode:OFFSet?**

Returns the ancillary time code offset in hours, minutes, seconds, and frames (HH:MM:SS:FF) for the specified generator output.

**:OUTPut<1|2>:TIMECode:DROP:STATE <Boolean>**

Enables or disables the use of drop frame format for ancillary time code for the specified generator output. This setting only applies to the 30 frames per second time code rate when the video format is 29.97, 30, 59.94 or 60 frames per second.

**:OUTPut<1|2>:TIMECode:DROP:STATE?**

Returns the drop frame format setting for ancillary time code for the specified generator output.

**:OUTPut<1|2>:TIMECode:LTC:STATe <Boolean>**

Enables or disables the ATC-LTC format of ancillary time code for the specified generator output.

**:OUTPut<1|2>:TIMECode:LTC:STATe?**

Returns the ATC\_LTC setting for ancillary time code for the specified generator output.

**:OUTPut<1|2>:TIMECode:AVITc:STATe <Boolean>**

Enables or disables the ATC-VITC format of ancillary time code for the specified generator output.

**:OUTPut<1|2>:TIMECode:AVITc:STATe?**

Returns the ATC\_VITC setting for ancillary time code for the specified generator output.

**:OUTPut<1|2>:TIMECode:INITial <NR1>,<NR1>,<NR1>**

Sets the initial time in hours, minutes, seconds (HH:MM:SS) of the program time counter used for ancillary time code for the specified generator output. This setting is valid only if:TIMECode:SOUrce is set to PCOUnter.

**:OUTPut<1|2>:TIMECode:INTial?**

Returns the initial time of the program time counter used for ancillary time code for the specified generator output.

**:OUTPut<1|2>:TIMECode:SET**

Applies the initial time of the program time counter used for ancillary time code for the specified generator output. This command is valid only if:TIMECode:SOUrce is set to PCOUnter.

**:OUTPut<1|2>:TRIGGER SYS\_CLOCK|PXL\_CLOCK|  
FRM\_PULSE|LINE\_PULSE**

Specifies the signal available at the TRIGGER output connector. The available choices are:

- **SYS\_CLOCK**: Low-jitter sample clock operating at 148.5 MHz for integer frame rates and 148.35 MHz for non-integer frame rates.
- **PXL\_CLOCK**: Pixel clock which runs at the parallel data clock rate (148.5 MHz or 148.35 MHz for 3G-SDI formats, 74.25 MHz or 74.18 MHz for HD-SDI formats, or 27 MHz for SD-SDI formats).

- FRM\_PULSE: For progressive formats, this option selects a pulse per video frame (high during vertical blanking). For interlaced or segmented frame formats, this option selects a field square wave signal.

- LINE\_PULSE: Pulse once per video line.

:OUTPut<1|2>:TRIGGER?

Returns the current signal type at the TRIGGER output connector.

:OUTPut<1|2>:VIDeo:Y:STATE <Boolean>

Enables or disables the Y component for the active video signal. When disabled, blanking (0%) values are used for this component. For GBR formats, this command affects the G component.

:OUTPut<1|2>:VIDeo:Y:STATE?

Returns the current signal output state of the Y component for the specified generator output.

:OUTPut<1|2>:VIDeo:PB:STATE <Boolean>

Enables or disables the P<sub>B</sub> component for the active video signal. When disabled, blanking (0%) values are used for this component. For GBR formats, this command affects the B component.

:OUTPut<1|2>:VIDeo:PB:STATE?

Returns the current signal output state of the P<sub>B</sub> component for the specified generator output.

:OUTPut<1|2>:VIDeo:PR:STATE <Boolean>

Enables or disables the P<sub>R</sub> component for the active video signal. When disabled, blanking (0%) values are used for this component. For GBR formats, this command affects the R component.

:OUTPut<1|2>:VIDeo:PR:STATE?

Returns the current signal output state of the P<sub>R</sub> component for the specified generator output.

:OUTPut<1|2>:VIDeo:EDH:STATE <Boolean>

Enables or disables the insertion of Error Detection and Handling (EDH) ancillary data packets, per SMPTE RP165. This setting is only applicable for standard definition formats.

:OUTPut<1|2>:VIDeo:EDH:STATE?

Returns the current setting for EDH insertion.

:OUTPut<1|2>:VIDeo:AVTiming:STATE <Boolean>

Enables or disables the audio/video timing mode for the specified generator output. Refer to the SDI7 module section in the *TG8000 User Manual* for detailed information about this mode.

:OUTPut<1|2>:VIDeo:AVTiming:STATe?

Returns the current setting for the audio/video timing measurement mode.

:OUTPut<1|2>:VIDeo:EFILter:STATe <Boolean>

Enables or disables edge filtering for the specified generator output. If disabled, test signals with quick, large data transitions will exhibit ringing when viewed with a waveform display.

:OUTPut<1|2>:VIDeo:EFILter:STATe?

Returns the current setting for edge filtering for the specified generator output.

:OUTPut<1|2>:VPID:STATe <Boolean>

Enables or disables the automatic insertion of the SMPTE 352M Video Payload Identifier in the ancillary data for the specified generator output.

:OUTPut<1|2>:VPID:STATe?

Returns the current setting for the Video Payload Identifier insertion for the specified generator output.

:OUTPut<1|2>:ZONE:FREQuency <NR2>

Sets the control frequency parameter value for the zone plate test pattern (when selected). See the SDI7 module section of the *TG8000 User Manual* for a description of the control parameter for each type of zone plate pattern.

:OUTPut<1|2>:ZONE:FREQuency?

Returns the frequency parameter for the zone plate test pattern.

:OUTPut<1|2>:ZONE:AMPLitude <NR2>

Sets the amplitude (in millivolts) for the zone plate test pattern. The maximum value is 700 mV.

:OUTPut<1|2>:ZONE:AMPLitude?

Returns the value of the zone plate amplitude.

:OUTPut<1|2>:ZONE:K <NR2>

Sets the value of the K parameter (phase) for the zone plate test pattern.

:OUTPut<1|2>:ZONE:K?

Returns the value of the K parameter for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KX <NR2>

Sets the value of the  $K_X$  parameter (horizontal frequency) for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KX?

Returns the value of the  $K_X$  parameter for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KXSQ <NR2>

Sets the value of the  $K_X^2$  parameter (horizontal sweep) for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KXSQ?

Returns the value of the  $K_X^2$  parameter for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KXT <NR2>

Sets the value of the  $K_{XT}$  parameter (temporal channel horizontal frequency) for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KXT?

Returns the value of the  $K_{XT}$  parameter for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KXY <NR2>

Sets the value of the  $K_{XY}$  parameter (vertical channel horizontal frequency) for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KXY?

Returns the value of the  $K_{XY}$  parameter for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KY <NR2>

Sets the value of the  $K_Y$  parameter (vertical channel frequency) for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KY?

Returns the value of the  $K_Y$  parameter for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KYSQ <NR2>

Sets the value of the  $K_Y^2$  parameter (vertical sweep) for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KYSQ?

Returns the value of the  $K_Y^2$  parameter for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KYT <NR2>

Sets the value of the  $K_{YT}$  parameter (vertical channel vertical frequency) for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KYT?

Returns the value of the  $K_{YT}$  parameter for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KT <NR2>

Sets the value of the  $K_T$  parameter (temporal channel frequency) for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KT?

Returns the value of the  $K_T$  parameter for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KTSQ <NR2>

Sets the value of the  $K_T^2$  parameter (temporal sweep) for the zone plate test pattern.

:OUTPut<1|2>:ZONE:KTSQ?

Returns the value of the  $K_T^2$  parameter for the zone plate test pattern.

:OUTPut<1|2>:ZONE:WAVE SINE|SQUARE|TRIANGLE

Sets the waveform shape for the zone plate test pattern.

:OUTPut<1|2>:ZONE:WAVE?

Returns the current waveform shape for the zone plate test pattern.

:OUTPut<1|2>:ZONE:SAVE 1|2

Saves the current zone plate test pattern settings as Custom 1 or Custom 2. After saving, the full set of parameters can be restored with the :SYNThesizer:SIGNAL command using the ZP\_1\_CUSTOM, or ZP\_2\_CUSTOM parameter respectively.

:OUTPut<1|2>:ZONE:TRESet:STATE <Boolean>

Sets the temporal dimension for the zone plate test pattern to stay constant or vary.

:OUTPut<1|2>:ZONE:TRESet:STATE?

Returns the temporal parameter state for the zone plate test pattern.

:OUTPut<1|2>:ZONE:VIDEO:Y:STATE <Boolean>

Enables or disables the Y/G/X component of the zone plate test pattern, depending on the selected sampling structure.

:OUTPut<1|2>:ZONE:VIDEO:Y:STATE?

Returns the Y/G/X component setting for the zone plate test pattern.

:OUTPut<1|2>:ZONE:VIDEO:PB:STATE <Boolean>

Enables or disables the  $P_B$ /B/Y component of the zone plate test pattern, depending on the selected sampling structure.

:OUTPut<1|2>:ZONE:VIDEO:PB:STATE?

Returns the P<sub>B</sub>/B/Y component setting for the zone plate test pattern.

:OUTPut<1|2>:ZONE:VIDEO:PR:STATE <Boolean>

Enables or disables the P<sub>R</sub>/R/Z component of the zone plate test pattern, depending on the selected sampling structure.

:OUTPut<1|2>:ZONE:VIDEO:PR:STATE?

Returns the P<sub>R</sub>/R/Z component setting for the zone plate test pattern.

## SENSE commands

Use these commands to set the timing of the SDI7 module relative to the internal reference signal (frame reset signal).

### Command tree

|             |                   |
|-------------|-------------------|
| :SENSe<1 2> |                   |
| :CORRection |                   |
| :MDElay     |                   |
| :HORizontal | <NR2>             |
| :HORizontal |                   |
| :VERTical   | <NR1>             |
| :Relative   | <ANALog   SERIAL> |

### Command description

:SENSe<1|2>:CORRection:MDElay:HORizontal <NR2>

Sets the horizontal timing offset of the selected outputs. The timing resolution is clock-cycles. The units are microseconds. (See Table 7.)

**Table 7: SDI7 horizontal offset ranges**

| Standard / Frame rate | Range $\mu$ s<br>( $\pm 1$ video line) | Resolution                       |
|-----------------------|--|----------------------------------|
| 1080 60p              | 14.814                                 | .0067 $\mu$ s (148.5 MHz clock)  |
| 1080 59.94p           | 14.829                                 | .0067 $\mu$ s (148.36 MHz clock) |
| 1080 50p              | 17.778                                 | .0067 $\mu$ s (148.5 MHz clock)  |
| 1080 60i              | 29.629                                 | .0135 $\mu$ s (74.25 MHz clock)  |
| 1080 59.94i           | 29.659                                 | .0135 $\mu$ s (74.18 MHz clock)  |
| 1080 50i              | 35.556                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 1080 30p / sF         | 29.629                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 1080 29.97p / sF      | 29.659                                 | .0135 $\mu$ s (74.18 MHz clock)  |
| 1080 25p / sF         | 35.542                                 | .0135 $\mu$ s (75.25 MHz clock)  |
| 1080 24p / sF         | 37.037                                 | .0135 $\mu$ s (75.25 MHz clock)  |

**Table 7: SDI7 horizontal offset ranges (cont.)**

| Standard / Frame rate | Range $\mu$ s<br>( $\pm 1$ video line) | Resolution                      |
|-----------------------|--|---------------------------------|
| 1080 23.98p / sF      | 37.074                                 | .0135 $\mu$ s (74.18 MHz clock) |
| 720 60p               | 22.222                                 | .0135 $\mu$ s (75.25 MHz clock) |
| 720 59.94p            | 22.244                                 | .0135 $\mu$ s (74.18 MHz clock) |
| 720 50p               | 26.667                                 | .0135 $\mu$ s (75.25 MHz clock) |
| 720 30p               | 44.444                                 | .0135 $\mu$ s (75.25 MHz clock) |
| 720 29.97p            | 44.489                                 | .0135 $\mu$ s (74.18 MHz clock) |
| 720 25p               | 53.333                                 | .0135 $\mu$ s (75.25 MHz clock) |
| 720 24p               | 55.555                                 | .0135 $\mu$ s (75.25 MHz clock) |
| 720 23.98p            | 55.611                                 | .0135 $\mu$ s (74.18 MHz clock) |
| 625 50i               | 64.000                                 | .0741 $\mu$ s (13.5 MHz clock)  |
| 525 59.94i            | 63.556                                 | .0741 $\mu$ s (13.5 MHz clock)  |

**:SENSe<1|2>:CORRection:MDELay:HORizontal?**

Returns the current horizontal timing offset of the selected outputs.

**:SENSe<1|2>:CORRection:MDELay:VERTical <NR1>**

Sets the vertical timing offset of the selected outputs. The units are lines and the range is  $\frac{1}{2}$  frame. (See Table 8.)

**Table 8: SDI7 Vertical offset ranges**

| Format (active lines) | Range (lines) |
|-----------------------|---------------|
| 1125-line (1080)      | 562           |
| 750-line (720)        | 375           |
| 625-line (576)        | 312           |
| 525-line (486)        | 262           |

**:SENSe<1|2>:CORRection:MDELay:VERTical?**

Returns the current vertical timing offset of the selected output.

**:SENSe<1|2>:CORRection:MDELay:RELative ANALog|SERial**

Sets the timing offset mode for the selected output. ANALog includes correction for the delay through a standard D to A converter; SERIAL omits this correction.

**:SENSe<1|2>:CORRection:MDELay:RELative**

Returns the current timing offset mode for the selected output.

# Error messages and codes

Error codes with a negative value are SCPI standard error codes; errors with a positive value are unique to the TG8000.

## Command errors

Command errors are returned when there is a syntax error in the command.

**Table 9: Command errors**

| Error code | Error message              |
|------------|----------------------------|
| -100       | command error              |
| -101       | invalid character          |
| -102       | syntax error               |
| -103       | invalid separator          |
| -104       | data type error            |
| -105       | GET not allowed            |
| -108       | parameter not allowed      |
| -109       | missing parameter          |
| -110       | command header error       |
| -111       | header separator error     |
| -112       | program mnemonic too long  |
| -113       | undefined header           |
| -114       | header suffix out of range |
| -120       | numeric data error         |
| -121       | character                  |
| -123       | exponent too large         |
| -124       | too many digits            |
| -128       | numeric data not allowed   |
| -130       | suffix error               |
| -131       | invalid suffix             |
| -134       | suffix too long            |
| -138       | suffix not allowed         |
| -140       | character data error       |
| -141       | invalid character data     |
| -144       | character data too long    |
| -148       | character data not allowed |
| -150       | string data error          |
| -151       | invalid string data        |
| -158       | string data not allowed    |

**Table 9: Command errors (cont.)**

| Error code | Error message                    |
|------------|----------------------------------|
| -160       | block data error                 |
| -161       | invalid block data               |
| -168       | block data not allowed           |
| -170       | command expression error         |
| -171       | invalid expression               |
| -178       | expression data not allowed      |
| -180       | macro error                      |
| -181       | invalid outside macro definition |
| -183       | invalid inside macro definition  |
| -184       | macro parameter error            |

## Execution errors

These error codes are returned when an error is detected while a command is being executed.

**Table 10: Execution errors**

| Error code | Error message            |
|------------|--------------------------|
| -200       | execution error          |
| -201       | invalid while in local   |
| -202       | settings lost due to RTL |
| -210       | trigger error            |
| -211       | trigger ignored          |
| -212       | arm ignored              |
| -213       | init ignored             |
| -214       | trigger deadlock         |
| -215       | arm deadlock             |
| -220       | parameter error          |
| -221       | settings conflict        |
| -222       | data out of range        |
| -223       | too much data            |
| -224       | illegal parameter value  |
| -225       | out of memory            |
| -226       | lists not same length    |
| -230       | data corrupt or stale    |
| -231       | data questionable        |
| -240       | hardware error           |

Table 10: Execution errors (cont.)

| Error code | Error message                   |
|------------|---------------------------------|
| -241       | hardware missing                |
| -250       | mass storage error              |
| -251       | missing mass storage            |
| -252       | missing media                   |
| -253       | corrupt media                   |
| -254       | media full                      |
| -255       | directory full                  |
| -256       | FileName not found              |
| -257       | FileName error                  |
| -258       | media protected                 |
| -260       | execution expression error      |
| -261       | math error in expression        |
| -270       | execution macro error           |
| -271       | macro syntax error              |
| -272       | macro execution error           |
| -273       | illegal macro label             |
| -274       | execution macro parameter error |
| -275       | macro definition too long       |
| -276       | macro recursion error           |
| -277       | macro redefinition not allowed  |
| -278       | macro header not found          |
| -280       | program error                   |
| -281       | cannot create program           |
| -282       | illegal program name            |
| -283       | illegal variable name           |
| -284       | program currently running       |
| -285       | program syntax error            |
| -286       | program runtime error           |

## Device specific errors

These error codes are returned when an internal instrument error is detected. This type of error may indicate a hardware problem.

**Table 11: Device specific errors**

| Error code | Error message             |
|------------|---------------------------|
| -300       | device specific error     |
| -310       | system error              |
| -311       | memory error              |
| -312       | PUD memory lost           |
| -313       | calibration memory lost   |
| -314       | save/recall memory lost   |
| -315       | configuration memory lost |
| -330       | self test failed          |
| -350       | queue overflow            |

## Query errors

These error codes are returned in response to an unanswered query.

**Table 12: Query errors**

| Error code | Error message                              |
|------------|--|
| -400       | query error                                |
| -410       | query interrupted                          |
| -420       | query unterminated                         |
| -430       | query deadlocked                           |
| -440       | query unterminated after indefinite period |

## Device errors

These error codes are unique to the TG8000 and the installed modules.

**Table 13: Device errors**

| Error code | Error message                      |
|------------|------------------------------------|
| 242        | module not found                   |
| 243        | module not a generator             |
| 249        | directory not found                |
| 251        | standard not compatible with input |

**Table 13: Device errors (cont.)**

| <b>Error code</b> | <b>Error message</b>             |
|-------------------|----------------------------------|
| 252               | no signal found on input         |
| 253               | unable to release clock          |
| 254               | unable to lock clock             |
| 263               | signal file not found            |
| 264               | current signal not saved to file |
| 265               | signal file failed to load       |



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