HP 8114A Programming Reference

Common Command Summary IEEE 488.2

Table 4-1.
HP 8114A IEEE 488.2 Common Command Summary

Command	Parameter	Description
*CLS	—	Clear the status structure
*ESE	<0-255>	Set the Event Status Register Mask
*ESE?	<0-255>	Read the Event Status Register Mask
*ESR?	—	Read the Event Status Register
*IDN?	—	Read the Instrument's Identification string
*LRN?	—	Read the complete Instrument Setting
*OPC	—	Generate the Operation Complete message when all pending actions are complete
*OPC?	—	Set the Operation Complete bit when all pending actions are complete
*OPT?	—	Read the installed options
*RCL	<0-9>	Recall a complete Instrument Setting from memory
*RST[1]	—	Reset the instrument to standard settings
*SAV	<1-9>	Save the complete Instrument Setting to memory
*SRE	<0-255>	Set the Service Request Enable Mask
*SRE?	<0-255>	Read the Service Request Enable Mask
*STB?	—	Read the Status Byte
*TRG	—	Trigger
*TST?	—	Execute instrument's self-test
*WAI	—	Wait until all pending actions are complete

1 See the default settings in table 4-13, at the end of this section.

SCPI Command Summary

Table 4-2. HP 8114A SCPI Command Summary

Command	Parameter	Description
:DISPlay		
[:WINDow]		
[:STATe]	ON|OFF|1|0	Set/read frontpanel display state
:MMEMory		
:CATalog?	[A:]	Read directory of memory card
:CDIRectory	[<name>]	Change directory on memory card
:COPY	<source>[,A:],<dest>[,A:]	Copy a file on memory card
:DELete	<name>[,A:]	Delete a file from memory card
:INITialize	[A:[,DOS]]	Initialize memory card to DOS format
:LOAD		
:STATe	<n>,<name>, [A:]	Load file from memory card to memory n
:STORe		
:STATe	<n>,<name>, [A:]	Store memory n to memory card
:OUTPut		
[:STATe]	ON|OFF|1|0	Set/read channel output state
:IMPedance		
[:INTernal]	<value>	Set/read internal source impedance of output
:EXTernal	<value>	Set/read expected external load impedance at output
:POLarity	POSitive|NEGative	Set/read output polarity

Table 4-2.
HP 8114A SCPI Command Summary (continued)

Command	Parameter	Description
[:SOURce]		
:CURRent[1]		
[:LEVel]		
[:IMMediate]		
[:AMPLitude]	<value>	Set/read channel amplitude current
:BASeline	<value>	Set/read channel baseline current
:HIGH	<value>	Set/read channel high-level current
:LOW	<value>	Set/read channel low-level current
:LIMit[1]		
[:HIGH]		Set/read maximum current limit
:LOW		Set/read minimum current limit
:STATe	ON|OFF|1|0	Enable/Disable the current limits.
:FREQuency		
[:CW|:FIXed]	<value>	Set/read frequency of pulses
:HOLD[1]	VOLT|CURR	Switch between VOLtage and CURRent command subtrees
:PHASe	<value>	
[:ADJust]	<value>	Set/read channel phase
:PULSe		
:DCYCle	<value>	Set/read channel duty-cycle
:DELay	<value>	Set/read channel delay (to leading edge)
:HOLD	TIME|PRATio	Hold absolute delay|delay as period ratio fixed with varying frequency
:UNIT	S|SEC|PCT|DEG|RAD	Set/read delay units
:DOUBle		
[:STATe]	OFF|ON	Enable/disable double pulses per pulse-period
:DELay	<value>	Set/read delay between double pulses
:HOLD	TIME|PRATio	Hold absolute delay|delay as period ratio fixed with varying frequency
:UNIT	S|SEC|PCT	Set/read delay units
:HOLD	WIDTh|DCYCle|TDELay	Hold Width|Duty-cycle|Trailing edge delay fixed with varying frequency

1 The CURRent and VOLTage subsystems cannot be used at the same time. Use the :HOLD command to select between them.
The Standard HP 8114A cannot program current via the HP-IB bus. Convert the required current with the help of the Ohm's law into voltage and program the voltage.
With Option 001 installed the commands can be used.

Table 4-2.
HP 8114A SCPI Command Summary (continued)

Command	Parameter	Description
[:SOURce]		
:PULSe		(Continued from previous page)
:LIMIT		
[:WIDth]	<value>	Set Width limit on/off
:DCYCle	<value>	Set Duty-cycle limit on/off
:STATe	OFF|ON	Enable/disable limits
:PERiod	<value>	Set/read pulse-period
:TrailingDELay	,value>	Set/read trailing edge delay
:WIDTh	<value>	Set/read channel pulse width
:VOLTage[1]		
[:LEVel]		
[:IMMediate]		
[:AMPLitude]	<value>	Set/read channel amplitude voltage
:BASeline	<value>	Set/read channel baseline voltage
:HIGH	<value>	Set/read channel high-level voltage
:LOW	<value>	Set/read channel low-level voltage
:LIMit		
[:HIGH]		Set/read maximum voltage limit
:LOW		Set/read minimum voltage limit
:STATe	ON|OFF|1|0	Enable/Disable the voltage limits.
:STATus		
:OPERation		
[:EVENt]?		Read Operation event register
:CONDition?		Read Operation condition register
:ENABle	Numeric	Set/Read Operation enable register
:NTRansition	Numeric	Set/Read Operation negative-transition register
:PTRansition	Numeric	Set/Read Operation positive-transition register
:PRESet		Clear and preset status groups

1 The CURRent and VOLTage subsystems cannot be used at the same time. Use the :HOLD command to select between them.

Table 4-2.
HP 8114A SCPI Command Summary (continued)

Command	Parameter	Description
:STATus		(Continued from previous page)
:QUEStionable		
[:EVENt]?		Read Questionable event register
:CONDition?		Read Questionable condition register
:ENABle	Numeric	Set/Read Questionable enable register
:NTRansition	Numeric	Set/Read Questionable negative-transition register
:PTRansition	Numeric	Set/Read Questionable positive-transition register
:SYSTem		
:ERRor?		Read error queue
:KEY	Numeric	Simulate key press
:KEY?	Numeric	Read last key pressed
:PRESet		Same as *RST, but display not affected
:SECurity	Block data	Set/read complete instrument
[:STATe]	ON|OFF	Switch security on and off
:SET	Block data	Set/read complete instrument setting
:VERSion?		Read SCPI compliance version
:WARNing		
[:COUNt]?		Read number of active warnings
:STRing?		Read active warnings as concatenated string
:BUFFer?		Read maximum possible length of concatenated string
:TRIGger		
[:SEQuence|:STARt]		
:COUNt	<value>	Set/read number of triggered periods to be generated in a burst
:EWIDth		
:STATe	ON|OFF|1|0	Set/read External WQidth mode
:INHibit		
[:STATe]	ON|OFF|1|0	Switch Inhibit Input on or off
:MODE	RISE|FALL|HIGH|LOW	Inhibit on edge or level
:INPut	RESet|SET	Reset or set inhibit (edge inhibit only)
:LEVel	<value>	Set/read threshold level at EXT INPUT
:SENSe	EDGE|LEVel	Set/read trigger on edge or gate on level
:SLOPe	POS|NEG|EITH	Set/read trigger slope at EXT INPUT
:SOURce	IMM|EXT|MAN	Set/read trigger source (VFO|EXT INPUT|MAN key)

Status Model

Overview

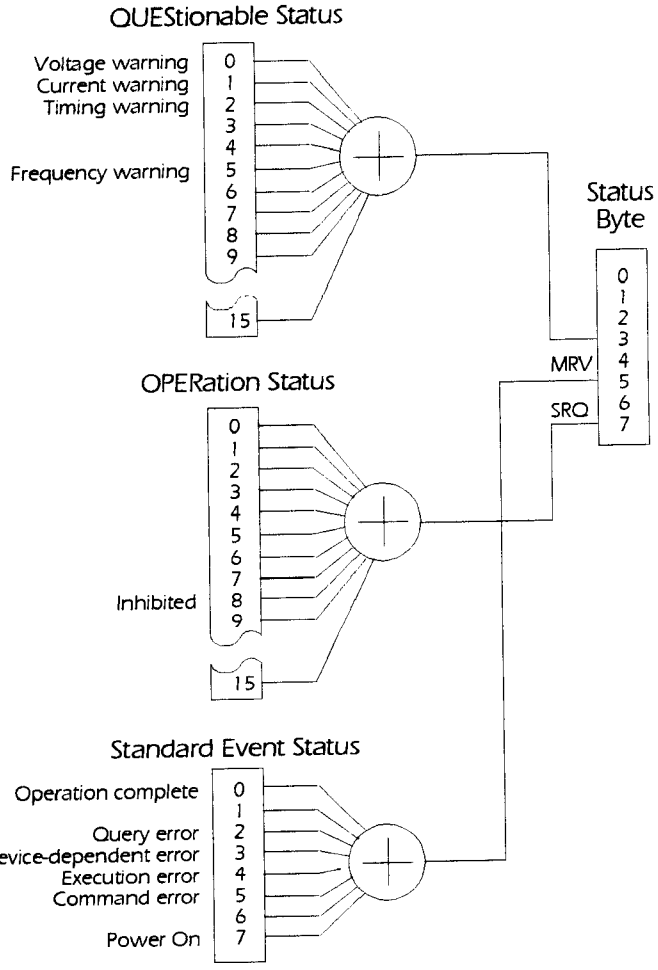

Figure 4-1. HP 8114A Status Groups

The HP 8114A has a status reporting system conforming to IEEE 488.2 and SCPI. Figure 4-1 shows the status groups available in the HP 8114A. Each status group is made up of component registers, as shown in Figure 4-2.

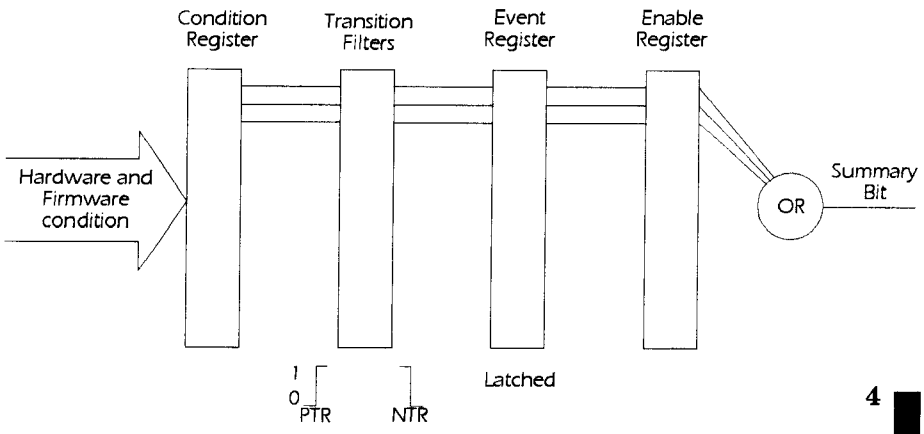

Figure 4-2. Component registers in a Status Group

Condition Register

A condition register contains the current status of the hardware and firmware. It is continuously updated and is not latched or buffered. You can only read condition registers. If there is no command to read the condition register of a particular status group, then it is simply invisible to you.

Transition Filters

Transition filters are used to detect changes of state in the condition register and set the corresponding bit in the event register. You can set transition filter bits to detect positive transitions (PTR), negative transitions (NTR) or both. Transition filters are therefore read-write registers. They are unaffected by *CLS.

Event Register

An event register latches transition events from the condition register as specified by the transition filters or records status events. Querying (reading) the event register clears it, as does the *CLS command. There is no buffering, so while a bit is set, subsequent transition events are not recorded. Event registers are read-only.

Enable register

The enable register defines which bits in an event register are included in the logical OR into the summary bit. The enable register is logically ANDed with the event register and the resulting bits ORed into the summary bit. Enable registers are read-write, and are not affected by *CLS or querying.

Although all status groups have all of these registers, not all status groups actually use all of the registers. Table 4-3 summarizes the registers used in the HP 8114A status groups.

Table 4-3.
HP 8114A Status Groups - Registers Used

Status Group	Registers in Group				
	CONDition	NTR	PTR	EVENt	ENABle
QUEStionable	√	√	√	√	√
OPERation	√	√	√	√	√
Standard Event Status	×	×	×	√[1]	√[2]
Status Byte	×	×	×	√[3]	√[4]

1 Use *ESR? to query.

2 Use *ESE to set,*ESE? to query

3 Use *STB? to query

4 Use *SRE to set, *SRE? to query

Status Byte

The status byte summarizes the information from all other status groups. The summary bit for the status byte actually appears in bit 6 (RQS) of the status byte. When RQS is set it generates an SRQ interrupt to the controller indicating that at least one instrument on the bus requires attention. You can read the status byte using a serial poll or *STB?.

Table 4-4. Status Byte bits

Bit	Description
0	Unused, always 0
1	Unused, always 0
2	Unused, always 0
3	QUESTionable Status Summary Bit
4	MAV - Message AVailable in output buffer
5	Standard Event Status summary bit
6	RQS - ReQuest Service
7	OPERation Status summary Bit, unused

Standard Event Status Group

Table 4-5.
Standard Event Status Group bits

Bit	Description
0	Operation Complete, set by *OPC
1	Unused, always 0
2	Query Error
3	Device Dependant Error
4	Execution Error
5	Command Error
6	Unused, always 0
7	Power On

OPERation Status Group

The HP 8114A uses only bit 8 in this Status Group, to indicate that the output pulses are inhibited.

Table 4-6. OPERation Status Group bits

Bit	Description
0	Unused, always 0
1	Unused, always 0
2	Unused, always 0
3	Unused, always 0
4	Unused, always 0
5	Unused, always 0
6	Unused, always 0
7	Unused, always 0
8	Pulse inhibited
9	Unused, always 0
10	Unused, always 0
11	Unused, always 0
12	Unused, always 0
13	Unused, always 0
14	Unused, always 0
15	Always 0

QUEStionable Status Group

Table 4-7. QUEStionable Status Group bits

Bit	QUEStionable
0	Voltage warning
1	Current warning
2	Time warning
3	Unused, always 0
4	Unused, always 0
5	Frequency warning
6	Unused, always 0
7	Unused, always 0
8	Unused, always 0
9	Unused, always 0
10	Unused, always 0
11	Unused, always 0
12	Unused, always 0
13	Unused, always 0
14	Unused, always 0
15	Always 0

The QUEStionable Status group is used to report warning conditions amongst the voltage, current, pulse timing and frequency parameters. For more information on warning conditions refer to "Warnings and Errors" in Chapter 3. Warnings occur when a parameter, although not outside its maximum limits, could be causing an invalid signal at the output because of the actual settings and uncertainties of related parameters.

Programming the HP 8114A Trigger Modes

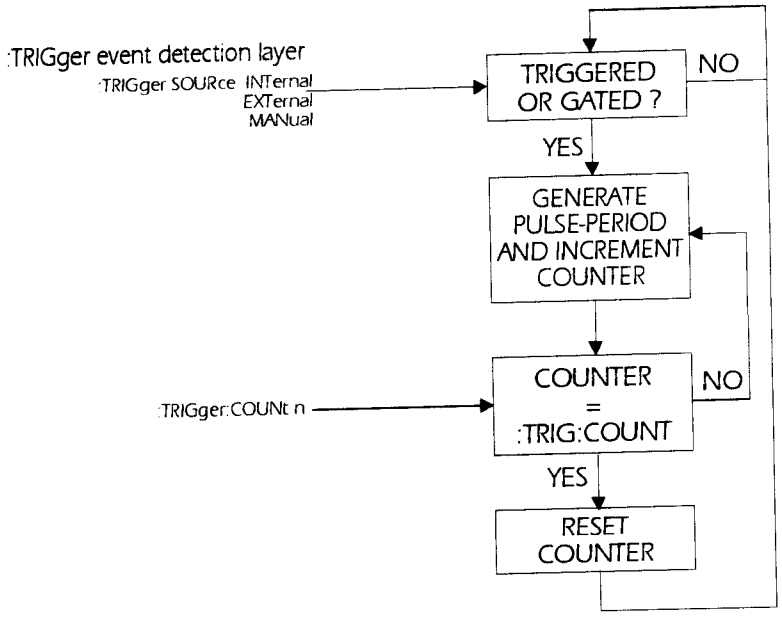

Figure 4-3. HP 8114A TRIGGER model

You program the triggering capabilities of the HP 8114A using the SCPI :TRIGger subsystem. Using this command subsystem you can program the operating modes of the instrument which are set up using the `TRIGGER` screen on the frontpanel.

Use the :TRIGger subsystem to select the triggering modes of the instrument: `CONTINUOUS`,`TRIGGERED`,`GATED`, and the triggering and number of pulse-periods per `BURST` length.

CONTINUOUS

Set CONTINUOUS mode by TRIGgering the HP 8114A from its internal oscillator:

```
:TRIGger:SOURce IMMediate     Trigger from internal osc.
```

TRIGGERED

Set TRIGGERED mode by TRIGgering the HP 8114A on *edges* from the EXT INPUT:

```
:TRIGger:SOURce EXTernal      Trigger from EXT INPUT
:TRIGger:SENSe EDGE           Trigger on edge
:TRIGger:SLOPe POSitive       Trigger on positive edge
:TRIGger:LEVel 1V             Set EXT INPUT threshold
```

GATED

Set GATED mode by TRIGgering the HP 8114A on *levels* from the EXT INPUT:

```
:TRIGger:SOURce EXTernal      Trigger from EXT INPUT
:TRIGger:SENSe LEVel          Trigger on signal level
:TRIGger:SLOPe POSitive       Trigger on positive level
```

EXT WIDTH

Set EXT WIDTH mode using the :TRIGger:EWIDth[:STATe] command:

```
:TRIGger:EWIDth ON     Switch on EXT WIDTH mode
```

This command disables the TRIGger system. The TRIGger system is re-enabled by switching OFF EWIDth mode.

PULSES

Set PULSES mode by setting the :TRIGger:COUNt to 1 so that a single triggered pulse-period is generated for every TRIGger. The trigger source sets the pulse-period:

```
:TRIGger:COUNt                Single pulse-period per TRIGger.
:TRIGger:SOURce INTernal      Pulse-period from internal osc.
```

Table 4-8.
Trigger sources set by :TRIG:SOUR

Trigger source	:TRIGger:SOURce
(internal)continuous	INTernal | IMMediate
External Input	EXTernal
MANual Key	MANual

BURST of — Set BURST of mode by setting the :TRIGger:COUNt to the burst count required.

```
:TRIGger:COUNt 16              Burst of 16 pulse-periods
:TRIGger:SOURce INTernal       Continuous mode
```

Command Dictionary

The following reference sections list the HP 8114A commands in alphabetical order. In addition to a command description, the attributes of each command are described under the following headings. Not all of these attributes are applicable to all commands.

Form

Set	The command can be used to program the instrument
Query	The command can be used to interrogate the instrument. Add a ? to the command if necessary.
Event	The command performs a one-off action.

Parameter The type of parameter, if any, accepted by the command.

Parameter Suffix The suffixes which may follow the parameter.

Functional Coupling Any other commands which are implicitly executed by the command.

Value Coupling Any other parameter which is also changed by the command.

Range Coupling Any other parameters whose valid ranges may be changed by the command.

***RST value** The value/state following a *RST command.

Specified Limits The specified limits of a parameter.

Absolute Limits

Some parameters can be programmed beyond their specified limits.

Example

Example programming statements which assume:

- HP BASIC 5.0/5.1/6.1
- HP-IB Interface Select Code = 7
- HP 8114A HP-IB Address = 14

:DISPlay[:WINDow][:STATe]

Form Set & Query

Parameter ON|OFF|1|0

***RST value** ON

Description This command is used to turn the frontpanel display on and off. Switching off the display improves the programming speed of the instrument.

Note 

*RST switches the display back on. Use `:SYSTem:PRESet` to perform an *RST without switching the display back on.

Example

```
OUTPUT 714;":DISP OFF"   Switch off the frontpanel display
```

:MMEMory:CATalog?

Form Query

Parameter ["A:"]

***RST value** Not applicable

4

Description Use this command to get a listing of the contents of the currently selected directory on the memory card. As there is only on memory card slot, the parameter A: is optional. The information returned is:

<bytes_used>,<bytes_free>{,<file_entry>}

<bytes_used>	The total number of bytes used on the memory card.
<bytes_free>	The total number of bytes still available on the memory card.
<file_entry>	String containing the name, type and size of one file: "<file_name>,<file_type>,<file_size>"

Note

- The <file_type> is always blank.
- A directory name has <file_size> = 0

:MMEMory:CDIRectory

Form Event

Parameter ["directory_name"]

***RST value** Not applicable

Description Use this command to change the current directory on the memory card. If you don't specify a directory name parameter, the root directory is selected.

Note that you cannot use DOS pathnames as directory names, you can only select a directory name within the current directory.

Use the directory name ".." to move back to the parent directory of the current directory, unless you are already in the root directory "\".

Examples

```
OUTPUT 714;":MMEM:CDIR"                 Select root directory
OUTPUT 714;":MMEM:CDIR ""PERFORM"""     Select directory"PERFORM"
OUTPUT 714;":MMEM:CDIR ""..."""         Select parent directory
```

:MMEMory:COPY

Form Event

Parameter "filename"[,"A:"],"copyname"[,"A:"]

***RST** Not applicable

Description Use this command to copy an existing file *filename* in the current directory to a new file *copyname*. If *copyname* is the name of a sub-directory in the current directory, a copy of the file *filename* is made in the sub-directory. Use ".." as *copyname* to copy a file into the parent directory of the current directory.

4

Examples

```
OUTPUT 714;":MMEM:COPY ""test1"",""test2"""   Copy test1 to test2
OUTPUT 714;":MMEM:COPY ""test1"","".."""      Copy test1 into parent directory
```

:MMEMory:DELete

Form Event

Parameter "filename"[,"A:"]

***RST** Not applicable

Description Use this command to delete file *filename* from the currently selected directory.

:MMEMory:INITialize

Form Event

Parameter ["A:"[,"DOS"]]

***RST** Not applicable

Description

4

Caution 

Initializing a memory card destroys any existing data on the card.

Use this command to initialize a memory card to DOS format.

:MMEMory:LOAD:STATe

Form Event

Parameter <n>,"filename"[,"A:"]

***RST** Not applicable

Specified Limits <n> = 0 to 9 (integer)

Description Use this command to load a complete instrument setting from file *filename* in the current directory into memory <n> in the HP 8114A.

Memories 1 to 9 are the internal memories. Use memory 0 to load a setting as the current instrument setting.

Examples

```
OUTPUT 714;":MMEM:LOAD:STAT 1,""FREQPERF""""   Load FREQPERF into memory 1
OUTPUT 714;":MMEM:LOAD:STAT 0,""AMPTEST""""    Load AMPTEST as current setting
OUTPUT 714;"*SAV 2"                            Save current setting in memory 2
OUTPUT 714;"*RCL 3"                            Recall memory 3 as current setting
```

:MMEMory:STORe:STATe

Form Event

Parameter <n>,"filename"[,"A:"]

***RST** Not applicable

Specified Limits <n> = 0 to 9 (integer)

4

Description Use this command to store a complete instrument setting from memory <n> to file *filename* in the current directory on the memory card.

Memories 1 to 9 are the internal memories. Use memory 0 to store the current instrument setting to a file.

Examples

```
OUTPUT 714;":MMEM:STOR:STAT 1,""FREQPERF"""     Store memory 1 to file FREQPERF
OUTPUT 714;":MMEM:STOR:STAT 0,""AMPTEST"""      Store current setting to file AMPTEST
OUTPUT 714;"*SAV 2"                             Save current setting in memory 2
OUTPUT 714;"*RCL 3"                             Recall memory 3 as current setting
```

:OUTPut[:STATe]

Form Set & Query

Parameter ON|OFF|1|0

***RST value** OFF

Description Use this command to switch the OUTPUT on or off

Example

```
OUTPUT 714;":OUTP ON"   Switch on OUTPUT
```

:OUTPut:IMPedance[:INTernal]

Form Set & Query

Parameter Numeric

Parameter Suffix `OHM` with engineering prefixes, or `MOHM` is Megaohms.

***RST value** 50 Ω

Specified Limits 50 Ω or HIZ (High-Z)

Description Use this command to program the source impedance of the OUTPUT connector. Note that only two settings are available. If you try to program values <100Ω, the impedance is set to 50Ω. For values ≥100Ω, the impedance is set to HIZ (High-Z).

Example

```
OUTPUT 714;":OUTP:IMP 50OHM"     Set OUTPUT impedance to 50 Ω
OUTPUT 714;":OUTP:IMP 100OHM"    Set OUTPUT to high impedance
```

:OUTPut:IMPedance:EXTernal

Form Set & Query

Parameter Numeric

Parameter Suffix OHM with engineering prefixes, or MOHM is Megaohms.

***RST value** 50.0 Ω

Specified Limits 0.1Ω to 999 kΩ for 50Ω source impedance

Description Use this command to set the expected load impedance of the device-under-test at the OUTPUT connectors. If you have a non-50 Ω load, the output levels at the device-under-test will not be the levels you program or set via the frontpanel *unless* you set the expected load using this command.

Example

```
OUTPUT 714;":OUTP:IMP:EXT 47.6OHM"    Set load impedance
                                       at OUTPUT
                                       impedance to 47.6 Ω
OUTPUT 714;":OUTP:IMP:EXT 999KOHM"    Set load impedance
                                       at OUTPUT
                                       impedance to 999 kΩ
```

:OUTPut[:STATe]

Form Set & Query

Parameter ON|OFF|1|0

***RST value** OFF

Description Use this command to switch the OUTPUT on or off

4

Example

```
OUTPUT 714;":OUTP ON"   Switch on OUTPUT
```

:OUTPut:POLarity

Form Set & Query

Parameter POSitive|NEGative

Parameter Suffix Not Applicable

***RST value** NEGative

Specified Limits Not Applicable

Description Use this command to program the polarity of the OUTPUT.

Example

```
OUTPUT 714;":OUTP:POS"   Set OUTPUT to positive pulses
OUTPUT 714;":OUTP:NEG"   Set OUTPUT to negative pulses
```

[:SOURce]:CURRent[:LEVel][:IMMediate][:AMPLitude]

Form Set & Query

Parameter Numeric

Parameter suffix A with engineering prefixes.

***RST value** 100 mA (50 Ω into 50 Ω)

Specified Limits 20 mA to 2 A

Value coupling *Amplitude = High − Low*

Baseline = low (Positive pulses)
Baseline = high (Negative pulses)

Range coupling Baseline

Description This command programs the amplitude current of the OUTPUT signal. Note that to set the OUTPUT levels in terms of current, you first have to execute the `[:SOURce]:HOLD CURRent` command to enable the `[:SOURce]:CURRent` subsystem.

Note

This command can be used with Option 001 installed, only.
When Option 001 is not installed, convert the required current with the help of the Ohm's law into voltage and program the voltage.

The available current range is limited by the combination of:

- Specified Voltage/Duty-cycle limits
- Actual OUTPUT Impedance setting `:OUTPut:IMPedance`
- Actual Expected Load impedance setting `:OUTPut:IMPedance:EXTernal`

Example

```
OUTPUT 714;":HOLD CURR"      Enable CURRENT subsystem
OUTPUT 714;":CURR 750MA"     Set OUTPUT amplitude to 750 mA
```

[:SOURce]:CURRent[:LEVel][:IMMediate]:BASeline

Form Set & Query

Parameter Numeric

Parameter suffix A with engineering prefixes.

4

***RST value** 0.0 μA (50 Ω into 50 Ω)
Baseline = low (Positive pulses)
Baseline = high (Negative pulses)

Value coupling *Amplitude = High − Low*

Baseline = low (Positive pulses)
Baseline = high (Negative pulses)

Range coupling Amplitude

Description This command programs the baseline current of the OUTPUT signal. A variable baseline is available only if Option 001 is installed. Note that to set the OUTPUT levels in terms of current, you first have to execute the `[:SOURce]:HOLD CURRent` command to enable the `[:SOURce]:CURRent` subsystem.

Note

This command can be used with Option 001 installed, only.
When Option 001 is not installed, convert the required current with the help of the Ohm's law into voltage and program the voltage.

The available current range is limited by the combination of:

- Specified Voltage/Duty-cycle limits

- Actual OUTPUT Impedance setting `:OUTPut:IMPedance`
- Actual Expected Load impedance setting `:OUTPut:IMPedance:EXTernal`

Example

```
OUTPUT 714;":HOLD CURR"          Enable CURRENT subsystem
OUTPUT 714;":CURR:BAS 200MA"     Set OUTPUT baseline to 200 mA
```

[:SOURce]:CURRent[:LEVel][:IMMediate]:HIGH

Form Set & Query

Parameter Numeric

Parameter suffix A with engineering prefixes.

4

Value coupling *Amplitude = High – Low*

Baseline = low (Positive pulses)
Baseline = high (Negative pulses)

Range coupling Low-level

***RST value** 0 mA (50 Ω into 50 Ω)

Specified Limits -2 A to 2 A typical

Description This command programs the High-level current of the OUTPUT signal. Note that to set the OUTPUT levels in terms of current, you first have to execute the `[:SOURce]:HOLD CURRent` command to enable the `[:SOURce]:CURRent` subsystem.

Note

This command can be used with Option 001 installed, only.
When Option 001 is not installed, convert the required current with the help of the Ohm's law into voltage and program the voltage.

The available current range is limited by the combination of:

- Specified Voltage/Duty-cycle limits

- Actual OUTPUT Impedance setting `:OUTPut:IMPedance`
- Actual Expected Load impedance setting `:OUTPut:IMPedance:EXTernal`

Example

```
OUTPUT 714;":HOLD CURR"          Enable CURRENT subsystem
OUTPUT 714;":CURR:HIGH 1 A"      Set OUTPUT High-level current to 1 A
```

[:SOURce]:CURRent[:LEVel][:IMMediate]:LOW

Form Set & Query

Parameter Numeric

Parameter suffix A with engineering prefixes.

4

Value coupling *Amplitude = High − Low*

Baseline = low (Positive pulses)
Baseline = high (Negative pulses)

Range coupling High-level

***RST value** -100 mA (50 Ω into 50 Ω)

Specified Limits -2 A to 2 A typical

Description This command programs the Low-level current of the OUTPUT signal. Note that to set the OUTPUT levels in terms of current, you first have to execute the `[:SOURce]:HOLD CURRent` command to enable the `[:SOURce]:CURRent` subsystem.

Note

This command can be used with Option 001 installed, only.
When Option 001 is not installed, convert the required current with the help of the Ohm's law into voltage and program the voltage.

The available current range is limited by the combination of:

- Specified Voltage/Duty-cycle limits

- Actual OUTPUT Impedance setting `:OUTPut:IMPedance`
- Actual Expected Load impedance setting `:OUTPut:IMPedance:EXTernal`

Example

```
OUTPUT 714;":HOLD CURR"          Enable CURRENT subsystem
OUTPUT 714;":CURR:LOW 500MA"     Set OUTPUT Low-level to 500 mA
```

[:SOURce]:CURRent:LIMit[:HIGH]

Form Set & Query

***RST value** +2 A

Description Use this command to set/read the High-level current limit. If you switch on current limiting, the High-level current cannot be set above the programmed limit. Note that the current is *NOT* limited by the OUTPUT hardware, this is a software limit.

4

Note 

This command can be used with Option 001 installed, only.
When Option 001 is not installed, convert the required current with the help of the Ohm's law into voltage and program the voltage.

Example

```
OUTPUT 714;":HOLD CURR"              Enable CURRENT subsystem
OUTPUT 714;":CURR:LIM 500MA"         Set OUTPUT High-level current limit to 500 mA
OUTPUT 714;":CURR:LIM:STAT ON"       Switch on OUTPUT limits
```

[:SOURce]:CURRent:LIMit:LOW

Form Set & Query

***RST value** -2 A

Description Use this command to set/read the Low-level current limit. If you switch on current limiting, the Low-level current cannot be set below the programmed limit. Note that the current is *NOT* limited by the OUTPUT hardware, this is a software limit.

Note

This command can be used with Option 001 installed, only.
When Option 001 is not installed, convert the required current with the help of the Ohm's law into voltage and program the voltage.

Example

```
OUTPUT 714;":HOLD CURR"                  Enable CURRENT subsystem
OUTPUT 714;":CURR:LIM:LOW -500MA"        Set OUTPUT Low-level current limit to -500 mA
OUTPUT 714;":CURR:LIM:STAT ON"           Switch on OUTPUT limits
```

[:SOURce]:CURRent:LIMit:STATe

Form Set & Query

Parameter ON|OFF|1|0

***RST value** OFF

Description This command switches the output limits on or off. When you switch on the output limits you cannot program the output-levels beyond the programmed limits, until you switch off the output-limits. The limits apply whether you program High/Low levels or Amplitude/Baseline levels.

Note 

This command can be used with Option 001 installed, only.
When Option 001 is not installed, convert the required current with the help of the Ohm's law into voltage and program the voltage.

You can switch the limits on and off in both the `[:SOURce]:CURRent` and the `[:SOURce]:VOLTage` subsystems *but the current and voltage limits are not enabled/disabled independently*. The voltage and current limits are always enabled/disabled together.

Example

```
OUTPUT 714;":HOLD CURR"                 Enable CURRENT subsystem
OUTPUT 714;":CURR:LIM 500MA"            Set OUTPUT High-level current limit to 50 mA
OUTPUT 714;":CURR:LIM:LOW -500MA"       Set OUTPUT Low-level current limit to -50 mA
```

```
OUTPUT 714;":CURR:LIM:STAT ON"
```
Switch on OUTPUT limits

[:SOURce]:FREQuency[:CW|:FIXed]

Form Set & Query

Parameter Numeric

Parameter Suffix Hz with engineering prefixes, or MHZ for Megahertz.

4

Value coupling $Period = \frac{1}{Frequency}$

***RST value** 1.00 MHz

Specified limits See [:SOURce]:PULSe:PERiod

Description Use this command to set/read the pulse frequency. Select the frequency source for the pulse frequency using :TRIGger:SOURce. The currently selected source is programmed by this command. Note that the specified limits and available resolution depend on the selected source.

In Trig'd by: EXT-IN mode the frequency parameter sets the maximum triggering frequency accepted at the External Input.

Example

```
OUTPUT 714;":FREQ 10MHz"    Set pulse frequency to 10 MHz
```

[:SOURce]:HOLD

Form Set & Query

Parameter VOLTage|CURRent

***RST value** VOLT

Description Use this command to enable either the `[:SOURce]:VOLTAge` or `[:SOURce]:CURRent` subsytems.

You can control the signal levels of the HP 8114A OUTPUT in terms of voltage or current.

Note This command can be used with Option 001 installed, only.
When Option 001 is not installed, convert the required current with the help of the Ohm's law into voltage and program the voltage.

[:SOURce]:PHASe[:ADJust]

Form Set & Query

Parameter Numeric

Parameter suffix DEG or RAD. A parameter without a suffix is interpreted as RAD.

4 **Functional coupling** Programming the pulse phase also executes [:SOURce]:PULSe:HOLD PHASe so that the pulse phase is held constant when the signal frequency is changed.

Value coupling $Delay = \frac{Phase}{360} \times Period$

***RST value** 0.0

Specified limits 0 to 360°, constrained by delay and period limits.

Description Use this command to set/read the relative phase-delay of the output signal. This is equivalent to setting an absolute or percentage pulse-delay with [:SOURce]:PULSe:DELay.

If you want the phase delay to remain constant when the pulse-period is varied (rather than the absolute pulse delay) use [:SOURce]:PULSe:DELay:HOLD PRATio.

Example

```
OUTPUT 714;":PHAS 180DEG"          Set OUTPUT phase
                                   to 180°
OUTPUT 714;":PULS:DEL:HOLD PRAT"   Hold OUTPUT phase
                                   constant with
                                   varying period
```

[:SOURce]:PULSe:DCYCle

Form Set & Query

Parameter Numeric

Value coupling $Width = \frac{Duty - cycle}{100} \times Period$

Range coupling Maximum available Amplitude/Baseline is dependent on duty-cycle - see Figure 6-1

***RST value** 5.0% (derived from Width and Period)

Specified limits 0.1 - 99.9%, constrained by Width & Period limits and Amplitude/Baseline setting.

Description Use this command to program the duty-cycle of the pulse signal. If you want to set an absolute pulse width use `[:SOURce]:PULSe:WIDTh`.

If you want the pulse duty-cycle to remain constant when the pulse-period is varied (rather than the absolute pulse width) use `[:SOURce]:PULSe:HOLD DCYCle`

Example

```
OUTPUT 714;":PULS:DCYC 25PCT"   Set OUTPUT duty-cyle to 25%
OUTPUT 714;":PULS:HOLD DCYC"    Hold duty-cycle constant with varying period
```

[:SOURce]:PULSe:DELay

Form Set & Query

Parameter Numeric

Parameter suffix S with engineering prefixes. You can change the default unit using `[:SOURce]:PULSe:DELay:UNIT`.

4

Value coupling

$$Phase = \frac{Delay}{Period} \times 360$$

$$Delay\% = \frac{Delay}{Period} \times 100$$

***RST value** 0.0

Specified limits 0.00 ns to 999 ms (limited by period–4 ns)

Description Use this command to set/read the pulse-delay. Delay is the time between the start of the pulse-period and the start of the leading-edge of the pulse.

If you want the pulse-delay to remain constant when the pulse-period is varied (rather than the phase-delay) use `[:SOURce]:PULSe:DELay:HOLD TIME`.

Example

```
OUTPUT 714;":PULS:DEL 500NS"        Set OUTPUT delay
                                    to 500 ns
OUTPUT 714;":PULS:DEL:HOLD TIM"     Hold OUTPUT de-
                                    lay constant with
                                    varying period
```

[:SOURce]:PULSe:DELay:HOLD

Form Set & Query

Parameter TIMe|PeriodRATio

***RST value** TIM

Description Use this command to set/read the coupling between the pulse-period and the pulse-delay:

TIMe	The absolute pulse-delay is held fixed when the pulse-period is varied (Pulse phase varies).
PeriodRATio	The pulse phase-delay (delay as ratio of period) is held fixed when the pulse-period is varied (Pulse-delay varies).

Example

```
OUTPUT 714;":PULS:DEL 500NS"          Set OUTPUT delay
                                      to 500 ns
OUTPUT 714;":PULS:DEL:HOLD TIM"       Hold OUTPUT de-
                                      lay constant with
                                      varying period
```

[:SOURce]:PULSe:DELay:UNIT

Form Set & Query

Parameter S|SEC|PCT|DEG|RAD

***RST value** S

4

Description Use this command to set/read the default units for the pulse-delay parameter. The default unit of a parameter is the unit used when the parameter is programmed to a value without a unit suffix.

Example

```
OUTPUT 714;":PULS:DEL:UNIT PCT"   Set OUTPUT delay
                                  unit to %
OUTPUT 714;":PULS:DEL 50"         Set OUTPUT delay
                                  to 50% of period
```

[:SOURce]:PULSe:DOUBle[:STATe]

Form Set & Query

Parameter OFF|ON

***RST value** OFF

Description Use this command to switch double-pulse mode on or off. In double-pulse mode two pulses are generated per pulse-period and the delay between the leading edges of the first and second pulse can be adjusted.

[:SOURce]:PULSe:DOUBle:DELay

Form Set & Query

Parameter Numeric

Parameter suffix S with engineering prefixes. You can change the default unit using `[:SOURce]:PULSe:DOUBle:DELay:UNIT`.

4

Value coupling $DblDel\% = \frac{DblDel}{Period} \times 100$

***RST value** 0.0

Specified limits 20.0 ns to 999 ms (limited by period–4 ns)

Description Use this command to set/read the delay between the leading edges of the two pulses in double-pulse mode. The first pulse always starts at the start of the pulse-period.

If you want the double-delay to remain constant when the pulse-period is varied (rather than the double-delay as percentage of period) use `[:SOURce]:PULSe:DOUBle:DELay:HOLD TIME`.

Example

```
OUTPUT 714;":PULS:DOUB ON"              Switch on Double-pulses on OUTPUT
OUTPUT 714;":PULS:DOUB:DEL 500NS"       Set inter-pulse delay to 500 ns
OUTPUT 714;":PULS:DOUB:DEL:HOLD TIM"    Hold inter-pulse delay fixed with varying pulse-period
```

[:SOURce]:PULSe:DOUBle:DELay:HOLD

Form Set & Query

Parameter TIMe|PeriodRATio

***RST value** TIM

Description Use this command to set/read the coupling between the pulse-period and the Double-pulse delay:

TIMe	The absolute double-pulse delay is held fixed when the pulse-period is varied.
PeriodRATio	The double-pulse delay as percentage of period is held fixed when the pulse-period is varied.

Example

```
OUTPUT 714;":PULS:DOUB ON"              Switch on Double-pulses on OUTPUT
OUTPUT 714;":PULS:DOUB:DEL 50PCT"       Set inter-pulse delay to 50% of pulse-period
OUTPUT 714;":PULS:DOUB:DEL:HOLD PRAT"   Hold inter-pulse delay as fixed percentage of pulse-period
```

[:SOURce]:PULSe:DOUBle:DELay:UNIT

Form Set & Query

Parameter S|SEC|PCT

***RST value** S

Description Use this command to set/read the default units for the double-delay parameter. The default unit of a parameter is the unit used when the parameter is programmed to a value without a unit suffix.

Example

```
OUTPUT 714;":PULS:DOUB:DEL:UNIT PCT"   Set OUTPUT double-delay unit to %
OUTPUT 714;":PULS:DOUB:DEL 50"         Set OUTPUT inter-pulse delay to 50% of period
```

[:SOURce]:PULSe:HOLD

Form Set & Query

Parameter WIDTh|DCYCle|TrailingDELAY

***RST value** WIDTh

Description Use this command to set whether the pulse width,the pulse-duty-cycle or the pulse trailing-edge delay is held constant when the pulse-period is changed.

Example

```
OUTPUT 714;":PULS:DEL:HOLD TIM"   Hold OUTPUT delay fixed when frequency varies
OUTPUT 714;":PULS:DEL 20NS"       Set OUTPUT delay to 20 ns
OUTPUT 714;":PULS:HOLD DCYC"      Hold OUTPUT Duty-cycle fixed when frequency varies
OUTPUT 714;":PULS:DCYC 25PCT"     Set OUTPUT Duty-cycle to 25%
```

[:SOURce]:PULSe:LIMit[:WIDth]

Form Set & Query

Parameter OFF|ON

***RST value** OFF

Description Use this command to set to set the Width limit. This command is used with DCYCle. If you attempt to set a value larger than the set limit, the limit will be enforced by the instrument.

Example

```
OUTPUT 714;":PULS:LIM 500NS"
```

Set the pulse width to 500 ns

[:SOURce]:PULSe:LIMit:DCYCle

Form Set & Query

Parameter numeric

***RST value** 100%

Description Use this command to set to set the Duty-cycle limit. This command is used with WIDth. If you attempt to set a value larger than the set limit, the limit will be enforced by the instrument.

Example

```
OUTPUT 714;":PULS:LIM:DCYC 20PCT"   Set the duty-cycle limit to 20%
```

[:SOURce]:PULSe:LIMit:STATe

Form Set & Query

Parameter OFF|ON

***RST value** OFF

Description Use this command to set the WIDth and DCYCle limits on or off.

Example

```
OUTPUT 714;":PULS:LIM:STAT ON"      Set the width/duty-cycle limits ON
OUTPUT 714;":PULS:LIM:STAT OFF"     Set the width/duty-cycle limits OFF
```

[:SOURce]:PULSe:PERiod

Form Set & Query

Parameter Numeric

Parameter Suffix S with engineering prefixes.

Value coupling $Frequency = \frac{1}{Period}$

***RST value** 1 μs

Specified limits

66.7 ns to 999 ms	Single Pulses
133.4 ns to 999 ms	Double Pulses

Description Use this command to set/read the pulse-period. In `Trig'd by: EXT-IN` mode the period parameter sets the maximum period accepted at the External Input.

Example

```
OUTPUT 714;":PULS:PER 100NS"    Set pulse frequency to 100 ns
```

[:SOURce]:PULSe:TrailingDELay

Form Set & Query

Parameter Numeric

Parameter Suffix S with engineering prefixes.

***RST value** 50 ns

Description Use this command to program the delay of the trailing-edge of the pulse relative to the start of the pulse-period. This is an alternative method of programming the pulse width.

Example

```
OUTPUT 714;":PULS:DEL 500NS"          Set OUTPUT delay to 500 ns
OUTPUT 714;":PULS:DEL:HOLD TIM"       Hold OUTPUT delay constant with varying period
OUTPUT 714;":PULS:TDEL 750NS"         Set OUTPUT trailing delay to 750 ns
```

[:SOURce]:PULSe:WIDTh

Form Set & Query

Parameter Numeric

Parameter suffix S with engineering prefixes

***RST value** 50 ns

Specified limits 10 ns to 150 ms (Maximum = Period − 3.3 ns)

Description Use this command to program the width of the pulse signal. If you want to set width as duty-cycle use `[:SOURce]:PULSe:DCYCle`.

If you want the pulse width to remain constant when the pulse-period is varied (rather than the duty-cycle) use `[:SOURce]:PULSe:HOLD WIDTh`

Example

```
OUTPUT 714;":PULS:WIDT 100NS"   Set OUTPUT pulse
                                width to 100 ns
OUTPUT 714;":PULS:HOLD WIDT"    Hold pulse width
                                constant with
                                varying period
```

[:SOURce]:VOLTage[:LEVel][:IMMediate][:AMPLitude]

Form Set & Query

Parameter Numeric

Parameter suffix V with engineering prefixes.

4

Value coupling

Baseline = low (Positive pulses)
Baseline = high (Negative pulses)

Range coupling Baseline

***RST value** 5.00 V

Specified limits

1.00 V to 50.0 V (50Ω into 50Ω)
2.00 V to 100 V (HIZ (High-Z) into 50Ω)

Description

This command programs the amplitude voltage of the OUTPUT signal. Note that to set the OUTPUT levels in terms of voltage, you first have to execute the `[:SOURce]:HOLD VOLTage` command to enable the `[:SOURce]:VOLTage` subsystem.

The available voltage range is limited by the combination of:

- Specified Voltage/Duty-cycle limits
- Actual OUTPUT Impedance setting `:OUTPut:IMPedance`
- Actual Expected Load impedance setting `:OUTPut:IMPedance:EXTernal`
- Baseline setting (Option 001 only)

Example

```
OUTPUT 714;":HOLD VOLT"    Enable VOLTAGE subsystem
OUTPUT 714;":VOLT 5V"      Set OUTPUT amplitude to 2.5 V
```

[:SOURce]:VOLTage[:LEVel][:IMMediate]:BASeline

Form Set & Query

Parameter Numeric

Parameter suffix V with engineering prefixes.

Value coupling

Baseline = low (Positive pulses)
Baseline = high (Negative pulses)

Range coupling Amplitude

***RST value** 0.0 mV

Description This command programs the baseline voltage of the OUTPUT signal. Variable baseline is available only if Option 001 is installed. Note that to set the OUTPUT levels in terms of voltage, you first have to execute the [:SOURce]:HOLD VOLTage command to enable the [:SOURce]:VOLTage subsystem.

The available voltage range is limited by the combination of:

- Specified current limits
- Actual OUTPUT Impedance setting :OUTPut:IMPedance
- Actual Expected Load impedance setting :OUTPut:IMPedance:EXTernal
- Actual Amplitude setting

Example

```
OUTPUT 714;":HOLD VOLT"          Enable VOLTAGE subsystem
OUTPUT 714;":VOLT:BAS -10V"      Set OUTPUT baseline to -10 V
```

[:SOURce]:VOLTage[:LEVel][:IMMediate]:HIGH

Form Set & Query

Parameter Numeric

Parameter suffix V with engineering prefixes.

Value coupling *Amplitude = High − Low*

Baseline = low (Positive pulses)
Baseline = high (Negative pulses)

Range coupling Low-level

***RST value** 0 V

Specified limits -49 V to 50 V (50Ω into 50Ω)

Description This command programs the High-level voltage of the OUTPUT signal. Note that to set the OUTPUT levels in terms of voltage, you first have to execute the `[:SOURce]:HOLD VOLTage` command to enable the `[:SOURce]:VOLTage` subsystem.

The available voltage range is limited by the combination of:

- Specified current limits
- Actual OUTPUT Impedance setting `:OUTPut:IMPedance`
- Actual Expected Load impedance setting `:OUTPut:IMPedance:EXTernal`

Example

```
OUTPUT 714;":HOLD VOLT"          Enable VOLTAGE subsystem
OUTPUT 714;":VOLT:HIGH 4.8V"     Set OUTPUT High-level to 4.8 V
```

[:SOURce]:VOLTage[:LEVel][:IMMediate]:LOW

Form Set & Query

Parameter Numeric

Parameter suffix V with engineering prefixes.

4

Value coupling *Amplitude = High − Low*

Baseline = low (Positive pulses)
Baseline = high (Negative pulses)

Range coupling High-level

***RST value** -5 V

Specified limits -50 V to 49 V (50Ω into 50Ω)

Description This command programs the Low-level voltage of the OUTPUT signal. Note that to set the OUTPUT levels in terms of voltage, you first have to execute the `[:SOURce]:HOLD VOLTage` command to enable the `[:SOURce]:VOLTage` subsystem.

The available voltage range is limited by the combination of:

- Specified Voltage/Duty-cycle limits
- Actual OUTPUT Impedance setting `:OUTPut:IMPedance`
- Actual Expected Load impedance setting `:OUTPut:IMPedance:EXTernal`

Example

```
OUTPUT 714;":HOLD VOLT"          Enable VOLTAGE subsystem
OUTPUT 714;":VOLT:LOW 5V"        Set OUTPUT Low-level to 5 V
```

[:SOURce]:VOLTage:LIMit[:HIGH]

Form Set & Query

***RST value** 100 V

Description Use this command to set/read the High-level voltage limit. If you switch on voltage limiting, the High-level voltage cannot be set above the programmed limit. Note that the voltage is *NOT* limited by the OUTPUT hardware, this is a software limit.

Example

```
OUTPUT 714;":HOLD VOLT"              Enable VOLTAGE subsystem
OUTPUT 714;":VOLT:LIM 3V"            Set OUTPUT High-level voltage limit to 3 V
OUTPUT 714;":VOLT:LIM:STAT ON"       Switch on OUTPUT limits
```

[:SOURce]:VOLTage:LIMit:LOW

Form Set & Query

***RST value** -100 V

Description Use this command to set/read the Low-level voltage limit. If you switch on voltage limiting, the Low-level voltage cannot be set below the programmed limit. Note that the voltage is *NOT* limited by the OUTPUT hardware, this is a software limit.

Example

```
OUTPUT 714;":HOLD VOLT"              Enable VOLTAGE subsystem
OUTPUT 714;":VOLT:LIM:LOW 0V"        Set OUTPUT Low-level voltage limit to 0 V
OUTPUT 714;":VOLT:LIM:STAT ON"       Switch on OUTPUT limits
```

[:SOURce]:VOLTage:LIMit:STATe

Form Set & Query

Parameter ON|OFF|1|0

***RST value** OFF

4

Description This command switches the output limits on or off. When you switch on the output limits cannot program the output-levels beyond the programmed limits, until you switch off the voltage-limits. The limits apply whether you program High/Low levels or Amplitude/Offset levels.

Note 

You can switch the limits on and off in both the `[:SOURce]:CURRent` and the `[:SOURce]:VOLTage` subsystems *but the current and voltage limits are not enabled/disabled independently.* The voltage and current limits are always enabled/disabled together.

Example

```
OUTPUT 714;":HOLD VOLT"            Enable VOLTAGE subsystem
OUTPUT 714;":VOLT:LIM 3V"          Set OUTPUT High-level voltage limit to 3 V
OUTPUT 714;":VOLT:LIM:LOW 0V"      Set OUTPUT Low-level voltage limit to 0 V
OUTPUT 714;":VOLT:LIM:STAT ON"     Switch on OUTPUT limits
```

:STATus:OPERation

This command tree accesses the `OPERation` status group. The OPERation status group uses only bit 8. When this bit is set the HP 8114A output is inhibited.

The following commands are used to access the registers within the status group:

:STATus:OPERation[:EVENt]?

Form Query

***RST value** Not Applicable

Description This command reads the event register in the OPERation status group.

:STATus:OPERation:CONDition?

Form Query

***RST value** Not Applicable

Description This command reads the condition register in the OPERation status group.

:STATus:OPERation:ENABle

Form Set & Query

Parameter Numeric

***RST value** Not affected by `*RST`

Specified limits 0 – 32767

Description This command sets or queries the enable register in the OPERation status group.

:STATus:OPERation:NTRansition

Form	Set & Query
Parameter	Numeric
***RST value**	Not Applicable
Specified limits	0–32767
Description	This command sets or queries the negative-transition register in the OPERation status group.

:STATus:OPERation:PTRansition

Form	Set & Query
Parameter	Numeric
***RST value**	Not Applicable
Specified limits	0–32767
Description	This command sets or queries the positive-transition register in the OPERation status group.

:STATus:OPERation:INHibit

Form	Set & Query
Parameter	Numeric
***RST value**	Not Applicable
Specified limits	0–32767
Description	This command sets or queries the positive-transition register in the OPERation status group.

:STATus:PRESet

Form Event

***RST value** Not Applicable

Description This command

- Clears all status group event-registers
- Clears the error queue
- Presets the status group enable-, PTR-, and NTR-registers as follows:

Status Group	Register	Preset value
OPERation	ENABle	0000000000000000
	PTR	0111111111111111
	NTR	0000000000000000
QUEStionable	ENABle	0000000000000000
	PTR	0111111111111111
	NTR	0000000000000000

:STATus:QUEStionable

This command tree accesses the QUEStionable status group. The QUEStionable status group contains warning bits for voltage, current, time and frequency parameters. A warning occurs when the output signal *could* be out of specification due to the combined specification uncertainties of many parameters, although all parameters are set within their individually specified limits. If a parameter is set outside its specified limits an error is generated.

The following commands are used to access the registers within the status group:

:STATus:QUEStionable[:EVENt]?

Form Query

***RST value** Not Applicable

Description This command reads the event register in the QUEStionable status group.

:STATus:QUEStionable:CONDition?

Form Query

***RST value** Not Applicable

Description This command reads the condition register in the QUEStionable status group.

:STATus:QUEStionable:ENABle

Form Set & Query

Parameter Numeric

***RST value** Not affected by *RST

Specified limits 0 – 32767

Description	This command sets or queries the enable register in the QUEStionable status group.

:STATus:QUEStionable:NTRansition

Form	Set & Query
Parameter	Numeric
***RST value**	Not Applicable
Specified limits	0–32767
Description	This command sets or queries the negative-transition register in the QUEStionable status group.

:STATus:QUEStionable:PTRansition

Form	Set & Query
Parameter	Numeric
***RST value**	Not Applicable
Specified limits	0–32767
Description	This command sets or queries the positive-transition register in the QUEStionable status group.

:SYSTem:ERRor?

Form Query

***RST value** Not Applicable

Description Use this command to read the HP 8114A error queue. The HP 8114A error queue can store up to 30 error codes on a first-in-first-out basis. When you read the error queue, the error number and associated message are put into the instrument's output buffer.

If the queue is empty, the value 0 is returned, meaning `No Error`. If the queue overflows at any time, the last error code is discarded and replaced with `-350` meaning `Queue overflow`.

:SYSTem:KEY

Form Set & Query

Parameter Numeric

Parameter suffix No suffix allowed

***RST value** -1

Specified limits See Table 4-9

Description This command simulates pressing a key on the frontpanel. Simulated key-press are also recorded as the last key pressed.

Note

1. `:SYST:KEY 19` sets the instrument to LOCAL mode.
2. In remote mode *only* the softkeys under the display and the (SHIFT) (LOCAL) key are active. Since the instrument normally switches to remote mode when any command is received, including `:SYSTem:KEY`, simulating one of the other disabled keys has no effect.
3. If you want to simulate full frontpanel operation, you must prevent the instrument from entering remote mode by using the REN line of the HP-IB to maintain local mode (`LOCAL 7` in BASIC).

   If you do this, the `:SYSTem:KEY` command is the only command which works. Any other commands will be buffered in the HP 8114A, blocking any further `:SYSTem:KEY` commands, until remote mode is enabled.

Table 4-9. :SYSTem:KEY parameter reference

No.	Key Description
-1	No key pressed (Query only)
0	DATA ENTRY (0)
1	DATA ENTRY (1)
2	DATA ENTRY (2)
3	DATA ENTRY (3)
4	DATA ENTRY (4)
5	DATA ENTRY (5)
6	DATA ENTRY (6)
7	DATA ENTRY (7)
8	DATA ENTRY (8)
9	DATA ENTRY (9)
10	DATA ENTRY (.)
11	DATA ENTRY (±)
12	CURSOR (⇧)
13	CURSOR (⇩)
14	CURSOR (⇦)

No.	Key Description
15	CURSOR (⇨)
16	(MAN)
17	(STORE)
18	(HELP)
19	(SHIFT)
20	(MORE)
21	Softkey 1 (LEFT)
22	Softkey 2
23	Softkey 3
24	Softkey 4 (RIGHT)
25	DATA ENTRY (nano)
26	DATA ENTRY (micro\Mega)
27	DATA ENTRY (milli\kilo)
28	DATA ENTRY (ENTER)
29	MODIFY Knob left (anticlockwise)
30	MODIFY Knob right (clockwise)

:SYSTem:KEY?

Form Query

Parameter ON|OFF

***RST value** -1

Description This command reads the last key pressed. The buffer is emptied by *RST and returns the value -1 when empty.

:SYSTem:PRESet

Form Set & Query

Parameter ON|OFF

***RST value** OFF

Description This command performs the same functions as *RST except that :DISP[:WIND][:STATe] is not influenced. This increases programming speed.

:SYSTem:SECurity[:STATe]

Form Set & Query

Parameter ON|OFF

***RST value** OFF

Description

Caution 

Do not switch on system security unless you are willing to erase the instrument settings stored in the instrument. All instrument memories, including the current setting, will be overwritten with the default settings if you

- Switch off system security
- Switch the instrument off and on again

If you accidentally switch on system security, and want to rescue the settings stored in the instrument, store the settings on a memory card. You can then recall them from the memory card later.

Use this command to switch on system security mode. Switch on system security if you need to make sure that all instrument settings stored in the instrument are erased automatically when the instrument is switched off, or when security mode is switched off..

The instrument settings are erased by overwriting them with the default settings.

System security mode is not available via the frontpanel. If you want to erase all settings by hand:

1. [SHIFT] [STORE] [0] to RECALL the default settings from memory 0.
2. [STORE] [1], [STORE] [2], . . . ,[STORE] [9] to store the defaults in memories 1 to 9.

:SYSTem:SET

Form Set & Query

Parameter Block data

***RST value** Not applicable

Description In query form, the command reads a block of data containing the instrument's complete set-up. The set-up information includes all parameter and mode settings, but does not include the contents of the instrument setting memories, the status group registers or the `:DISPlay[:WINDow][:STATe]` The data is in a binary format, not ASCII, and cannot be edited.

In set form, the block data must be a complete instrument set-up read using the query form of the command.

:SYSTem:VERSion?

Form Query

***RST value** "1992.0"

Description This command reads the SCPI revision to which the instrument complies.

:SYSTem:WARNing[:COUNt]?

Form Query

***RST value** Not applicable

Description Use this command to read the number of warnings which are currently active. Note that the warning status of voltage, current, time and frequency are also summarised by bits in the QUESTionable Status register.

:SYSTem:WARNing:STRing?

Form Query

***RST value** Not applicable

Description Use this command to read all the currently active warning messages. The warning messages are concatenated to form a single string with a ; as seperator between the messages.

:SYSTem:WARNing:BUFFer?

Form Query

***RST value** Not applicable

Description Use this command to read the maximum possible number of characters which could be returned by `:SYST:WARN:STR?` if all warnings were active.

:TRIGger:COUNt

Form Set & Query

Parameter Numeric

***RST value** 2

Specified limits 2 to 65536

Description Use this command to set/read the number of trigger events (pulse-periods) to be generated for each triggering event. This corresponds to selecting the event mode on the `TRIGGER` screen:

`PULSES`	Set a trigger count of 1 so that a single pulse-period is generated for each triggering event.
`BURST of`	Set a trigger count of 2 to 65536 so that a burst of 2 to 65536 pulse-periods is generated for each triggering event.

Examples

To set TRIGGERED BURST of 16 Single-Pulses, each burst triggered by a positive edge at the EXT INPUT:

```
OUTPUT 714;":TRIG:SOUR EXT"      Set triggering from
                                 EXT INPUT
OUTPUT 714;":TRIG:SENS EDGE"     Set triggering on edges
OUTPUT 714;":TRIG:SLOP POS"      Set triggering on positive edges
OUTPUT 714;":TRIG:COUN 16"       Burst length 16
OUTPUT 714;":PULS:DOUB OFF"      Ensure single pulses at
                                 OUTPUT
```

To set GATED PULSES Single-Pulses, gated by a positive level at the EXT INPUT:

```
OUTPUT 714;":TRIG:SOUR EXT"      Set triggering from
                                 EXT INPUT
OUTPUT 714;":TRIG:SENS LEV"      Set triggering on levels
OUTPUT 714;":TRIG:SLOP POS"      Set triggering on positive level
OUTPUT 714;":TRIG:COUN 1"        1 pulse-period
OUTPUT 714;":PULS:DOUB OFF"      Ensure single pulses at
                                 OUTPUT
```

:TRIGger:EWIDth:[STATe]

Form Set & Query

Parameter ON|OFF|1|0

***RST value** OFF

Description This command enables the EXT WIDTH trigger mode available on the TRIGGER screen using the frontpanel. When EXT WIDTH mode is switched on, the rest of the :TRIGger and :TRIG system is disabled.

In EXT WIDTH mode a signal applied to the EXT INPUT determines the width and period of the output signal(s) from the HP 8114A. You can still control the edge transition-times and levels of the output signal(s).

:TRIGger:INHibit[:STATe]

Form Set & Query

Parameter ON|OFF|1|0

***RST value** OFF

Description This command switches ON or OFF the Inh trigger mode available on the OUTPUT screen.

:TRIGger:INHibit[:STATe]:MODE

Form Set & Query

Parameter RISE|FALL|HIGH|LOW

***RST value** RISE

Description This command, available on the OUTPUT screen, selects whether the output is triggered (RISE/FALL) or gated (HIGH/LOW) by an inhibit signal.

:TRIGger:INHibit[:STATe]:INPut

Form Set & Query

Parameter RESet|SET

***RST value** RESet

Description This command, available on the OUTPUT screen, resets (enables) the output after being latched during triggering (RISE/FALL).

:TRIGger:LEVel

Form Set & Query

Parameter Numeric

Parameter Suffix V with engineering prefixes.

***RST value** +1.0 V

Specified Limits -10 V to +10 V

Description Use this command to program the triggering threshold of the EXT INPUT connector.

Example

```
OUTPUT 714;":TRIGger:LEV 2.5V"
```

Set EXT INPUT threshold to 2.5 V

:TRIGger:SENSe

Form Set & Query

Parameter EDGE|LEVel

***RST value** EDGE

Description Use this command to select TRIGGERED or GATED mode by choosing whether the HP 8114A triggers on the edge(s) or level of the triggering signal.

When sensing edges, the HP 8114A triggers when the triggering signal crosses the selected threshold level (:TRIGger:LEV) in the selected direction (:TRIGger:SLOP). This corresponds to the TRIGGERED mode selected on the TRIGGER screen when using the frontpanel.

When sensing levels, the HP 8114A triggers as long as the triggering signal is above (:TRIGger:SLOP POS), or below (:TRIGger:SLOP NEG) the selected threshold level (:TRIGger:LEV). This corresponds to the GATED mode selected on the TRIGGER screen when using the frontpanel.

:TRIGger:SLOPe

Form Set & Query

Parameter POSitive|NEGative|EITHer

***RST value** POS

Description Use this command to select the trigger slope for the triggering signal when triggering on edges. Use EITHer to trigger on both the positive and negative edges of the triggering signal. This allows you to trigger at twice the frequency of the triggering signal.

If you are triggering on levels, use this command to select whether the HP 8114A triggers during the positive or negative cycle of the signal.

:TRIGger:SOURce

Form Set & Query

Parameter IMMediate|INTernal|EXTernal|MANual

***RST value** IMM

Description Use this command to select the triggering mode of the HP 8114A by selecting the source of the triggering signal:

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Table 4-10.
Triggering sources and modes set by :TRIGger:SOURce

Triggering source	:TRIGger:SOURce	Mode
Internal osc.	IMMediate|INTernal	CONTINUOUS
EXT INPUT	EXTernal	[1]TRIGGERED|GATED by: EXT IN
MAN key	MANual	[1]TRIGGERED|GATED by: MANKey

1 Use :TRIG:SENSe EDGE|LEVEL to choose between TRIGGERED and GATED

Default Values, standard settings

Table 4-11. HP 8114A Default Values

Parameter			*RST, Default Values
:DISPlay	[:WINDow]	[:STATe]	ON
:MMEMory	:CATalog?		not applicable
	:CDIRectory		not applicable
	:COPY		not applicable
	:DELete		not applicable
	:INITialize		not applicable
	:LOAD	:STATe	not applicable
	:STORe	:STATe	not applicable
:OUTPut	[:STATe]		OFF
	:IMPedance	[:INTernal]	50Ω
		:EXTernal	50Ω
	:POLarity		NEGative

Table 4-11. HP 8114A Default Values (continued)

Parameter					*RST, Default Values
[:SOURce]	:CURRent	[:LEVel]	[:IMM]	[:AMPL]	100mA (from 50Ωinto 50Ω)
				:BASeline	0mA (from 50Ωinto 50Ω)
				:HIGH	0mA from(50 Ωinto 50Ω)
				:LOW	-100mA (from 50Ωinto 50Ω)
		:LIMit	[:HIGH]		2 A
			:LOW		-2 A
			:STATe		OFF
	:FREQ	[:CW|:FIXed]			1.00MHz
	:HOLD				VOLT
	:PHASe	[:ADJust]			0.0
	:PULSe	:DCYCle			5% (derived from Width and Period)
		:DELay			0.0
			:HOLD		TIMe
			:UNIT		S
		:DOUBle	[:STATe]		OFF
			:DELay		0.0
				:HOLD	TIMe
				:UNIT	S
		:HOLD			WIDTh

Table 4-11. HP 8114A Default Values (continued)

Parameter					*RST, Default Values
[:SOURce]	:PULSe	:LIMIT	[:WIDth]		999 ns
			:DCYCle		100%
			:STATe		OFF
		:PERiod			1μs
		:Trailing DELay			50ns
		:WIDTh			50ns
	:VOLTage	[:LEVel]	[IMMediate]	[:AMPLitude]	5 V
				:BASeline	0 V
				:HIGH	0 V
				:LOW	-5 V
		LIMit[:HIGH]			100 V
		:LOW			-100 V
		:STATe			OFF
:STATus	:OPERation	[:EVENt]			not applicable
		:CONDition?			not applicable
		:ENABle			not affected
		:NTRansition			not applicable
		:PTRansition			not applicable
	:PRESet				not applicable
	:QUEStionable	[:EVENt]?			not applicable
		:CONDition?			not applicable
		:ENABle			not affected
		:NTRansition			not applicable
		:PTRansition			not applicable

Table 4-11.
HP 8114A Default Values (continued)

Parameter				*RST, Default Values
:SYSTem	:ERRor?			not applicable
	:KEY			−1
	:PRESet			not applicable
	:SECurity	[:STATe]		OFF
	:SET			not applicable
	:VERSion			"1992.0"
	:WARNing	[:COUNt]?		not applicable
		:STRing?		not applicable
		:BUFFer?		not applicable
:TRIGger	:COUNt			2
:TRIGger	:EWIDth	:STATe		OFF
:TRIGger	:INHibit	[:STATe]		OFF
:TRIGger	:INHibit	[:STATe]	:MODE	OFF
:TRIGger	:INHibit	[:STATe]	:INPut	OFF
	:LEVel			1.0V
	:SENSe			EDGE
	:SLOPe			POSitive
	:SOURce			IMMediate