EDU34450A
5½ Digit Digital Multimeter

KEYSIGHT

PROGRAMMING GUIDE

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Safety considerations

WARNING OPERATING IN REMOTE MODE

When operating in remote mode, measurements will be triggered by remote computer and will not be updated continuously on the instrument display. Always refer to the remote computer for actual measurement.

1 Remote Operation

Introduction to the SCPI Language

SCPI Error Messages

Power-On and Reset State

SCPI Status Registers

This chapter describes the remote operation for the Keysight EDU34450A 5½ digit digital multimeter.

Introduction to the SCPI Language

SCPI (Standard Commands for Programmable Instruments) is an ASCII-based instrument command language designed for test and measurement instruments. SCPI commands are based on a hierarchical structure, also known as a tree system. In this system, associated commands are grouped together under a common node or root, thus forming subsystems. A portion of the SENSe subsystem is shown below to illustrate the tree system.

SENSe:
VOLTage:
DC:RANGe <range>|MIN|MAX|DEF
DC:RANGe? [MIN|MAX]

SENSe is the root keyword of the command, VOLTage and RESistance are second-level keywords. A colon (:) separates a command keyword from a lower-level keyword.

Syntax Conventions

The format used to show commands is illustrated below:

```
VOLTage:DC:RANGe <range>|MIN|MAX|DEF
```

The command syntax shows most commands (and some parameters) as a mixture of upper- and lowercase letters. The upper-case letters indicate the abbreviated spelling for the command. For shorter program lines, you can send the abbreviated form. For better program readability, you can send the long form.

For example, in the above syntax statement, VOLT and VOLTAGE are both acceptable forms. You can use upper- or lower-case letters. Therefore, VOLTAGE, volt, and Volt are all acceptable. Other forms, such as VOL and VOLTAG, are not valid and will generate an error.

- A vertical bar (|) separates multiple parameter choices for a given command string. For example, <range>|MIN|MAX|DEF in the above command indicates that you can specify a numeric range parameter, or "MIN", "MAX", or "DEF". The bar is not sent with the command string.
- Triangle brackets (< >) indicate that you must specify a value for the enclosed parameter. For example, the above syntax statement shows the <range> parameter enclosed in triangle brackets. The brackets are not sent with the command string. You must specify a value for the parameter (for example "VOLT:DC:RANG 10") unless you select one of the other options shown in the syntax (for example "VOLT:DC:RANG MIN").
- Some parameters are enclosed in square brackets ([ ]). This indicates that the parameter is optional and can be omitted. The brackets are not sent with the command string. If you do not specify a value for an optional parameter, the instrument chooses a default value.

Command Separators

A colon (:) is used to separate a command keyword from a lower-level keyword. You must insert a blank space to separate a parameter from a command keyword. If a command requires more than one parameter, you must separate adjacent parameters using a comma as shown below:

```
CONF:VOLT:DC 10,FAST
```

A semicolon (;) is used to separate commands within the same subsystem, and can also minimize typing. For example, sending the following command string:

```
CALCULATE:FUNC DB; FUNC?
```

... is the same as sending the following two commands:

```
CALCULATE:FUNC DB
CALCULATE:FUNC?
```

Use a colon and a semicolon to link commands from different subsystems. For example, in the following command string, an error is generated if you do not use both the colon and semicolon:

```
CONF:VOLT:DC;:INIT;:FETC?
```

Using the MIN, MAX, and DEF Parameters

For many commands, you can substitute "MIN" or "MAX" in place of a parameter. In some cases you may also substitute "DEF". For example, consider the following command:

```
VOLTage:DC:RANGe <range>|MIN|MAX|DEF
```

Instead of selecting a specific value for the <range> parameter, you can substitute MIN to set the range to its minimum value, MAX to set the range to its maximum value, or DEF to set the range to its default value.

Querying Parameter Settings

You can query the current value of most parameters by adding a question mark (?) to the command. For example, the following command sets the beeper to ON :

```
SYStem:BEEPer:STATe ON
```

You can then query the beeper state by sending:

```
SYStem:BEEPer:STATe?
```

SCPI Command Terminators

A command string sent to the instrument must terminate with a <new line> (<NL>) character. The IEEE- 488 EOI (End-Or-Identify) message is interpreted as a <NL> character and can be used to terminate a command string in

place of a <NL> character. A <carriage return> followed by a <NL> is also accepted. Command string termination will always reset the current SCPI command path to the root level.

IEEE-488.2 Common Commands

The IEEE-488.2 standard defines a set of common commands that perform functions such as reset, selftest, and status operations. Common commands always begin with an asterisk (*), are three characters in length, and may include one or more parameters. The command keyword is separated from the first parameter by a blank space. Use a semicolon (;) to separate multiple commands as shown below:

```
*RST; *CLS; *ESE 32; *OPC?
```

SCPI Parameter Type

The SCPI language defines several data formats to be used in program messages and response messages.

Numeric Parameters

Commands that require numeric parameters will accept all commonly used decimal representations of numbers including optional signs, decimal points, and scientific notation. Special values for numeric parameters such as MIN, MAX, and DEF are also accepted. You can also send engineering unit suffixes with numeric parameters (e.g., M, k, m, or u). If a command accepts only certain specific values, the instrument will automatically round the input numeric parameters to the accepted values. The following command requires a numeric parameter for the range value:

```
VOLTage:DC:RANGe <range>|MIN|MAX|DEF
```

NOTE Because the SCPI parser is case-insensitive, there is some confusion over the letter "M" (or "m"). For your convenience, the instrument interprets "mV" (or "MV") as millivolts, but "MHZ" (or "mhz") as megahertz. Likewise "MΩ" (or "mΩ") is interpreted as megohms. You can use the prefix "MA" for mega. For example, "MAV" is interpreted as megavolts.

Discrete Parameters

Discrete parameters are used to program settings that have a limited number of values (like IMMediate, EXTernal, or BUS). They have a short form and a long form just like command keywords. You can mix upper- and lower-case letters. Query responses will always return the short form in all upper-case letters. The following command requires a discrete parameters for the temperature units:

```
UNIT:TEMPerature C|F
```

Boolean Parameters

Boolean parameters represent a single binary condition that is either true or false. For a false condition, the instrument will accept "OFF" or "0". For a true condition, the instrument will accept "ON" or "1". When you query a boolean setting, the instrument will always return "0" or "1". The following command requires a boolean parameter:

```
SYSTem:BEEPer:ENABle OFF|0|ON|1
```

ASCII String Parameters

ASCII string parameters can contain virtually any set of ASCII characters. A quoted ASCII string parameter must begin and end with matching quotes; either with a single quote or a double quote. You can include the quote delimiter as part of the string by typing it twice without any characters in between. The following command uses a quoted ASCII string parameter:

```
FUNC <quoted ASCII string>
```

For example, the following commands select the AC voltage function (double or single quotes are allowed).

```
FUNC "VOLT:AC" or FUNC 'VOLT:AC'
```

An unquoted ASCII string parameter does not use quotation marks. The following command uses an unquoted ASCII string parameter:

```
CALibration:SECure:CODE <unquoted ASCII string>
```

For example, the following command uses an unquoted ASCII string to set a new calibration security code (calibration memory must be unsecured):

```
CAL:SEC:CODE T3ST_DUT165
```

Using Device Clear

Device Clear is an IEEE-488 low-level bus message that you can use to return the instrument to a responsive state. Different programming languages and IEEE-488 interface cards provide access to this capability through their own unique commands. The status registers, the error queue, and all configuration states are left unchanged when a Device Clear message is received.

Device Clear performs the following actions:

- If a measurement is in progress, it is aborted.
- The instrument returns to the trigger "idle" state.
- The instrument's input and output buffers are cleared.
- The instrument is prepared to accept a new command string.

NOTE The ABORt command is the recommended method to terminate a measurement.

SCPI Error Messages

The EDU34450A 5½ Digit Digital Multimeter returns error messages in accordance with the SCPI standard.

- A record of up to 20 errors can be stored in the instrument's error queue. If more than 20 errors have occurred, the last error stored in the queue (the most recent error) is replaced with -350,"Error queue overflow". No additional errors are stored until you remove errors from the queue. If no errors have occurred when you read the error queue, the instrument responds with +0,"No error".
- The instrument beeps once each time a command syntax or hardware error is generated.
- A special global error queue holds all power-on and hardware-related errors (for example, over-temperature).
- Errors are retrieved in first-in-first-out (FIFO) order. The first error returned is the first error that was stored. Once you have read all of the interface-specific errors, the errors in the global error queue are retrieved.
- Errors are cleared as you read them.
- Error conditions are also summarized in the Status Byte Register. For more information on the SCPI Status System for the EDU34450A 5½ Digit Digital Multimeter, see Status Subsystem Introduction.
- The interface-specific error queues are cleared by the *CLS (Clear Status) command and when power is cycled. All errors are cleared when you read the error queue. The error queue is not cleared by a Factory Reset (*RST command).

To read errors

SYSTem:ERRor? *Read and clear one error from the queue*

Errors have the following format (the error string may contain up to 80 characters):

-113,"Undefined header"

Command Errors

Error Code	Error Messages
0	No error
-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	Invalid character in number
-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
-160	Block data error
-161	Invalid block data
-168	Block data not allowed
-170	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

Error Code	Error Messages
-200	Execution error
-211	Trigger ignored
-213	Init ignored
-221	Settings conflict
-222	Data out of range
-223	Too much data
-224	Illegal parameter value
-225	Out of memory
-230	Data corrupt or stale
-241	Hardware missing
-270	Macro error
-272	Macro execution error
-273	Illegal macro label
-276	Macro recursion error
-277	Macro redefinition not allowed

Internal Errors

Error Code	Error Messages
-310	System error
-330	Self-test failed
-350	Queue overflow

Query Errors

Error Code	Error Messages
-400	Query error
-410	Query INTERRUPTED
-420	Query UNTERMINATED
-430	Query DEADLOCKED
-440	Query UNTERMINATED after indefinite response
531	Memory store is disabled
532	Cannot achieve requested resolution
540	Cannot use overload as math reference

Self-Test Errors

The EDU34450A self-test (see the *TST? command) performs a series of tests on the instrument hardware. Any failure of these tests will generate a SCPI error number -330, with additional test failure information. Refer to the Keysight EDU34450A 5½ Digit Digital Multimeter Service Guide for more information.

The form of this error message is as follows:

-330,"Self-test failed; <test# - testname>"

Where **test#** is the number of the test that failed (range 550 - 617) and **testname** describes the test. Here is an example of a test failure message:

-330,"Self-test failed; 617 - RTC Oscillation failed"

The following is the list of test numbers and descriptions:

Error Code	Error Messages
550	3.3V power lost
551	5.0V power lost
552	12V power lost
600	I/O processor failed self test
601	M/B eeprom failed
602	M/B flash failed
603	M/B ASIC failed
604	DC low path zero test failed
605	DC high path zero test failed
606	AC path zero test failed
611	EEPROM load failed
612	EEPROM checksum failed
615	Invalid MAC address
616	Front panel does not respond
617	RTC Oscillation failed

Calibration Errors

The following errors indicate failures that may occur during a calibration. Refer to the Keysight EDU34450A 5½ Digit Digital Multimeter Service Guide for more information.

Error Code	Error Messages
702	Calibration secured
703	Invalid secure code
704	Secure code too long
708	Unable to store calibration data

709	No calibration for this function
720	DCV calibration failed
721	DCI calibration failed
722	RES calibration failed
723	CAP calibration failed
724	FRES calibration failed
725	FREQ calibration failed
726	ACV calibration failed
727	ACI calibration failed
732	ACV flatness calibration failed

Power-On and Reset State

The following tables show the factory defaults for various instrument settings. The parameters marked with a dagger (†) are stored in non-volatile memory, and are not affected by power-on or a system reset. Other parameters are stored in volatile memory and are reset to the indicated values at power-on or after a *RST command is issued.

NOTE The power-on/reset state will be different than that in the table if you have enabled the power-on state recall mode. This mode is entered from the **Utility** menu. See the EDU34450A 5½ Digit Digital Multimeter User's Guide and EDU34450A 5½ Digit Digital Multimeter Service Guide for further information.

Parameter	Factory Setting	Power-On/ Reset State
Measurement Configuration		
Function	DCV	DCV
Secondary Function	OFF	OFF
Range	AUTO	AUTO
Resolution	5 ½ digits	5 ½ digits
† Temperature Units	°C	**User Setting**
Offset Compensation (OHM)	OFF	OFF
Hi-Z (DCV)	10M	10M
Math Operation		
Math State, Function	Off, Null	Off, Null
† dBm Reference Resistance	600 **Ω**	**User Setting**
Statistic Display	Single	Single
Trigger Operations		
* Trigger Source	Auto Trigger	Auto Trigger
System-Related Operations		
† Power-Down Recall	Disabled	**User Setting**
Stored States	0-5 cleared	No Change
† Beeper	On	**User Setting**
Display	On	On
Display Brightness	Full	**User Setting**
* Keyboard	Unlocked, Local key enabled	Unlocked, Local key enabled
* Reading Output Buffer	Cleared	Cleared
* Error Queue	Cleared	Cleared
*† Power-on Status Clear	Enabled	**User Setting**
* Status Registers, Masks and Transition Filters	Cleared	**Cleared if power-on status clear enabled**; no change otherwise
Serial Number	Unique value per instrument	No Change
Calibration		

† Calibration State	Secured	User Setting
Calibration value	0	No Change
Language		
† Language Mode	L1 (Normal mode)	User Setting
IO Configuration		
Enabled Interface		
USB	Enabled	No change
LAN	Enabled	No change

* State managed by IO Processor firmware

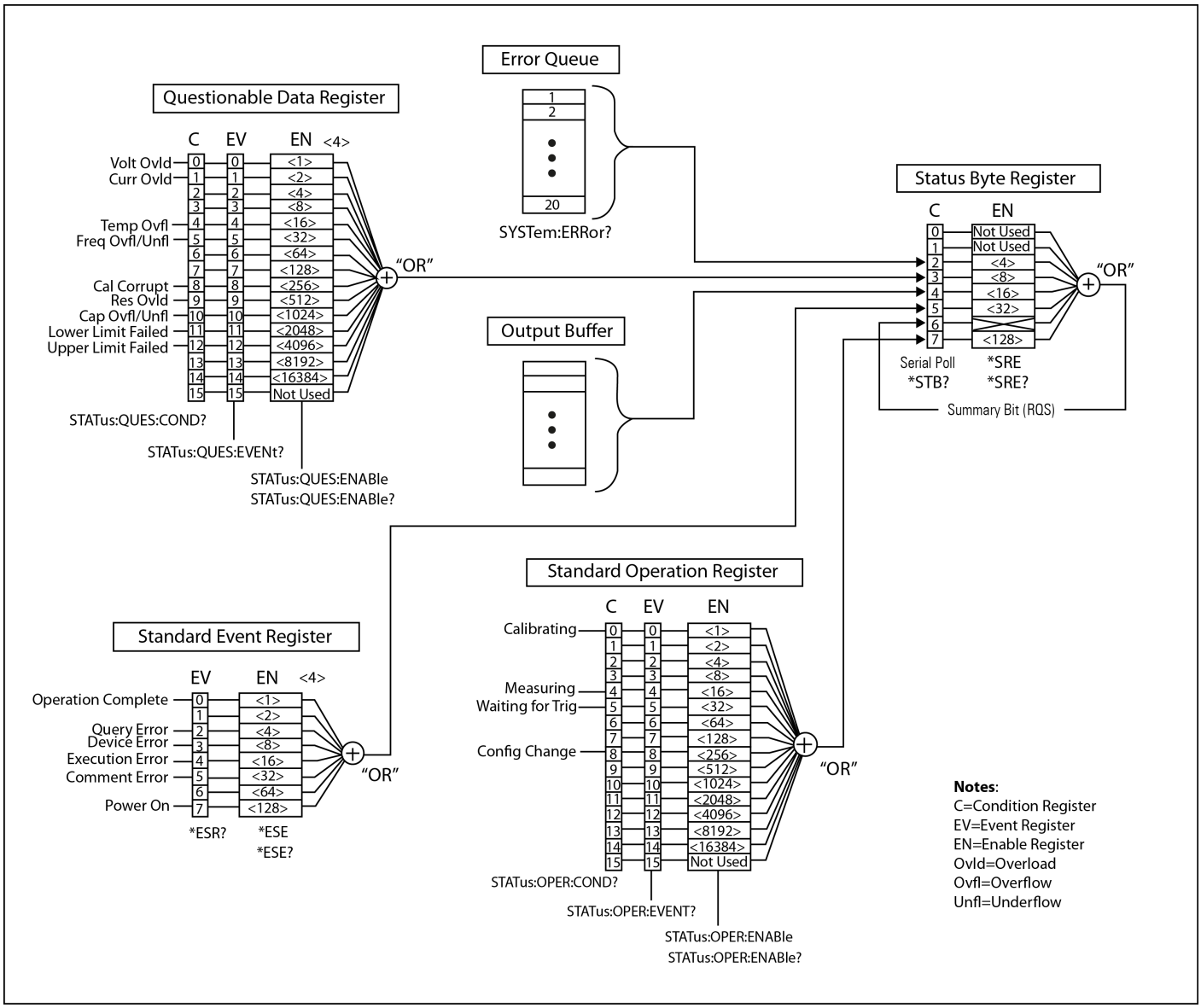
† These parameters are stored in non-volatile memory, and are not affected by power-on or a system reset.

NOTE The Error Queue is cleared at power on. However, it is not cleared by a *RST command.

SCPI Status Registers

All SCPI instruments implement status registers in the same way. The status system records various instrument conditions in four register groups: the Status Byte register, the Standard Event register, the Standard Operation register, and the Questionable Data register groups. The Status Byte register records high-level summary information reported in the other register groups.

The figure below illustrates the SCPI status system used by the instrument.



What is an event register?

An event register is a read-only register that reports defined conditions within the instrument. Bits in an event register are latched. Once an event bit is set, subsequent state changes are ignored. Bits in an event register are automatically cleared by a query of that register (such as *ESR? or STAT:QUES:EVEN?) or by sending the *CLS (clear status) command. A reset (*RST) or device clear will not clear bits in event registers. Querying an event register returns a decimal value of the binary-weighted sum of all bits set in the register.

What is an enable register?

An enable register defines which bits in the corresponding event register are logically ORed together to form a single summary bit. Enable registers are both readable and writable. Querying an enable register will not clear it. The *CLS (clear status) command does not clear enable registers but it does clear the bits in the event registers. To enable bits in an enable register, you must write a decimal value which corresponds to the binary-weighted sum of the bits you wish to enable in the register.

The Questionable Data register

The following table lists the bit definitions for the Questionable Data register:

Bit	Bit name	Decimal Value	Definition
0	Voltage Overload	1	Only reported as event. Returns "0". *Read the Event Register.*
1	Current Overload	2	Only reported as event. Returns "0". *Read the Event Register.*
2-3	Measuring	Not Used	"0" is returned.
4	Temperature Overload	16	Only reported as event. Returns "0". *Read the Event Register.*
5	Frequency Overload/Underflow	32	Only reported as event. Returns "0". *Read the Event Register.*
6-7	Not Used	Not Used	"0" is returned.
8	Calibration Corrupt	256	At least one calibration constant is corrupt.
9	Resistance Overload	512	Only reported as event. Returns "0". *Read the Event Register.*
10	Capacitance Overload/Underflow	1024	Only reported as event. Returns "0". *Read the Event Register.*
11	Lower Limit Failed	2048	Reading is less than lower limit in limit test.
11	Lower Limit Failed	2048	Reading is less than lower limit in limit test.
12	Upper Limit Failed	4096	Reading is greater than upper limit in limit test.
13-15	Not used	Not used	"0" is returned.

The Standard Operation register

The following table lists the bit definitions for the Standard Operation register:

Bit	Bit name	Decimal Value	Definition
0	Calibration in Progress	1	Instrument is performing a calibration.
1-3	Not Used	Not Used	"0" is returned.
4	Measuring	16	Instrument is initiated, and is making, or about to make a measurement.
5	Waiting for Trigger	32	Instrument is waiting for a trigger.
6-7	Not Used	Not Used	"0" is returned.
8	Configuration Change	256	Instrument configuration has been changed, either from the front panel or from SCPI.
9-15	Not Used	Not Used	"0" is returned.

The Standard Event register

The following table lists the bit definitions for the Standard Event register:

Bit	Bit name	Decimal Value	Definition
0	Operation Complete	1	All commands prior to and including *OPC have been executed.
1	Not Used	Not Used	"0" is returned.
2	Query Error	4	The instrument tried to read the output buffer but it was empty. Or, a new command line was received before a previous query has been read. Or, both the input and output buffers are full.
3	Device-Specific Error	8	A device-specific error, including a self-test error or calibration error, occurred (an error in the -300 range or any positive error has been generated). For a complete listing of the error messages, see SCPI Error Messages.
4	Execution Error	16	An execution error occurred (an error in the -200 range has been generated).
5	Command Error	32	A command syntax error occurred (an error in the -100 range has been generated).
6	Not Used	Not Used	"0" is returned.
7	Power On	128	Power has been turned off and on since the last time the event register was read or cleared.

The Status Byte register

This register summarizes the information from all other status groups as defined in the IEEE 488.2 Standard Digital Interface for Programmable Instrumentation.

The following table lists the bit definitions for the Status Byte register:

Bit	Bit name	Decimal Value	Definition
0	not used	1	0 is returned
1	not used	2	0 is returned
2	Error Queue	4	One or more errors have been stored in the Error Queue. Use SYSTem:ERRor? to read and delete errors.
3	Questionable Data Summary	8	One or more bits are set in the Questionable Data Register (bits must be enabled, seeSTATus:QUEStionable:ENABle).
4	Message Available	16	Data is available in the instrument's output buffer.
5	Standard Event Summary	32	One or more bits are set in the Standard Event Register (bits must be enabled, see *ESE).
6	Master Summary	64	One or more bits are set in the Status Byte Register and may generate a Request for Service (RQS). Bits must be enabled using *SRE.
7	Standard Operation Summary	128	One or more bits are set in the Standard Operation Register (bits must be enabled, see STATus:OPERation:ENABle).

2 SCPI Programming

ABORt Subsystem

CALCulate Subsystem

CALibration Subsystem

CONFigure Subsystem

DATA Subsystem

DISPlay Subsystem

FETCh Subsystem

FORMat Subsystem

HCOpy Subsystem

IEEE-488.2 Common Subsystem

INITiate Subsytem

LXI Subsystem

MEASure Subsystem

MEMory Subsystem

READ Subsystem

SAMPle Subsystem

SENSe Subsystem

STATus Subsystem

SYSTem Subsystem

TRIGger Subsystem

UNIT Subsystem

This chapter describes the subsystem commands available to the Keysight EDU34450A 5½ digit digital multimeter.

ABORt Subsystem

Command Summary

- ABORt

ABORt

This command aborts a measurement in progress.

Parameter	Typical Return
(none)	(none)
Aborts the measurement in progress: ABORt	

Remarks

- The command will abort a measurement in progress and stop, returning the instrument to the trigger idle state.
- This command may be useful to abort a measurement when the instruments is waiting for a trigger.
- The *RST command will abort a measurement and set all measurement parameters to their factory settings.

See also

- *RST

CALCulate Subsystem

The EDU34450A 5½ Digit Digital Multimeter can perform several mathematical, statistical, and limit calculation functions using the CALCulate commands.

Command Summary

Select and Enable Functions

- CALCulate:FUNCtion
- CALCulate: FUNCtion?
- CALCulate: STATe
- CALCulate: STATe?

Limit Functons

- CALCulate:LIMit:LOWer
- CALCulate:LIMit:LOWer?
- CALCulate:LIMit:UPPer
- CALCulate:LIMit:UPPer?

Mathematical Functions

- CALCulate:AVERage:AVERage?
- CALCulate:AVERage:COUNt?
- CALCulate:AVERage:MAXimum?
- CALCulate:AVERage:MINimum?
- CALCulate:DB:REFerence
- CALCulate:DB:REFerence?
- CALCulate:DBM:REFerence
- CALCulate:DBM:REFerence?
- CALCulate:NULL:OFFSet
- CALCulate:NULL:OFFSet?

CALCulate:FUNCtion NULL|DB|DBM|LIMit|AVERage|HOLD
CALCulate:FUNCtion?

This command selects the calculation function to be used. The default function is NULL.

Parameter	Typical Return
NULL|DB|DBM|LIMit|AVERage|HOLD Default: NULL	NULL, DB, DBM, AVER, HOLD or LIM
Sets the function to be calculated to DBM: CALC:FUNC DBM CALC:STAT ON CALC:DBM:REF 16	

Remarks

- The CALCulate subsystem (math operations) must be enabled using the CALCulate:STATe command.
- The instrument clears the calculation function selection, reverting to the default after a Factory Reset (*RST command) .
- NULL equation: Result = Reading – Offset
  Set the Offset using the CALCulate:NULL:OFFSet command
- dBm equation: Result = $10 \times \text{Log}_{10} [\text{Reading}^2 / R_{REF} / 0.001\text{W}]$
  Set the reference resistance (RREF) with the CALCulate:DBM:REFerence command.
- When enabled, the dB operation computes the dBm value for the next reading, stores the dBm result into the dB Ref register and immediately produces the following calculation. The first computed reading is always precisely 000.00 dB.

  Result = $10 \times \text{Log}_{10} [\text{Reading}^2 / R_{REF} / 0.001\text{W}]$ - dB Ref
  Set the reference resistance (RREF) with the CALCulate:DB:REFerence command.
- LIMit: Compares each reading against upper and lower limits. Limit failures are posted in the Questionable Status Register. Set the upper and lower limits with CALCulate:LIMit:UPPer and CALCulate:LIMit:LOWer, respectively. Check for limit failures with the STATus:QUEStionable[:EVENt]? command.
- AVERage: Returns the mathematical average of all readings taken since averaging was enabled. Use CALCulate:AVERage:AVERage?, CALCulate:AVERage:MAXimum?, CALCulate: AVERage:MINimum?, and CALCulate:AVERage:COUNt? to return the average, maximum, minimum and count, respectively, since averaging was enabled.
- HOLD:The reading hold feature allows you to capture and hold a stable reading (refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for details). This feature only support measurement resolution MEDium and SLOW.
- When the secondary measurement function is enabled, the calculation function applies to the primary measurement only.

See also

- CALCulate:STATe

CALCulate[:STATe] <mode>
CALCulate[:STATe]?

This command turns the CALCulate subsystem, and thus the selected calculation function, on or off.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: OFF	0 (OFF) or 1 (ON)
Sets the calculation state to "ON": CALC:STAT ON	

Remarks

- The calculation function to be used is selected using the CALCulate:FUNCtion command.
- CALCulate:STATe is set to OFF when the measurement function is changed.
- When CALCulate:STATe:ON is sent the math registers for limits, statistics, and dB reference value and the value set by CALCulate:NULL:OFFSET are cleared. This also occurs when CALCulate:FUNCtion is sent with CALCulate:STATe previously set to ON. Note that the dBm reference resistance value is not cleared in either case.
- The instrument resets the calculation state to off after a Factory Reset (*RST command) or a function change.
- When CALCulate:STATe is set to ON, the secondary measurement function will be disabled.

See also:

- CALCulate:FUNCtion
- CALCulate:NULL:OFFSET

CALCulate:LIMit:LOWer <value>|MIN|MAX
CALCulate:LIMit:LOWer? MIN|MAX

This command sets the lower limit for the present measurement function (used in limit testing).

The query returns the parameter in the form +n.nnnnnnnnE+nn. The parameter returned is the programmed lower limit.

Parameter	Typical Return
<value>: -120% to +120% Default: 0	-2.50000000E-01
Sets the lower limit to -0.25: CALC:LIM:LOW -0.25	

Remarks

- You must select the limit math function (CALC:FUNC LIM) and turn on math operations (CALC:STAT ON) before you set a limit value.
- You can assign a lower limit, an upper limit (see CALCulate:LIMit:UPPer command), or both. The lower limit must always be less than or equal to the upper limit, even if you are using only one of the limits

- *Limit crossing*: If a reading is less than the specified lower limit, bit 11 ("Lower Limit Failed") is set in the Questionable Data Register, which results in an SRQ if enabled. You can use the STATus:QUEStionable[:EVENt]? command to read the event register. See STATus Subsystem Introduction for further information.
- The instrument clears all the limits after a Factory Reset (*RST command) or when the math function or measurement function is changed.

See also

- CALCulate:FUNCtion
- CALCulate:LIMit:UPPer
- CALCulate:STATe
- STATus Subsystem Introduction

CALCulate:LIMit:UPPer <value>|MIN|MAX
CALCulate:LIMit:UPPer? MINMAX

This command sets the upper limit for the present measurement function (used in limit testing).

The query returns the parameter in the form +n.nnnnnnnnE+nn. The parameter returned is the programmed upper limit.

Parameter	Typical Return
<value>: -120% to +120% Default: 0	+1.02500000E+01
Sets the upper limit to 10.25: CALC:LIM:UPP 10.25	

Remarks

- You must select the limit math function (CALC:FUNC LIM) and turn on math operations (CALC:STAT ON) before you set a limit value.
- You can assign a lower limit (see CALCulate:LIMit:LOWer command), an upper limit, or both. The lower limit must always be less than or equal to the upper limit, even if you are using only one of the limits
- *Limit crossing*: If a reading is greater than the specified upper limit, bit 12 ("Upper Limit Failed") is set in the Questionable Data Register, which results in an SRQ if enabled. You can use the STATus:QUEStionable[:EVENt]? command to read the event register. See STATus Subsystem Introduction for further information.
- The instrument clears all the limits after a Factory Reset (*RST command) or when the math function or measurement function is changed.

See also

- CALCulate:FUNCtion
- CALCulate:LIMit:LOWer
- CALCulate:STATe
- STATus Subsystem Introduction

CALCulate:AVERage:AVERage?

This query returns the mathematical average of all readings taken since averaging was enabled.

Parameter	Typical Return
(none)	+2.61920000E+01 (If no data is available , "0" is returned.)
Returns the average of the readings taken: CALC:AVER:AVER?	

Remarks

- The instrument clears the stored average data when averaging is enabled, when the CALCulate:FUNCtion command is sent while CALCulate:STATe is ON, when the power has been off, after a Factory Reset (*RST command), or after a function change.

See also

- CALCulate:AVERage:COUNt?
- CALCulate:FUNCtion
- CALCulate:STATe

CALCulate:AVERage:COUNt?

This query returns the number of readings taken since averaging was enabled.

Parameter	Typical Return
(none)	+20 (If no data is available , "0" is returned.)
Returns the number of readings taken since statistics were enabled: CALC:AVER:COUN?	

Remarks

- The instrument clears the stored average data when averaging is enabled, when the CALCulate:FUNCtion command is sent while CALCulate:STATe is ON, when the power has been off, after a Factory Reset (*RST command), or after a function change.

See also

- CALCulate:FUNCtion
- CALCulate:STATe

CALCulate:AVERage:MAXimum?

This query returns the maximum value found since averaging was enabled.

Parameter	Typical Return
(none)	+1.37370000E+03 (If no data is available , "0" is returned)
Returns the maximum value found: CALC:AVER:MAX?	

Remarks

- The instrument clears the stored average data when averaging is enabled, when the CALCulate:FUNCtion command is sent while CALCulate:STATe is ON, when the power has been off, after a Factory Reset (*RST command), or after a function change.

See also

- CALCulate:AVERage:COUNt?
- CALCulate:FUNCtion
- CALCulate:STATe

CALCulate:AVERage:MINimum?

This query returns the minimum value found since averaging was enabled.

Parameter	Typical Return
(none)	+4.27150000E-03 (If no data is available , "0" is returned)
Returns the minimum value found: CALC:AVER:MIN?	

Remarks

- The instrument clears the stored average data when averaging is enabled, when the CALCulate:FUNCtion command is sent while CALCulate:STATe is ON, when the power has been off, after a Factory Reset (*RST command), or after a function change.

See also

- CALCulate:AVERage:COUNt?
- CALCulate:FUNCtion
- CALCulate:STATe

CALCulate:DB:REFerence <value>|MIN|MAX
CALCulate:DB:REFerence? MIN|MAX

This command stores a reference value in the instrument's dB reference register, which is used for the dB function in the CALCulate:FUNCtion command.

The query returns the parameter in the form +n.nnnnnnnnE+nn. The parameter returned is the programmed dBm reference value.

Parameter	Typical Return
<value>: -120dBm to +120dBm Default: 0 dBm	-1.00000000E+01
Sets the dB reference value to -10.0 dBm: CALC:DB:REF -10.0	

Remarks

- You must select (CALCulate:FUNCtion) and turn on (CALCulate:STATe) math operations before writing to the dB reference Register.
- The instrument resets the dB reference value to the default after a Factory Reset (*RST command) or when the math function or measurement function is changed.

See also

- CALCulate:DBM:REFerence
- CALCulate:FUNCtion
- CALCulate:STATe

CALCulate:DBM:REFerence <value>|MIN|MAX
CALCulate:DBM:REFerence? MIN|MAX

This command selects the dBm reference resistance. The default is 600 ohms. This reference value affects both the dBm and dB functions in the CALCulate:FUNCtion command.

The query returns the parameter in the form +n.nnnnnnnnE+nn. The parameter returned is the programmed dBm reference value.

Parameter	Typical Return
<value>: 2|4|8|16|50|75|93|110|124|125|135|150|250|300|500|600|800|900|1000|1200|8000 Default: 600 Ω	+3.00000000E+02
Sets the dBm reference resistance to 300 ohms: CALC:DBM:REF 300	

Remarks

- The dBm reference resistance is not reset when math functions are enabled by the CALCulate:STATe command, nor when a CALCulate:FUNCtion command is sent with CALCulate:STATe set to ON.

- The dBm reference resistance value is stored in non-volatile memory. It is not affected by a power-on cycle, Factory Reset (*RST command) or function change.

See also

- CALCulate:DB:REFerence
- CALCulate:FUNCtion
- CALCulate:STATe

CALCulate:NULL:OFFSet <value>|MIN|MAX
CALCulate:NULL:OFFSet? MIN|MAX

This command stores a null value in the instrument's Null Register.

The query returns the parameter in the form +n.nnnnnnnnE+nn.

Parameter	Typical Return
<value>: -120% to +120% Takes any value between -120% to +120% of the highest range for the present measurement function. Default: 0	-2.50000000E-01
Sets the null value to -0.25: CALC:NULL:OFFS -0.25	

Remarks

- You must select (CALCulate:FUNCtion) and turn on (CALCulate:STATe) math operations before you set a null value.
- The instrument clears the null value after a Factory Reset (*RST command), or when the math function or measurement function is changed.

See also

- CALCulate:STATe

CALibration Subsystem

The CALibration commands are used to calibrate the EDU34450A 5½ Digit Digital Multimeter. Please note that the use of these commands requires a detailed knowledge of the appropriate calibration procedures, which are described in the Keysight EDU34450A 5½ Digit Digital Multimeter Service Guide. Please refer to that guide before attempting to calibrate the instrument. Improper use of the CALibration commands can adversely affect the accuracy and reliability of the instrument.

Command Summary

- CALibration[:ALL]?
- CALibration:COUNt?
- CALibration:SECure:CODE
- CALibration:SECure:STATe
- CALibration:SECure:STATe?
- CALibration:STRing
- CALibration:STRing?
- CALibration:VALue
- CALibration:VALue?
- CALibration:STORe

CALibration[:ALL]?

This query performs a calibration of the multimeter using the specified calibration value (CALibration:VALue command). Before you can calibrate the instrument, you must unsecure it by entering the correct security code.

Parameter	Typical Return
(none)	"+0" (calibration passed) or "+1" (calibration failed)
Performs a calibration and returns a pass indication: CAL?	

Remarks

- If a calibration fails, "+1" is returned and an error is stored in the error queue. For a complete listing of the error messages related to calibration failures, see SCPI Error Messages.
- This query increments the calibration count on the EDU34450A 5½ Digit Digital Multimeter (see CALibration:COUNt?).

See also

- CALibration:SECure:STATe
- CALibration:VALue

CALibration:COUNt?

This query returns the calibration count indicating how many calibrations have been performed. Note that your instrument was calibrated before it left the factory. When you receive your instrument, be sure to read the count to determine the initial values.

Parameter	Typical Return
(none)	+739
Returns the calibration count: CAL:COUN?	

Remarks

- The calibration counts increment up to a maximum of 32767 after which they roll over to "0". Since the value increments by one for each calibration point, a complete calibration may increase the value by many counts.
- The calibration count is incremented by the CALibration? command. You can read the calibration count whether the instrument is secured or unsecured.
- The calibration count is stored in non-volatile memory, and does not change when power has been off or after a Factory Reset (*RST).

See also

- CALibration?
- CALibration:SECure:STATe

CALibration:SECure:CODE <new_code>

This command allows you to enter a new security code to prevent accidental or unauthorized calibrations. The specified code is used to unsecure calibration memory. To change the security code, you must first unsecure calibration memory using the old security code, and then enter a new code.

Parameter	Typical Return
Unquoted string of up to 12 characters. Must start with letter (A-Z) May contain letters, numbers (0-9) and underscores	(none)
Sets a new calibration security code: CAL:SEC:CODE T3ST_DUT165	

Remarks

- The security code is set to EDU34450A when the instrument is shipped from the factory.
- If you forget your security code, you can override the security feature. See the Keysight EDU34450A 5½ Digit Digital Multimeter Service Guide for more information.
- Before setting a new calibration security code, calibration memory must be unsecured first using the CALibration:SECure:STATe command.

NOTE **The security code is stored in non-volatile memory, and does not change when power has been off or after a Factory Reset (*RST command).**

See also:

- CALibration:SECure:STATe

CALibration:SECure:STATe ON|1|OFF|0|RESET, <code>
CALibration:SECure:STATe?

This command unsecures or secures the instrument for calibration. To unsecure the instrument, you must provide a security code to prevent accidental or unauthorized calibrations of the instrument. Before you can calibrate the instrument, you must unsecure it by entering the correct security code.

The query command returns "0" (OFF) or "1" (ON) indicating the current calibration security setting.

Parameter	Typical Return
ON|1|OFF|0|RESET Default: ON	0 (OFF) or 1 (ON)
<code>: Unquoted string of up to 12 characters.	
Unsecure the instrument using the factory default security code: CAL:SEC:STAT OFF,EDU34450A	
Returns the current calibration security setting: CAL:SEC:STAT? Typical Response: +0	

Remarks

- When you first receive your instrument, it is secured. The security code is set to EDU34450A when the instrument is shipped from the factory.
- Once you enter a security code, that code must be used for both front-panel and remote-interface calibration. For example, if you secure the instrument from the front panel, you must use that same code to unsecure it from the remote interface.
- Un-securing the instrument using this command enables the instrument to be calibrated.
- To calibrate the EDU34450A 5½ Digit Digital Multimeter, use the CALibration:VALue and CALibration? commands.

NOTE The calibration security setting is stored in non-volatile memory, and does not change when power has been off or after a Factory Reset (*RST).

See also

- CALibration:SECure:CODE

CALibration:STRing "<string>"
CALibration:STRing?

This command allows you to store one message in calibration memory. For example, you can store such information as the date when the last calibration was performed, the date when the next calibration is due, the instrument's serial number, or even the name and phone number of the person to contact for a new calibration.

Parameter	Typical Return
Quoted string of up to 40 characters. May contain letters, numbers, spaces, and other common characters.	"CAL: 21 Nov 2010"
Stores a message in the calibration memory: CAL:STR "CAL: 21 Nov 2010" or CAL:STR 'CAL: 21 Nov 2010'	

Remarks

- You can record a calibration message only from the remote interface and only when the instrument is unsecured (see CALibration:SECure:STATe OFF command). You can read the message from the remote interface only. You can read the calibration message whether the instrument is secured or unsecured.
- Storing a calibration message will overwrite any message previously stored in memory.
- The calibration message is stored in non-volatile calibration memory, and does not change when power has been off or after a Factory Reset (*RST command).

See also

- CALibration:SECure:STATe

CALibration:VALue <value>
CALibration:VALue?

This command specifies the value of the known calibration signal as outlined in the calibration procedures in the Keysight EDU34450A 5½ Digit Digital Multimeter Service Guide.

The query returns the parameter in the form +n.nnnnnnnnE+nn.

Parameter	Typical Return
Numeric Desired calibration signal in the units specified by the present measurement function.	+1.00000000E+01
Sets calibration value to +10 volts: `CAL:VAL 10`	

Remarks

- Refer to the Keysight EDU34450A 5½ Digit Digital Multimeter Service Guide for detailed procedures, including how to connect a calibration source, recommended equipment, the specified calibration points, and so forth.

See also

- CALibration[:ALL]?

CALibration:STORe

This command stores the present function calibration constant in the non-volatile memory.

Parameter	Typical Return
(none)	(none)
Stores calibration results of the current function in the non-volatile memory: `CAL:STOR`	

Remarks

- Refer to the Keysight EDU34450A 5½ Digit Digital Multimeter Service Guide for detailed procedures, which includes how to connect a calibration source, recommended equipment, the specified calibration points, and so forth.

CONFigure Subsystem

The CONFigure command allows you to set the measurement function, range, and resolution without actually making a measurement.

NOTE Use the INITiate or READ? command to initiate the measurement.

Command Summary

- CONFigure[:PRIMary]?
- CONFigure[:PRIMary][:VOLTage]:AC
- CONFigure[:PRIMary][:VOLTage][:DC]
- CONFigure[:PRIMary]:CURRent:AC
- CONFigure[:PRIMary]:CURRent[:DC]
- CONFigure[:PRIMary]:DIODe
- CONFigure[:PRIMary]:FREQuency
- CONFigure[:PRIMary]:RESistance
- CONFigure[:PRIMary]:FRESistance
- CONFigure[:PRIMary]:TEMPerature
- CONFigure[:PRIMary]:CONTinuity
- CONFigure[:PRIMary]:CAPacitance
- CONFigure:SECondary?
- CONFigure:SECondary[:VOLTage]:AC
- CONFigure:SECondary[:VOLTage][:DC]
- CONFigure:SECondary:CURRent:AC
- CONFigure:SECondary:CURRent[:DC]
- CONFigure:SECondary:FREQuency

Default Settings

With the CONFigure command, you can select the function, range, and resolution all in one command. All other measurement parameters are set to their default values as shown below.

Measurement Parameter:	CONFigure Setting:
Trigger Source	Immediate
Math Functions	OFF

Using the CONFigure Command

The following program segment shows how to use the CONFigure command with the READ? command to make a measurement. The CONFigure command configures the instrument for DC voltage measurements.

```
CONF:VOLT:DC
READ?
```

Typical Response:
+4.27150000E-00
50000E-00

The following program segment configures the instrument for 2-wire resistance measurements, triggers the instrument to make one measurement using the INITiate command. The FETC? command retrieves the reading. The 10 kΩ range is selected with resolution set to FAST.

```
CONF:RES 10000,FAST
INIT
FETC?
```

Typical Response: +5.95850000E+03

CONFigure[:PRIMary]?

The query returns the present (primary configuration if secondary function is turned on) configuration of the instrument as a quoted string. This query returns a series of comma-separated fields indicating the present function, range, and resolution. The short form of the function name is always returned (e.g., "CURR:AC", "FREQ", etc.).

Parameter	Typical Return
(none)	"VOLT +1.000000E+01,FAST"
Returns the present configuration of the instrument: CONF?	

Remarks

- The *RST command will set all measurement parameters to their factory settings, clear reading memory, and clear all stored statistical data.

CONFigure[:PRIMary][:VOLTage]:AC [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

This command resets all (primary) AC voltage measurement parameters and trigger parameters to their default values. Then, it configures the instrument for AC voltage measurements but does not initiate the measurement.

WARNING **The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.**

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>: 100 mV|1 V|10 V |100 V|750V Default: AUTO (auto range, set to DEF (10 V))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for AC voltage measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement. CONF:VOLT:AC READ? Typical Response: **+1.86850000E+02**	
Configures the instrument for AC voltage measurements. The INITiate command places the instrument in the "wait-for-trigger" state, triggers a measurement, and stores the reading in memory. The FETCh? command transfers the reading from reading memory to the instrument output buffer. The 1 V range is selected. CONF:VOLT:AC 1 INIT FETC? Typical Response: **+4.27150000E-01**	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.

See also:

- CONFigure[:PRIMary]?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure[:PRIMary][:VOLTage][:DC] [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all (primary) DC voltage measurement parameters and trigger parameters to their default values. Then, it configures the instrument for DC voltage measurements but does not initiate the measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|1000 V Default: AUTO (auto range, set to DEF (10 V))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	

Configures the instrument for DC voltage measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement.

```
CONF:VOLT:DC
READ?
```

Typical Response: +1.86850000E-03

Configures the instrument for DC voltage measurements. The INITiate command places the instrument in the "wait-for-trigger" state, triggers a measurement, and stores the reading in memory. The FETCh? command transfers the reading from reading memory to the instrument output buffer. The 1 V range is selected with a FAST resolution.

```
CONF:VOLT:DC 1,FAST
INIT
FETC?
```

Typical Response: +4.27150000E-01

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL (positive overload) or -OL (negative overload) from the front panel or "±9.9E+37" from the remote interface.

See also:

- CONFigure[:PRIMary]?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure[:PRIMary]:CURRent:AC [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all (primary) AC current measurement parameters and trigger parameters to their default values. Then, it configures the instrument for AC current measurements but does not initiate a measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: AUTO (auto range, set to DEF (100 mA))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for AC current measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement. CONF:CURR:AC READ? Typical Response: +8.54530000E-02	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "9.9E+37" from the remote interface.

See also

- CONFigure[:PRIMary]?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure[:PRIMary]:CURRent[:DC] [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all (primary) DC current measurement parameters and trigger parameters to their default values. Then, it configures the instrument for DC current measurements but does not initiate the measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: AUTO (auto range, set to DEF (100 mA))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for DC current measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement. CONF:CURR:DC READ? Typical Response: **+8.54530000E-03**	
Configures the instrument for DC current measurements. The INITiate command places the instrument in the "wait-for-trigger" state, triggers a measurement, and stores the reading in memory. The FETCh? command transfers the reading from reading memory to the instrument output buffer. The 1 A range is selected with a FAST resolution. CONF:CURR:DC 1A,FAST INIT FETC? Typical Response: **+4.27150000E-02**	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately determine the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL (positive overload) or -OL (negative overload) from the front panel or "±9.9E+37" from the remote interface.

See also:

- CONFigure[:PRIMary]?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure[:PRIMary]:DIODe

First, this command resets all diode test parameters and trigger parameters to their default values. Then it configures the instrument for diode tests, but does not initiate the test.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
(none)	(none)

Configures the instrument for diode tests. The READ? command places the instrument in the "wait-for-trigger" state, triggers a test, and then sends the reading to memory and the instrument output buffer.

```
CONF:DIOD
READ?
```

Typical Response: **+1.32130000E-01**

Remarks

- The range and resolution are fixed for diode tests: The range is 1 Vdc (with a 1 mA current source output) the resolution is fixed at MEDium.
- The voltage is returned if it is in the 0 to 1.2 volt range. The instrument beeps when the signal transitions to the 0.3 to 0.8 volt threshold (unless beep is disabled). If the signal is greater than 1.2 volts, **OPEn** is displayed on the front panel and "+9.9E+37" is returned from the remote interface.
- The FETCh?, READ?, and MEASure:DIODe? commands return the measured voltage, regardless of its value.

See also

- CONFigure[:PRIMary]?
- FETCh?

- INITiate[:IMMediate]
- READ?

CONFigure[:PRIMary]:FREQuency [<range>|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all frequency measurement parameters and trigger parameters to their default values. Then, it configures the instrument for frequency measurements but does not initiate the measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>:1 Hz to 1 MHz Default: 1 Hz	(none)
<resolution>: Desired resolution in hertz Default: SLOW (5½ digits)	
Configures the instrument for frequency measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. CONF:FREQ READ? Typical Response: **+1.32130000E+03**	
Configures the instrument for frequency measurements. The INITiate command places the instrument in the "wait-for-trigger" state, triggers a measurement, and stores the reading in memory. The FETCh? command transfers the reading from reading memory to the instrument's output buffer. CONF:FREQ 1 INIT FETC? Typical Response: **+1.01230000E+02**	

Remarks

- Frequency is measured on AC voltage signals if previous function selected is not CURR:AC. Thus, the proper AC voltage range should be set first using the [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe command. The voltage range should be 0.1 volts or greater for more accurate frequency measurements.
- The <*range*> parameter is required only to specify the measurement resolution parameter. Therefore, it is not necessary to send a new command for each new frequency to be measured.
- To measure frequency on AC current signal, configure the instrument to AC current (CONF:CURR:AC); followed by frequency (CONF:FREQ).
- With no signal applied, "0" is returned.

See also

- CONFigure[:PRIMary]?
- FETCh?
- INITiate[:IMMediate]

- READ?
- [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe

CONFigure[:PRIMary]:RESistance [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all 2-wire resistance measurement parameters and trigger parameters to their default values. Then, it configures the instrument for 2-wire resistance measurements but does not initiate the measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>: 100 Ω|1 kΩ|10 kΩ|100 kΩ|1 MΩ|10 MΩ|100 MΩ Default: AUTO (auto range, set to DEF (1 kΩ))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	

Configures the instrument for 2-wire resistance measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement.

```
CONF:RES
READ??
```

Typical Response: **+1.32130000E+04**

Configures the instrument for 2-wire resistance measurements. The INITiate command places the instrument in the "wait-for-trigger" state, triggers a measurement, and stores the reading in memory. The FETCh? command transfers the reading from reading memory to the instrument output buffer. The 1 kΩ range is selected with FAST resolution.

```
CONF:RES 1000,FAST
INIT
FETC?
```

Typical Response: **+4.27150000E+02**

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range

- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.

See also:

- CONFigure[:PRIMary]?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure[:PRIMary]:FRESistance [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all 4-wire resistance measurement parameters and trigger parameters to their default values. Then, it configures the instrument for 4-wire resistance measurements but does not initiate the measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>: 100 Ω|1 kΩ|10 kΩ|100 kΩ|1 MΩ|10 MΩ|100 MΩ Default: AUTO (auto range, set to DEF (1 kΩ))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for 4-wire resistance measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement. CONF:FRES READ? Typical Response: **+1.32130000E+04**	
Configures the instrument for 4-wire resistance measurements. The INITiate command places the instrument in the "wait-for-trigger" state, triggers a measurement, and stores the reading in memory. The FETCh? command transfers the reading from reading memory to the instrument output buffer. The 1 kΩ range is selected with resolution set to FAST. CONF:FRES 1000,FAST INIT FETC? Typical Response: **+4.27150000E+02**	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).

- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.

See also

- CONFigure[:PRIMary]?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure[PRIMary]:TEMPerature [<probe_type>|DEF[,<type>|DEF [,1 [,<resolution>|MIN|MAX|DEF]]]]

First, this command resets all temperature measurement parameters and trigger parameters to their default values. Then, it configures the instrument for temperature measurements but does not initiate the measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<probe_type>: THERmistor Default: THER	(none)
<type>: 5000 Default: 5000	
<resolution>: Desired resolution in the currently selected units (°C or °F) Default: FAST (3½ digits)	
Configures the instrument for 5 kΩ, 2-wire thermistor measurements. The INITiate command places the instrument in the "wait-for-trigger" state, triggers a measurement, and stores the reading in memory. The FETCh? command transfers the reading from reading memory to the instrument output buffer. CONF:TEMP THER,5000 INIT FETC? Typical Response: +7.78000000E+01	

Remarks

- For temperature measurements, the instrument internally selects the range–you cannot select the range to be used.
- For temperature measurements, the resolution is fixed at Fast.
- To change temperature units, use the UNIT:TEMPerature command.
- For thermistor measurements, the instrument auto ranges to the correct range for the transducer resistance measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?
- INITiate[:IMMediate]
- READ?
- UNIT:TEMPerature

CONFigure[:PRIMary]:CONTinuity

First, this command resets all continuity measurement parameters and trigger parameters to their default values. Then, it configures the instrument for continuity measurements but does not initiate a measurement. Continuity is a special type of fixed-range 2-wire resistance measurement. This command presets the instrument to a fixed range and resolution, and then configures for continuity tests. However, it does not initiate the test.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
(none)	(none)
Configures the instrument for continuity measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. CONF:CONT READ? Typical Response: +1.32130000E-02	

Remarks

- The range is fixed at 1 kΩ (a 2-wire resistance measurement) the resolution is fixed at MEDium.
- The meter beeps (even if beep is disabled) for each measurement that is less than or equal to the continuity threshold (≤10 Ω), and the actual resistance reading is displayed on the front panel.
- From 10 Ω to 1.2 kΩ the meter displays the actual resistance reading with no beep.
- If the reading exceeds 1.2 kΩ, the meter displays "OPEN" on the front panel (no beep).

- The FETCh?, READ?, and MEASure[:PRIMary]:CONTinuity? commands return the measured resistance, regardless of its value.

See also

- CONFigure[:PRIMary]?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure[:PRIMary]:CAPacitance[<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all capacitance measurement parameters and trigger parameters to their default values. Then, it configures the instrument for capacitance measurements but does not initiate the measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>: 1 nF|10 nF|100 nF|1 µF|10 µF|100 µF|1 mF|10 mF Default: AUTO (auto range, set to DEF (1 µF)	(none)
<resolution>: Desired resolution in F (farads) Default: FAST (3½ digits)	
Configures the instrument for capacitance measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. The default range (AUTO) and resolution are used for the measurement. CONF:CAP DELAY 0.3 s READ? Typical Response: +1.91793439E-08	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For fastest measurements, use manual ranging on each measurement (some additional time may be required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range

- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.

See also

- CONFigure[:PRIMary]?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure:SECondary?

This command returns the secondary function configuration of the instrument in a quoted string indicating the present function, range, and resolution. The short form of the function name (CURR:AC, FREQ) is always returned.

Parameter	Typical Return
(none)	"VOLT +1.000000E+01,FAST"
Returns the secondary configuration of the instrument: CONF:SEC?	

Remarks

- The *RST command will set all measurement parameters to their factory settings, clear reading memory, and clear all stored statistical data.

CONFigure:SECondary[:VOLTage]:AC [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

This command resets all (secondary) AC voltage measurement parameters and trigger parameters to their default values. Then, it configures the instrument for AC voltage measurements but does not initiate the measurement.

WARNING **The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.**

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|750 V Default: AUTO (auto range, set to DEF (10 V))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	

Configures the instrument for AC voltage measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement.

```
CONF:SEC:VOLT:AC
READ?
```

Typical Response: +1.86850000E+02

Configures the instrument for AC voltage measurements. The INITiate command places the instrument in the "wait-for-trigger" state, triggers a measurement, and stores the reading in memory. The FETCh? command transfers the reading from reading memory to the instrument output buffer. The 1 V range is selected.

```
CONF:SEC:VOLT:AC 1
INIT
FETC?
```

Typical Response: +4.27150000E-01

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.
- For the available measurement functions in dual display mode, refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide.

See also

- CONFigure:SECondary?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure:SECondary[:VOLTage][:DC] [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

This command resets all (secondary) DC voltage measurement parameters and trigger parameters to their default values. Then, it configures the instrument for DC voltage measurements but does not initiate the measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>:100 mV|1 V|10 V|100 V|1000 V Default: AUTO (auto range, set to DEF (10 V))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	

Configures the instrument for DC voltage measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement.

```
CONF:SEC:VOLT:DC
READ?
```

Typical Response: +1.86850000E-03

Configures the instrument for DC voltage measurements. The INITiate command places the instrument in the "wait-for-trigger" state, triggers a measurement, and stores the reading in memory. The FETCh? command transfers the reading from reading memory to the instrument output buffer. The 1 V range is selected with resolution set to Fast.

```
CONF:VOLT:DC 1,FAST
INIT
FETC?
```

Typical Response: +4.27150000E-01

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL (positive overload) or -OL (negative overload) from the front panel or "±9.9E+37" from the remote interface.

- For the available measurement functions in dual display mode, refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide.

See also

- CONFigure:SECondary?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure:SECondary:CURRent:AC [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

This command resets all (secondary) AC current measurement parameters and trigger parameters to their default values. Then, it configures the instrument for AC current measurements but does not initiate a measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: AUTO (auto range, set to DEF (100 mA))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for AC current measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement. CONF:SEC:CURR:AC READ? Typical Response: **+8.54530000E-02**	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range

- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "9.9E+37" from the remote interface.
- For the available measurement functions in dual display mode, refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide.

See also

- CONFigure:SECondary?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure:SECondary:CURRent[:DC] [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

This command resets all (secondary) DC current measurement parameters and trigger parameters to their default values. Then, it configures the instrument for DC current measurements but does not initiate the measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: AUTO (auto range, set to DEF (100 mA))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for DC current measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement.CONF:CURR:DC READ? Typical Response: +8.54530000E-03	
Configures the instrument for DC current measurements. The INITiate command places the instrument in the "wait-for-trigger" state, triggers a measurement, and stores the reading in memory. The FETCh? command transfers the reading from reading memory to the instrument output buffer. The 1 A range is selected with a resolution set to Fast. CONF:SEC:CURR:DC 1A,FAST INIT FETC? Typical Response: +4.27150000E-02	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).

- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately determine the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL (positive overload) or -OL (negative overload) from the front panel or "±9.9E+37" from the remote interface.
- For the available measurement functions in dual display mode, refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide.

See also

- CONFigure:SECondary?
- FETCh?
- INITiate[:IMMediate]
- READ?

CONFigure:SECondary:FREQuency [<range>|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

This command resets all (secondary) frequency measurement parameters and trigger parameters to their default values. Then, it configures the instrument for frequency measurements but does not initiate the measurement.

The CONFigure command does not place the instrument in the "wait-for-trigger" state. Use the INITiate or READ? command in conjunction with CONFigure to place the instrument in the "wait-for-trigger" state.

Parameter	Typical Return
<range>: 1 Hz to 1 MHz Default: 1 Hz	(none)
<resolution>: Desired resolution in hertz Default: SLOW (5½ digits)	

Configures the instrument for frequency measurements. The READ? command places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer.

```
CONF:SEC:FREQ
READ?
```

Typical Response: +1.32130000E+03

Configures the instrument for frequency measurements. The INITiate command places the instrument in the "wait-for-trigger" state, triggers a measurement, and stores the reading in memory. The FETCh? command transfers the reading from reading memory to the instrument's output buffer.

```
CONF:SEC:FREQ 1
INIT
FETC?
```

Typical Response: +1.01230000E+02

Remarks

- Frequency is measured on AC voltage signals if primary function is VOLT:AC. Thus, the proper AC voltage range should be set first using the [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe command. The voltage range should be 0.1 volts or greater for more accurate frequency measurements.
- Frequency is measured on AC current signals if primary function is CURR:AC. Thus, the proper AC current range should be set first using the [SENSe:][PRIMary:]FREQuency:CURRent:RANGe command. The current range should be 0.01 amps or greater for more accurate frequency measurements
- The <*range*> parameter is required only to specify the measurement resolution parameter. Therefore, it is not necessary to send a new command for each new frequency to be measured.
- With no signal applied, "0" is returned.
- For the available measurement functions in dual display mode, refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide.

See also

- CONFigure:SECondary?
- FETCh?
- INITiate[:IMMediate]
- READ?
- [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe
- [SENSe:][PRIMary:]FREQuency:CURRent:RANGe

DATA Subsystem

Command Summary

- DATA:DATA? NVMEM
- DATA:DELete NVMEM
- DATA:LAST?
- DATA:POINts? NVMEM

DATA:DATA? NVMEM

This command returns all reading stored in non-volatile memory (Data Log Function)

Parameter	Typical Return
(none)	(none)
Returns all readings from non-volatile memory (NVMEM): DATA:DATA? NVMEM	

Remarks

- The internal non-volatile memory can store up to 5,000 readings (by default)

See also

- DATA:DELete

DATA:DELete NVMEM

This command deletes all readings from non-volatile memory (NVMEM).

Parameter	Typical Return
NVMEM	(none)
Deletes all readings from non-volatile memory: DATA:DELete NVMEM	

Remarks

- The internal non-volatile memory is not erased by a power-down cycle. If data has been copied into nonvolatile memory, use DATA:DELete to erase the readings

See also

- DATA:DATA?

DATA:LAST?

This query returns the last measurement log in data logging.

The query returns one reading with units. If no data is available, 9.91000000E+37 is returned.

Parameter	Typical Return
(none)	+1.73730000E-03 VDC
Returns the last reading log by the meter: DATA:LAST?	

Remarks

- User can execute this command at any time, even during a series of measurements.
- The instrument will not clears log readings from non-volatile memory after a Factory Reset (*RST command), after an Instrument Preset (SYSTem:PRESet command), or when mainframe power is cycled.

DATA:POINts? NVMEM

This query returns the total number of readings currently stored in non-volatile memory (NVMEM).

Parameter	Typical Return
(none)	+215
Returns the number of readings in reading memory: DATA:POIN? NVMEM	

Remarks

- The query returns between 0 and 5,000 readings.
- You are able to read the count at any time, even during a series of measurements. –
- Non-volatile memory (NVMEM) can store up to 5,000 readings:
  - 1 to 5,000 reading (by default)
- The instrument will not clears log readings from non-volatile memory after a Factory Reset (*RST command), after an Instrument Preset (SYSTem:PRESet command), or when mainframe power is cycled.

DISPlay Subsystem

Command Summary

- DISPlay[:WINDow1][:STATe]
- DISPlay[:WINDow1][:STATe]?
- DISPlay:WINDow2[:STATe]
- DISPlay:WINDow2[:STATe]?

DISPlay[:WINDow1][:STATe] <mode>
DISPlay[:WINDow1][:STATe]?

This command enables or disables the entire front panel display. For security reasons or for a slight increase in the measurement rates, you may want to turn off the front-panel display. When the display is disabled, the front-panel display goes blank with all the display annunciators disabled except for Remote and ERROR annunciator.

Parameter	Typical Return
<mode>: ON|1|OFF|0	0 (OFF) or 1(ON)
Turn display off: DISP OFF	

Remarks

- A return to local mode will enabled the display.
- The display setting is not stored as part of the instrument state by the *SAV command.
- The front-panel display is automatically enabled during power-cycle, after a Factory Reset (*RST command), or after an Instrument Preset (SYSTem:PRESet command).

DISPlay[:WINDow2][:STATe] <mode>
DISPlay[:WINDow2][:STATe]?

This command controls the instrument's secondary front-panel display.

Parameter	Typical Return
<mode>: ON|1|OFF|0	0 (OFF) or 1 (ON)
Turn off the front-panel secondary display: DISP:WIND2 OFF	

Remarks

- OFF will also turn off the secondary measurement function.
- For the available measurement functions in dual display mode, refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide.

FETCh Subsystem

Command Summary

- FETCh?

FETCh?

This command transfers the reading to the instrument's output buffer where you can read it into your computer. The reading is not erased when read. You can send the command multiple times to retrieve the same reading from memory.

Parameter	Typical Return
(none)	(none)

Use FETCh? with the CONFigure and INITiate. The INITiate command places the instrument in the "wait-for-trigger" state. The FETCh? command retrieves the reading from the instrument's output buffer.

```
CONF:VOLT:DC 10,FAST
INIT
FETC?
```

Typical response: **+4.27150000E-03**

Remarks

- The FETCh? command will wait until the measurement is complete to terminate.
- The instrument clears any reading from volatile memory after a Factory Reset (*RST command) when mainframe power is cycled, when the configuration is changed (see CONFigure), or on an INITiate command.

See also:

- INITiate[:IMMediate]

FORMat Subsystem

Command Summary

- FORMat:OUTPut

FORMat:OUTPut [1|2]
FORMat:OUTPut?

This command set the returned measurement data format to with or without measurement unit.

Parameter	Typical Return
1|2	1 or 2

1: Displays measurement values without measurement unit.
2: Displays measurement values with measurement unit.

Set the output display format to display measurement values with measurement unit: FORM:OUTP 2

Remarks

- The query returns whether the measurement unit is included or vice-versa.
- Refer to table below for output unit for each of the measurement function.

Measurement Function	Unit
DC Voltage	VDC
AC Voltage	VAC
DC Current	ADC
AC Current	AAC
Resistance	OHMS
Frequency	HZ
Diode	VDC
Continuity Test	OHMS
Capacitance	F
Temperature	CEL or FAH

HCOpy Subsystem

Command Summary

- HCOpy:SDUMp:DATA?
- HCOpy:SDUMp:DATA:FORMat
- HCOPy:SDUMp:DATA:FORMat?

HCOPy:SDUMp:DATA:FORMat BMP
HCOPy:SDUMp:DATA:FORMat?

This command specifies the format for front panel images returned by HCOPy:SDUMp:DATA?.

Parameter	Typical Return
BMP Default: BMP	BMP
Specify BMP as the image format: HCOP:SDUM:DATA:FORM BMP	

HCOPy:SDUMp:DATA?

This command returns the front panel display ("screen shot").

Parameter	Typical Return
(none)	(A definite-length binary block containing the image.) Definite-length block data allows any type of device-dependent data to be transmitted as a series of 8-bit binary data bytes. This is particularly useful for transferring large quantities of data or 8-bit extended ASCII codes.
Capture and return the display image: HCOP:SDUM:DATA?	

Remarks

- The image format (BMP) is specified by HCOPy:SDUMp:DATA:FORMat.

Command Summary

- *CLS
- *ESE
- *ESE?
- *ESR?
- *IDN?
- *OPC
- *OPC?
- *PCS
- *PCS?
- *RST
- *SRE
- *SRE?
- *STB?
- *TRG
- *TST?
- *WAI
- *RCL
- *SAV

*CLS

This command clears the event registers in all register groups. This command also clears the Error queue.

Parameter	Typical Return
(none)	(none)
Clears the event register bits: `*CLS`	

See also

- *ESR?

*ESE <enable_value>
*ESE?

This command enables bits in the enable register for the Standard Event Register group. The selected bits are then reported to bit 5 of the Status Byte Register.

The query returns the decimal value of the binary-weighted sum of all bits in the Standard Event enable register.

NOTE For more information on the SCPI Status System for the EDU34450A 5½ Digit Digital Multimeter, see the Status System Introduction section.

Parameter	Typical Return
A decimal value that corresponds to the binary weighted sum of the bits in the register	<bit value>
Enables bit 4 (decimal value = 16) in the enable register: `*ESE 16`	

Remarks

- Use the <enable_value> parameter to specify which bits will be enabled. The decimal value specified corresponds to the binary-weighted sum of the bits you wish to enable in the register. For example, to enable bit 2 (decimal value = 4), bit 3 (decimal value = 8), and bit 7 (decimal value = 128), the corresponding decimal value would be 140 (4 + 8 + 128).
- You can use the *PSC command to control whether the Standard Event enable register is cleared at power on.
- The *CLS (clear status) command will not clear the enable register but it does clear all bits in the event register.
- The query returns a value from 0 to 65,535.

See also

- *ESR?
- *PSC

*ESR?

This query returns the event register for the Standard Event Register group. This is a read-only register and the bits are not cleared when you read the register.

NOTE For more information on the SCPI Status System for the EDU34450A 5½ Digit Digital Multimeter, see the Status System Introduction section.

Parameter	Typical Return
(none)	<bit value>
Reads the event register (bits 3 and 4 are set): *ESR?	

Remarks

- In order to be reported to the Standard Event Register, the corresponding bits in the event register must be enabled using the *ESE command.
- Once a bit is set, it remains set until cleared by reading the event register or the *CLS (clear status) command.
- The query returns a value from 0 to 65,535.

See also:

- *ESE
- *CLS

*IDN?

This query reads the instrument's identification string which contains four comma-separated fields. The first field is the manufacturer's name, the second field is the instrument model number, the third field is the serial number, and the fourth field is a I/O board firmware revision code, and the fifth field shows the measurement board firmware version.

The query returns a string with the following format:

Keysight Technologies,EDU34450A,<Serial Number>,II.II-MM.MM

II.II = I/O board firmware version
MM.MM = Measurement board firmware version

NOTE For more information on the SCPI Status System for the EDU34450A 5½ Digit Digital Multimeter, see the Status System Introduction section.

Parameter	Typical Return
(none)	<ASCII string with comma-seperated fields>
Returns the instrument's identification string: *IDN?	

See also

- *TST?

*OPC

This command sets the "Operation Complete" bit (bit 0) in the Standard Event register at the completion of the current operation.

NOTE For more information on the SCPI Status System for the EDU34450A 5½ Digit Digital Multimeter, see the Status System Introduction section.

Parameter	Typical Return
(none)	(none)
Sets the "Operation Complete" bit: *OPC	

Remarks

- The purpose of this command is to synchronize your application with the instrument.
- Note the difference between the *OPC command and the *OPC? query command. The latter returns "1" to the output buffer at the completion of the current operation.

See also

- *OPC?

*OPC?

This query returns "1" to the output buffer at the completion of the current operation.

NOTE For more information on the SCPI Status System for the EDU34450A 5½ Digit Digital Multimeter, see the Status System Introduction section.

Parameter	Typical Return
(none)	1
Return 1 when the command is complete: *OPC?	

Remarks

- The purpose of this command is to synchronize your application with the instrument.
- Note the difference between the *OPC? command and the *OPC command. The latter sets the "Operation Complete" bit (bit 0) in the Standard Event register at the completion of the current operation.

See also

- *OPC

*PSC 0|1
*PSC?

Power-On Status Clear. This command enables or disables the clearing of certain enable registers at power on. With *PSC 0 specified, these registers are not cleared at power on. With *PSC 1 specified, these registers are cleared at power on. The following registers are affected:

- Questionable Data Register:
  STATus:QUEStionable:ENABle
- Standard Operation Register:
  STATus:OPERation:ENABle
- Status Byte Register:
  *SRE (Service Request Enable)
- Standard Event Register:
  *ESE (Event Status Enable)

NOTE The *PSC command does not affect the clearing of the condition or event registers, just the enable registers. For more information on the SCPI Status System for the EDU34450A, see the Status System Introduction section.

Parameter	Typical Return
0|1 Default: 1	0 or 1
Disables the power-on clearing of the affected registers: *PSC 0	

See also

- *SRE
- *STB?

*RST

This command resets the multimeter to the Factory configuration. See Factory Reset State for a complete listing of the instrument's Factory configuration.

Parameter	Typical Return
(none)	(none)
Resets the instrument: *RST	

Remarks

- This command does not affect any previously-stored instrument states (see *SAV command).

*SRE <enable_value>
*SRE?

This command enables bits in the enable register for the Status Byte Register group. Once enabled, the corresponding bits may generate a Request for Service (RQS) in the Status Byte. This RQS event may generate a "call back" to your application as a type of asynchronous interrupt.

NOTE For more information on the SCPI Status System for the EDU34450A, see the Status System Introduction section.

Parameter	Typical Return
A decimal value which corresponds to the binary weighted sum of the bits in the register	<bit value>
Enables bit 4 (decimal value = 16) in the enable register: *SRE 16	

Remarks

- Use the <enable_value> parameter to specify which bits will be enabled. The decimal value specified corresponds to the binary-weighted sum of the bits you wish to enable in the register. For example, to enable bit 3 (decimal value = 8) and bit 5 (decimal value = 32), the corresponding decimal value would be 40 (8 + 32).
- The *CLS (clear status) command will not clear the enable register but it does clear all bits in the event register.
- The *PSC (power-on status clear) command determines whether or not the Status Byte enable register is cleared at power on, or not cleared.
- A *CLS, or *RST command does not clear the bits in the Status Byte enable register.

See also:

- *STB?

*STB?

This query queries the condition register for the Status Byte Register group. This command is similar to a Serial Poll but it is processed like any other instrument command. This is a read-only register and the bits are not cleared when you read the register.

NOTE For more information on the SCPI Status System for the EDU34450A, see the Status System Introduction section.

Parameter	Typical Return
(none)	<bit value>
Reads the condition register: *STB?	

Remarks

- This query returns the same results as a Serial Poll but the "Master Summary" bit (bit 6) is not cleared if a Serial Poll has occurred.
- A Factory Reset (*RST command) or power-on cycle will clear all bits in the condition register.

See also

- *PSC
- *SRE

*TRG

This query is used in conjunction with the TRIGger:SOURce command to trigger the instrument from the remote interface.

Parameter	Typical Return
(none)	(none)
Triggers the instrument: TRIG:SOUR BUS INIT *TRG	

Remarks

- Use the TRIGger:SOURce command to select the BUS (software) trigger source.
- After setting the trigger source, you must place the multimeter in the "wait-for-trigger" state using the INITiate command. The *TRG command will not be accepted unless the multimeter is in the "wait-fortrigger" state.

See also

- TRIGger:SOURce

*TST?

This query performs a complete self-test of the instrument and returns a pass/fail indication. The self-test runs a series of tests and will take a few seconds to complete. If all tests pass, you can have a high confidence that the instrument is operational.

Parameter	Typical Return
(none)	+0 (all tests passed) or +1 (one or more tests failed)
Performs a self-test: *TST?	

Remarks

- If one or more tests fail, "+1" is returned and an error is stored in the error queue. For a complete listing of the error messages related to self-test failures, see SCPI Error Messages.

- If one or more tests fail, see the Keysight EDU34450A 5½ Digit Digital Multimeter Service Guide for instructions on obtaining service.
- Following the *TST? command, the instrument issues a Factory Reset (*RST command).

See also

- *IDN?

*WAI

This command configures the instrument's output buffer to wait for all pending operations to complete before executing any additional commands over the interface.

Parameter	Typical Return
(none)	(none)
Wait until all pending operations complete: *WAI	

Remarks

- Function and range changes are considered pending operations. Therefore, *WAI will cause these changes to occur and complete.

See also

- *OPC

*RCL 0|1|2|3|4|5

This command recalls the instrument state stored in the specified storage location. If you recall the instrument state from an empty storage location, it will automatically reset the instrument to factory default setting. When shipped from the factory, storage locations 1 through 5 are empty (location 0 has the power-down state).

Use the *SAV command to store the current instrument state.

Parameter	Typical Return
0|1|2|3|4|5	(none)
Recalls the instrument state previously stored in location 1: *RCL 1	

Remarks

- The instrument has five storage locations in non-volatile memory to store instrument states. The instrument uses location 0 to automatically hold the state of the instrument at power down.
- A Factory Reset (*RST command) does not affect the configurations stored in memory. Once a state is stored, it remains until it is overwritten.

See also

- *SAV

*SAV 0|1|2|3|4|5

This command stores (saves) the current instrument state in the specified storage location. Any state previously stored in the same location is overwritten (no error is generated).

Use the *RCL command to recall a stored instrument state.

Parameter	Typical Return
0|1|2|3|4|5	(none)
Stores the current instrument state in location 1: *SAV 1	

Remarks

- The instrument has five storage locations in non-volatile memory to store instrument states. The instrument uses location 0 to automatically hold the state of the instrument at power down. You can store the instrument state in location 1, 2, 3, 4, or 5. You can use location 0 to store a fifth instrument state, but keep in mind that location 0 is automatically overwritten when power is cycled.
- When shipped from the factory, storage locations 1 through 5 are empty and the instrument is configured to issue a factory reset (*RST command) when power is restored. You can change the factory configuration such that the power-down state (location 0) is automatically recalled when power is restored.
- A Factory Reset (*RST command) does not affect the configurations stored in memory. Once a state is stored, it remains until it is overwritten.

See also

- *RCL

INITiate Subsystem

Command Summary

- INITiate[:IMMediate]

INITiate[:IMMediate]

This command changes the state of the triggering system from the "idle" state to the "wait-for-trigger" state. Measurements will begin when the specified trigger conditions are satisfied following the receipt of the INITiate command. Note that the INITiate command also clears the previous reading from memory.

Parameter	Typical Return
(none)	(none)

The following program segment shows how to use the INITiate command with the CONFigure and FETCh? commands. The INITiate command places the instrument in the "wait-for-trigger" state which is set to immediate. The FETCh? command transfers the reading from memory to the instrument's output buffer:

```
CONF:VOLT:DC 10,FAST
TRIG:SOUR IMM
INIT
FETC?
```

Typical Response: **+4.27150000E-03**

Remarks

- To retrieve the reading, use the FETCh? command.
- The ABORt command may be used to return to idle.
- The INITiate command only initiates the measurement and needs a trigger (BUS or IMMediate) to make the actual measurement.

See also

- FETCh?
- READ?
- ABORt

Command Summary

- LXI:IDENtify[:STATe]
- LXI:IDENtify[:STATe]?
- LXI:MDNS:ENABle
- LXI:MDNS:ENABle?
- LXI:MDNS:HNAMe[:RESolved]?
- LXI:MDNS:SNAMe:DESired
- LXI:MDNS:SNAMe:DESired?
- LXI:MDNS:SNAMe[:RESolved]?
- LXI:MDNS[:STATe]
- LXI:MDNS[:STATe]?
- LXI:RESet
- LXI:RESTart

LXI:IDENtify[:STATe] <mode>
LXI:IDENtify[:STATe]?

This command allows you to set the property to ON to change the LXI status indicator to the "Identify" state. Setting this property OFF changes the LXI status indicator to "No Fault".

The query returns the state of the LXI status indicator.

Parameter	Typical return
<mode>: ON|1|OFF|0	0 or 1
Sets the LXI status indicator to "No Fault": LXI:IDEN 0	

LXI:MDNS:ENABle <mode>
LXI:MDNS:ENABle?

This command enables (On) or disables (Off) the multicast Domain Name System (mDNS), which provides the capabilities of a DNS server for service discovery in a small network that without a DNS server.

The query returns the state of the mDNS service.

Parameter	Typical return
<mode>: ON|1|OFF|0 Default: ON	0 or 1
Enables mDNS service: LXI:MDNS:ENAB 1	

Remarks

- This setting is non-volatile; it is not changed by power cycling or a Factory Reset (*RST).
- This parameter is set to its default value when the instrument is shipped from the factory.

LXI:MDNS:HNAMe[:RESolved]?

This command returns the resolved (unique) mDNS hostname in the form "K-<model number>-<serial>-N", where <serial> is the last 5 digits of the instrument's serial number. The N is an integer appended if necessary to make the name unique.

The desired name may be truncated, if necessary, to make room for the appended integer.

Parameter	Typical return
(none)	"K-34450A-yyyyy", where yyyyy is the last five digits of the serial number.
Returns the resolved mDNS hostname: LXI:MDNS:HNAMe:RESolved?	

LXI:MDNS:SNAMe:DESired "<name>"
LXI:MDNS:SNAMe:DESired?

This command sets the desired mDNS service name.

This query returns the mDNS service name.

Parameter	Typical return
<name> = Quoted string of up to 63 characters. Default: "Keysight <model number> Digital Multimeter - <serial number>"	"Keysight EDU34450A Digital Multimeter - CN00000001"
Sets the desired mDNS service name: LXI:MDNS:SNAM:DES "EDU34450A	

Remarks

- This setting is non-volatile; it is not changed by power cycling or a Factory Reset (*RST).
- This parameter is set to its default value when the instrument is shipped from the factory.

LXI:MDNS:SNAMe[:RESolved]?

The resolved mDNS service name will be the desired service name (LXI:MDNS:SNAMe:DESired command), possibly with "(<N>)" appended. The N is an integer appended if necessary to make the name unique. The desired name may be truncated, if necessary, to make room for the appended integer.

Parameter	Typical return
(none)	"Keysight EDU34450A Digital Multimeter- CN00000001"
Returns the resolved mDNS service: LXI:MDNS:SNAMe:RESolved?	

LXI:MDNS[:STATe] <mode>
LXI:MDNS[:STATe]?

This command enables (On) or disables (Off) the multicast Domain Name System (mDNS), which provides the capabilities of a DNS server for service discovery in a small network without a DNS server.

This query returns the state of the mDNS service.

Parameter	Typical return
<mode>: ON|1|OFF|0 Default: ON	0 or 1
Enables mDNS service: LXI:MDNS ON	

LXI:RESet

This command resets LAN interface to a known operating state, beginning with DHCP, and clears the Web Interface password. If DHCP fails, it uses Auto-IP.

Parameter	Typical return
(none)	(none)
Resets the LAN interface: LXI:RES	

Remarks

- Depending on your network, the LAN interface may take several seconds to restart after this command is sent.
- If the LAN interface or specific LAN services (VXI-11, Sockets, and so on) have been disabled by SYSTem:COMMunicate:ENABle, you must separately re-enable the interface or services and cycle instrument power for the LAN to be operational.

LXI:RESTart

This command restarts the LAN interface with the current settings as specified by the SYSTem:COMMunicate:LAN commands.

Parameter	Typical return
(none)	(none)
Restarts the LAN interface: LXI:REST	

Remarks

- Depending on your network, the LAN interface may take several seconds to restart after this command is sent.
- If the LAN interface or specific LAN services (VXI-11, Sockets, and so on) have been disabled by SYSTem:COMMunicate:ENABle, you must separately re-enable the interface or services and cycle instrument power for the LAN to be operational.

MEASure Subsystem

The MEASure? command provides the easiest way to program the instrument for measurements. When you execute this command, the instrument immediately performs the measurement (see Triggering the Multimeter for details). The reading is sent directly to the instrument's output buffer. For voltage, current, and frequency measurements you can use the SECondary command to send measurement readings to the secondary display.

Command Summary

- MEASure[:PRIMary]:CAPacitance
- MEASure[:PRIMary]:CONTinuity
- MEASure[:PRIMary]:CURRent:AC
- MEASure[:PRIMary]:CURRent[:DC]
- MEASure[:PRIMary]:DIODe
- MEASure[:PRIMary]:FREQuency
- MEASure[:PRIMary]:FRESistance
- MEASure[:PRIMary]:RESistance
- MEASure[:PRIMary]:TEMPerature
- MEASure[:PRIMary][:VOLTage][:DC]
- MEASure[:PRIMary][:VOLTage]:AC
- MEASure:SECondary:CURRent:AC
- MEASure:SECondary:CURRent[:DC]
- MEASure:SECondary:FREQuency
- MEASure:SECondary[:VOLTage][:DC]
- MEASure:SECondary[:VOLTage]:AC

Default Settings for the MEASure? Command

With the MEASure? command, you can select the function, range, and resolution all in one command. All other measurement parameters are set to their default values as shown below.

Measurement Parameter:	CONFigure Setting:
Trigger Source	Immediate
Math Functions	OFF

Using the MEASure? Command

The following command shows how to use the MEASure? command to make a measurement. This example configures the instrument for DC voltage measurements, internally triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (autorange) and resolution (1 ;) are used for the measurement.

```
MEAS:VOLT:DC?
```

Typical Response: +4.23450000E-03

The following command configures the instrument for 2-wire resistance measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The 1 kΩ range is selected with resolution set to FAST.

```
MEAS:RES? 1000,FAST
```

Typical Response: +3.27150000E+02

MEASure[:PRIMary]:CAPacitance? [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all capacitance measurement parameters and trigger parameters to their default values. Then, it configures the instrument for capacitance measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
<range>: 1 nF|10 nF|100 nF|1 µF|10 µF|100 µF|1 mF|10 mF Default: AUTO (auto range, set to DEF (1 µF)	(none)
<resolution>: Desired resolution in F (farads) Default: FAST (3½ digits)	
Configures the instrument for capacitance measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (AUTO) and resolution (4½ digits) are used for the measurement: MEAS:CAP? Typical Response: +1.91793439E-08	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input. For fastest measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?
- READ?

MEASure[:PRIMary]:CONTinuity?

First, this command resets all continuity measurement parameters and trigger parameters to their default values. Then it configures the instrument for continuity tests, and immediately triggers the test. Continuity is a special type of fixed-range 2-wire resistance measurement. The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
(none)	(none)

Configures the instrument for continuity measurements, places the instrument in the "wait-for-trigger" state, triggers a measurement, and then sends the reading to memory and the instrument output buffer:
MEAS:CONT?
Typical Response: **+1.32130000E-02**

Remarks

- The range is fixed at 1 kΩ (a 2-wire resistance measurement) the resolution is fixed at 4½ digits.
- The meter beeps (even if beep is disabled) for each measurement that is less than or equal to the continuity threshold (≤10 Ω), and the actual resistance reading is displayed on the front panel.
  - From 10 Ω to 1.2 kΩ the meter displays the actual resistance reading with no beep.
  - If the reading exceeds 1.2 kΩ, the meter displays "OPEN" on the front panel (no beep).
- The MEASure:[PRIMary:]CONTinuity? command returns the measured resistance, regardless of its value.
- Either the *RST command will set all measurement parameters to their factory settings, clear reading memory, and clear all stored statistical data.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?
- READ?

MEASure[:PRIMary]:CURRent:AC? [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all primary AC current measurement parameters and trigger parameters to their default values. Then, it configures the instrument for AC current measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: AUTO (auto range, set to DEF (100 mA))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for AC current measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (auto range) and resolution are used for the measurement: MEAS:CURR:AC? Typical Response: **+8.54530000E-02**	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For fastest measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL from the front panel or "±9.9E+37" from the remote interface.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?
- READ?

MEASure[:PRIMary]:CURRent[:DC]? [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all primary DC current measurement parameters and trigger parameters to their default values. Then, it configures the instrument for DC current measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: AUTO (auto range, set to DEF (100 mA))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for DC current measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement. MEAS:CURR:DC? Typical Response: **+8.54530000E-03**	
Configures the instrument for DC current measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The 1 A range is selected with resolution set to FAST. MEAS:CURR:DC? 1,FAST Typical Response: **+4.27150000E-02**	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: **OL** (positive overload) or **-OL** (negative overload) from the front panel or "±9.9E+37" from the remote interface.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?

- READ?

MEASure[:PRIMary]:DIODe?

First, this command resets all diode test parameters and trigger parameters to their default values. Then it configures the instrument for diode tests, and immediately triggers the test.The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
(none)	(none)
Configures the instrument for diode tests, places the instrument in the "wait-fortrigger" state, triggers a test, and then sends the reading to memory and the instrument output buffer. MEAS:DIOD? Typical Response: +0.65120000E-00	

Remarks

- The range is fixed at 1 Vdc (with a 1 mA current source output) and the resolution is fixed at 4½ digits.
- The voltage is returned if it is in the 0 to 1.2 volt range. The instrument beeps when the signal transitions to the 0.3 to 0.8 volt threshold (unless beep is disabled). If the signal is greater than 1.2 volts, OPEn is displayed on the front panel and "+9.9E+37" is returned from the remote interface.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?
- READ?

MEASure[:PRIMary]:FREQuency? [<range>|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all primary frequency measurement parameters and trigger parameters to their default values. Then, it configures the instrument for frequency measurements and immediately triggers a measurement. The results are sent directly to the instrument output buffer.

Parameter	Typical Return
<range>: 1 Hz to 1 MHz Default: 1 Hz	(none)
<resolution>: Desired resolution in hertz Default: SLOW (5½ digits)	
Configures the instrument for frequency measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. MEAS:FREQ? Typical Response: +1.32130000E+03	

Remarks

- Frequency is measured on AC voltage signals. Thus, the proper AC voltage range should be set first using the [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe command. The voltage range should be 0.1 volts or greater for more accurate frequency measurements.
- The <*range*> parameter is required only to specify the measurement resolution parameter. Therefore, it is not necessary to send a new command for each new frequency to be measured.
- With no signal applied "0" is returned.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?
- READ?
- [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe

MEASure[:PRIMary]:FRESistance? [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all resistance measurement parameters and trigger parameters to their default values. Then, it configures the instrument for 4-wire resistance measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
<range>: 100 Ω|1 kΩ|10 kΩ|100 kΩ|1 MΩ|10 MΩ|100 MΩ Default: AUTO (auto range, set to DEF (1 kΩ))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for 4-wire resistance measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement. MEAS:FRES? Typical Response: **+1.32130000E+04**	
Configures the instrument for 4-wire resistance measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The 1 kΩ range is selected with resolution set to FAST. MEAS:FRES? 1000,FAST Typical Response: **+4.27150000E+02**	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL from the front panel or "±9.9E+37" from the remote interface.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?
- READ?

MEASure[:PRIMary]:RESistance? [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all resistance measurement parameters and trigger parameters to their default values. Then, it configures the instrument for 2-wire resistance measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
<range>: 100 Ω|1 kΩ|10 kΩ|100 kΩ|1 MΩ|10 MΩ|100 MΩ Default: AUTO (auto range, set to DEF (1 kΩ))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for 2-wire resistance measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement. MEAS:RES? Typical Response: +1.32130000E+04	
Configures the instrument for 2-wire resistance measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The 1 kΩ range is selected with resolution set to FAST. MEAS:RES? 1000,FAST Typical Response: +4.27150000E+02	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OLfrom the front panel or "±9.9E+37" from the remote interface.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?
- READ?

MEASure[:PRIMary]:TEMPerature? [<probe_type>|DEF [,<type>|DEF [,1 [,<resolution>|MIN|MAX|DEF]]]]

First, this command resets all temperature measurement parameters and trigger parameters to their default values. Then, it configures the instrument for temperature measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
<probe_type>: THERmistor Default: THER	(none)
<type>: 5000 Default: 5000	
<resolution>: Desired resolution in the currently selected units (°C or °F) Default: FAST (3½ digits)	
Configures the instrument for 5 kΩ thermistor measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. This 2-wire measurement is made with 0.1 °C resolution (assumes default temperature units). MEAS:TEMP? THER,5000,1,0.1 Typical Response: +2.47150000E+01	

Remarks

- For temperature measurements, the instrument internally selects the range–you cannot select the range to be used.
- For temperature measurements, the resolution is fixed at 3½ digits.
- To change temperature units, use the UNIT:TEMPerature command.
- For thermistor measurements, the instrument auto ranges to the correct range for the transducer resistance measurement.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?
- READ?
- UNIT:TEMPerature

MEASure[:PRIMary][:VOLTage][:DC]? [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all primary DC voltage measurement parameters and trigger parameters to their default values. Then, it configures the instrument for DC voltage measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|1000 V Default: AUTO (auto range, set to DEF (10 V))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for DC voltage measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement. MEAS:VOLT:DC? Typical Response: **+1.86850000E-03**	
Configures the instrument for DC voltage measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The 1 V range is selected with resolution set to FAST. MEAS:VOLT:DC? 1,FAST Typical Response: **+4.27150000E-03**	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL (positive overload) or -OL (negative overload) from the front panel or "±9.9E+37" from the remote interface.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?
- READ?

MEASure[:PRIMary][:VOLTage]:AC? [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all primary AC voltage measurement parameters and trigger parameters to their default values. Then, it configures the instrument for AC voltage measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

WARNING **The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.**

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|750 V Default: AUTO (auto range, set to DEF (10 V))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	

Configures the instrument for AC voltage measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement.

```
MEAS:VOLT:AC?
```

Typical Response: +1.86850000E-03

Configures the instrument for AC voltage measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The 1 V range is selected.

```
MEAS:VOLT:AC? 1
```

Typical Response: +4.27150000E-03

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL from the front panel or "±9.9E+37" from the remote interface.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.

See also

- CONFigure[:PRIMary]?
- FETCh?
- READ?

MEASure:SECondary:CURRent:AC? [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all secondary AC current measurement parameters and trigger parameters to their default values. Then, it configures the instrument for AC current measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: AUTO (auto range, set to DEF (100 mA))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for AC current measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (auto range) and resolution are used for the measurement. MEAS:SEC:CURR:AC? Typical Response: +8.54530000E-02	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Autoranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For fastest measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL from the front panel or "±9.9E+37" from the remote interface.
- If the **TRIGger:SOURce** is set to BUS, the **MEASure?** command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.
- For the available measurement functions in dual display mode, refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide.

See also

- CONFigure:SECondary
- FETCh?
- READ?

MEASure:SECondary:CURRent[:DC]? [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all secondary DC current measurement parameters and trigger parameters to their default values. Then, it configures the instrument for DC current measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: AUTO (auto range, set to DEF (100 mA))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for DC current measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement. MEAS:SEC:CURR:DC? Typical Response: **+8.54530000E-03**	
Configures the instrument for DC current measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The 1 A range is selected with resolution set to Slow. MEAS:SEC:CURR:DC? 1,SLOW Typical Response: **+4.27150000E-02**	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Auto ranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: **OL** (positive overload) or **-OL** (negative overload) from the front panel or "±9.9E+37" from the remote interface.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.
- For the available measurement functions in dual display mode, refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide.

See also

- CONFigure:SECondary
- FETCh?
- READ?

MEASure:SECondary:FREQuency? [<range>|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all secondary frequency measurement parameters and trigger parameters to their default values. Then, it configures the instrument for frequency measurements and immediately triggers a measurement. The results are sent directly to the instrument output buffer.

Parameter	Typical Return
<range>: 1 Hz to 1 MHz Default: 1 Hz	(none)
<resolution>: Desired resolution in hertz Default: SLOW (5½ digits)	
Configures the instrument for frequency measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. MEAS:SEC:FREQ? Typical Response: **+1.32130000E+03**	

Remarks

- Frequency is measured on AC voltage signals. Thus, the proper AC voltage range should be set first using the [SENSe:]SECondary:FREQuency:VOLTage:RANGe command. The voltage range should be 0.1 volts or greater for more accurate frequency measurements.
- The <range> parameter is required only to specify the measurement resolution parameter. Therefore, it is not necessary to send a new command for each new frequency to be measured.
- With no signal applied "0" is returned.
- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.
- For the available measurement functions in dual display mode, refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide.

See also

- CONFigure:SECondary
- FETCh?
- READ?
- [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe

MEASure:SECondary[:VOLTage][:DC]? [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all secondary DC voltage measurement parameters and trigger parameters to their default values. Then, it configures the instrument for DC voltage measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|1000 V Default: AUTO (auto range, set to DEF (10 V))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	
Configures the instrument for DC voltage measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement. MEAS:SEC:VOLT:DC? Typical Response: **+1.86850000E-03**	
Configures the instrument for DC voltage measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The 1 V range is selected with resolution set to FAST. MEAS:SEC:VOLT:DC? 1,FAST Typical Response: **+4.27150000E-03**	

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Autoranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: **OL** (positive overload) or **-OL** (negative overload) from the front panel or "±9.9E+37" from the remote interface.
- For the available measurement functions in dual display mode, refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide.

See also

- CONFigure:SECondary
- FETCh?

- READ?

MEASure:SECondary[:VOLTage]:AC? [<range>|AUTO|MIN|MAX|DEF [,<resolution>|MIN|MAX|DEF]]

First, this command resets all secondary AC voltage measurement parameters and trigger parameters to their default values. Then, it configures the instrument for AC voltage measurements and immediately triggers a measurement. The reading is sent directly to the instrument output buffer.

WARNING **The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.**

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|750 V Default: AUTO (auto range, set to DEF (10 V))	(none)
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	

Configures the instrument for AC voltage measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The default range (auto range) and resolution (5½ digits) are used for the measurement.

```
MEAS:SEC:VOLT:AC?
```

Typical Response: **+1.86850000E-03**

The following command configures the instrument for AC voltage measurements, triggers the instrument to take a reading, and then transfers the reading to the instrument output buffer. The 1 V range is selected.

```
MEAS:SEC:VOLT:AC? 1
```

Typical Response: **+4.27150000E-03**

Remarks

- You can allow the instrument to automatically select the measurement range using auto ranging or you can select a fixed range using manual ranging. Autoranging is convenient because the instrument decides which range to use for each measurement based on the input signal. For faster measurements, use manual ranging on each measurement (some additional time is required for auto ranging since the instrument has to make a range selection).
- If you select auto ranging (by specifying "AUTO" or "DEF"), an error will be generated if you specify a discrete value for the <resolution> parameter. When auto ranging is combined with a discrete resolution, the instrument cannot accurately resolve the integration time (especially if the input signal is continuously changing). If your application requires auto ranging, be sure to specify "DEF" for the <resolution> parameter or omit the parameter from the command.
- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: **OL** from the front panel or "±9.9E+37" from the remote interface.

- If the TRIGger:SOURce is set to BUS, the MEASure? command overwrites the BUS trigger (sets it to IMMediate), triggers the DMM and returns a measurement.
- For the available measurement functions in dual display mode, refer to the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide.

See also

- CONFigure:SECondary
- FETCh?
- READ?

MEMory Subsystem

Command Summary

- MEMory:STATe:RECall:AUTO
- MEMory:STATe:RECall:AUTO?
- MEMory:STATe:STORe
- MEMory:STATe:STORe?

MEMory:STATe:RECall:AUTO <mode>
MEMory:STATe:RECall:AUTO?

This command disables or enables the automatic recall of the power-down state (state 0) when power is turned on. Select "ON" to automatically recall the power-down state (location 0) when power is turned on. Select "OFF" to issue a Factory Reset (and state 0 is not automatically recalled) when power is turned on.

Parameter	Typical Return
<mode>: ON|1|OFF|0	0 or 1
Enables automatic recall of the power-down state: MEM:STAT:REC:AUTO ON	

Remarks

- With the *SAV command, you can use location 0 to store a fifth instrument state. However, keep in mind that location 0 is automatically overwritten with the power-down state when power is cycled.
- When shipped from the factory, storage locations 1 through 5 are empty and the instrument is configured to NOT automatically recall the power-down state (location 0) when power is restored.
- A Factory Reset (*RST command) does not affect the value of <*mode*>.

See also

- *SAV

MEMory:STATe:STORe <mode>
MEMory:STATe:STORe?

This command disables or enables instrument state storage.

Parameter	Typical Return
<mode>: ON|1|OFF|0	0 or 1
Disables instrument state storage.:MEM:STAT:STOR OFF	

Remarks

- When shipped from the factory, storage locations 1 through 5 are empty and the instrument is configured to NOT automatically recall the power-down state (location 0) when power is restored.
- A Factory Reset (*RST command) does not affect the value of <mode>.
- If the setting is disabled, sending *SAV <value> will result an error in error queue (+531).

READ Subsystem

Command Summary

- READ?

READ?

This command changes the instrument's triggering system from the "idle" state to the "wait-for-trigger" state. Measurements will begin when the specified trigger conditions are satisfied following the receipt of the READ? command. The reading is then sent immediately to volatile memory and the instrument's output buffer.

Parameter	Typical Return
(none)	(none)

The following program segment shows how to use the READ? command to make a DC voltage measurement. The CONFigure command configures the instrument for a DC voltage measurement and sets the trigger source to IMMediate. The READ? command places the instrument in the "wait-for-trigger" state, initiates a trigger, and then sends the reading to the output buffer.

```
CONF:VOLT:DC
READ?
```

Typical Response: +1.26360000E-02

Remarks

- By default, READ? only returns reading for primary function. If secondary function is set to ON, READ? will return readings for both primary and secondary function.
- Sending the READ? command is similar to sending the INITiate command followed immediately by theFETCh? Command.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.

See also

- FETCh?
- INITiate[:IMMediate]

SAMPle Subsystem

Command Summary

- SAMPle:COUNt
- SAMPle:COUNt?
- SAMPle:TIMer
- SAMPle:TIMer?

SAMPle:COUNt <count>|MIN|MAX|DEF
SAMPle:COUNt?

This command selects the number of readings (samples) the meter will take per trigger.

Parameter	Typical Return
<count>: 1 to 5000 samples Default: 100 samples	+<count>
Set the sample count to 4: SAMP:COUN 4	

SAMPle:TIMer <interval>|MIN|MAX
SAMPle:TIMer?

This command sets a sample interval for timed sampling when the sample count is greater than one.

Parameter	Typical Return
<interval>: 10 ms to 3600 s	<Sample interval in seconds>
Set the sample interval to 0.1 seconds. INIT sets the meter to the "wait-for-trigger" state. When a trigger is received from the selected trigger source, the instrument waits the trigger delay time, and then takes readings every 0.10 seconds until the sample count is satisfied. SAMP:SOUR TIM SAMP:TIM 0.1 INIT	

Remarks

- MIN = 10 ms (depend on function and resolution set)
- MAX = ~3600 seconds (100 us steps)

Command Summary

AC Voltage

Primary Measurements

- [SENSe:][PRIMary:]VOLTage:AC:RANGe
- [SENSe:][PRIMary:]VOLTage:AC:RANGe?
- [SENSe:][PRIMary:]VOLTage:AC:RANGe:AUTO
- [SENSe:][PRIMary:]VOLTage:AC:RANGe:AUTO?
- [SENSe:][PRIMary:]VOLTage:AC:RESolution
- [SENSe:][PRIMary:]VOLTage:AC:RESolution?

Secondary Measurements

- [SENSe:]SECondary:VOLTage:AC:RANGe
- [SENSe:]SECondary:VOLTage:AC:RANGe?
- [SENSe:]SECondary:VOLTage:AC:RANGe:AUTO
- [SENSe:]SECondary:VOLTage:AC:RANGe:AUTO?
- [SENSe:]SECondary:VOLTage:AC:RESolution
- [SENSe:]SECondary:VOLTage:AC:RESolution?

DC Voltage

Primary Measurements

- [SENSe:][PRIMary:]VOLTage[:DC]:RANGe
- [SENSe:][PRIMary:]VOLTage[:DC]:RANGe?
- [SENSe:][PRIMary:]VOLTage[:DC]:RANGe:AUTO
- [SENSe:][PRIMary:]VOLTage[:DC]:RANGe:AUTO?
- [SENSe:][PRIMary:]VOLTage[:DC]:RESolution
- [SENSe:][PRIMary:]VOLTage[:DC]:RESolution?

Secondary Measurements

- [SENSe:]SECondary:VOLTage[:DC]:RANGe
- [SENSe:]SECondary:VOLTage[:DC]:RANGe?
- [SENSe:]SECondary:VOLTage[:DC]:RANGe:AUTO
- [SENSe:]SECondary:VOLTage[:DC]:RANGe:AUTO?
- [SENSe:]SECondary:VOLTage[:DC]:RESolution
- [SENSe:]SECondary:VOLTage[:DC]:RESolution?

AC Current

Primary Measurements

- [SENSe:][PRIMary:]CURRent:AC:RANGe
- [SENSe:][PRIMary:]CURRent:AC:RANGe?
- [SENSe:][PRIMary:]CURRent:AC:RANGe:AUTO
- [SENSe:][PRIMary:]CURRent:AC:RANGe:AUTO?
- [SENSe:][PRIMary:]CURRent:AC:RESolution
- [SENSe:][PRIMary:]CURRent:AC:RESolution?

Secondary Measurements

- [SENSe:]SECondary:CURRent:AC:RANGe
- [SENSe:]SECondary:CURRent:AC:RANGe?
- [SENSe:]SECondary:CURRent:AC:RANGe:AUTO
- [SENSe:]SECondary:CURRent:AC:RANGe:AUTO?
- [SENSe:]SECondary:CURRent:AC:RESolution
- [SENSe:]SECondary:CURRent:AC:RESolution?

DC Current

Primary Measurements

- [SENSe:][PRIMary:]CURRent[:DC]:RANGe
- [SENSe:][PRIMary:]CURRent[:DC]:RANGe?
- [SENSe:][PRIMary:]CURRent[:DC]:RANGe:AUTO
- [SENSe:][PRIMary:]CURRent[:DC]:RANGe:AUTO?
- [SENSe:][PRIMary:]CURRent[:DC]:RESolution
- [SENSe:][PRIMary:]CURRent[:DC]:RESolution?

Secondary Measurements

- [SENSe:]SECondary:CURRent[:DC]:RANGe
- [SENSe:]SECondary:CURRent[:DC]:RANGe?
- [SENSe:]SECondary:CURRent[:DC]:RANGe:AUTO
- [SENSe:]SECondary:CURRent[:DC]:RESolution
- [SENSe:]SECondary:CURRent[:DC]:RESolution?
- [SENSe:]SECondary:CURRent[:DC]:RANGe:AUTO?

2-Wire Resistance

Primary Measurements

- [SENSe:][PRIMary:]RESistance:RANGe
- [SENSe:][PRIMary:]RESistance:RANGe?
- [SENSe:][PRIMary:]RESistance:RANGe:AUTO
- [SENSe:][PRIMary:]RESistance:RANGe:AUTO?
- [SENSe:][PRIMary:]RESistance:RESolution
- [SENSe:][PRIMary:]RESistance:RESolution?
- [SENSe:][PRIMary:]RESistance:OCOMpensated
- [SENSe:][PRIMary:]RESistance:OCOMpensated?

4-Wire Resistance

Primary Measurements

- [SENSe:][PRIMary:]FRESistance:RANGe
- [SENSe:][PRIMary:]FRESistance:RANGe?
- [SENSe:][PRIMary:]FRESistance:RANGe:AUTO
- [SENSe:][PRIMary:]FRESistance:RANGe:AUTO?
- [SENSe:][PRIMary:]FRESistance:RESolution
- [SENSe:][PRIMary:]FRESistance:RESolution?
- [SENSe:][PRIMary:]FRESistance:OCOMpensated
- [SENSe:][PRIMary:]FRESistance:OCOMpensated?

Impedance

Primary Measurements

- [SENSe:][PRIMary:]VOLTage[:DC]:IMPedance:AUTO
- [SENSe:][PRIMary:]VOLTage[:DC]:IMPedance:AUTO?

Frequency

Primary Measurements

- [SENSe:][PRIMary:]FREQuency:APERture
- [SENSe:][PRIMary:]FREQuency:APERture?
- [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe
- [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe?
- [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe:AUTO
- [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe:AUTO?
- [SENSe:][PRIMary:]FREQuency:CURRent:RANGe
- [SENSe:][PRIMary:]FREQuency:CURRent:RANGe?
- [SENSe:][PRIMary:]FREQuency:CURRent:RANGe:AUTO
- [SENSe:][PRIMary:]FREQuency:CURRent:RANGe:AUTO?

Secondary Measurements

- [SENSe:]SECondary:FREQuency:APERture
- [SENSe:]SECondary:FREQuency:APERture?
- [SENSe:]SECondary:FREQuency:VOLTage:RANGe
- [SENSe:]SECondary:FREQuency:VOLTage:RANGe?
- [SENSe:]SECondary:FREQuency:VOLTage:RANGe:AUTO
- [SENSe:]SECondary:FREQuency:VOLTage:RANGe:AUTO?
- [SENSe:]SECondary:FREQuency:CURRent:RANGe
- [SENSe:]SECondary:FREQuency:CURRent:RANGe?
- [SENSe:]SECondary:FREQuency:CURRent:RANGe:AUTO
- [SENSe:]SECondary:FREQuency:CURRent:RANGe:AUTO?

Temperature

Primary Measurements

- [SENSe:][PRIMary:]TEMPerature:TRANsducer:THERmistor:TYPE
- [SENSe:][PRIMary:]TEMPerature:TRANsducer:THERmistor:TYPE?

Capacitance

Primary Measurements

- [SENSe:][PRIMary:]CAPacitance:RANGe
- [SENSe:][PRIMary:]CAPacitance:RANGe?
- [SENSe:][PRIMary:]CAPacitance:RANGe:AUTO
- [SENSe:][PRIMary:]CAPacitance:RANGe:AUTO?

Miscellaneous

Primary Measurements

- [SENSe:][PRIMary:]FUNCtion
- [SENSe:][PRIMary:]FUNCtion?

Secondary Measurements

- [SENSe:]SECondary:FUNCtion
- [SENSe:]SECondary:FUNCtion?

[SENSe:][PRIMary:]VOLTage:AC:RANGe <range>|MIN|MAX|DEF
[SENSe:][PRIMary:]VOLTage:AC:RANGe? [MIN|MAX]

This command selects the measurement range for primary AC voltage measurements.

WARNING The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|750 V Default: 10 V	+1.00000000E+01
Selects the 10 volt range: `VOLT:AC:RANG 10`	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.

See also

- CONFigure[:PRIMary][:VOLTage]:AC
- [SENSe:][PRIMary:]VOLTage:AC:RANGe:AUTO

[SENSe:][PRIMary:]VOLTage:AC:RANGe:AUTO <mode>
[SENSe:][PRIMary:]VOLTage:AC:RANGe:AUTO?

This command disables or enables auto ranging for primary AC voltage measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input signal detected.

WARNING The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: `VOLT:AC:RANG:AUTO OFF`	

Remarks

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- With auto ranging enabled, the instrument selects the appropriate range based on the input signal detected.
- Selecting a discrete range (see [SENSe:][PRIMary:]VOLTage:AC:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary][:VOLTage]:AC
- [SENSe:][PRIMary:]VOLTage:AC:RANGe

[SENSe:][PRIMary:]VOLTage:AC:RESolution <resolution>|MIN|MAX|DEF
[SENSe:][PRIMary:]VOLTage:AC:RESolution? [MIN|MAX]

This command selects the measurement resolution for primary AC voltage measurements.

Parameter	Typical Return
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	SLOW, MED or FAST
Sets the measurement resolution to Fast: VOLT:AC:RES FAST	

Remarks

- For the <resolution> parameter, you can substitute MIN or MAX for a numeric value. MIN selects the smallest value accepted, which gives the highest resolution; MAX selects the largest value accepted, which gives the least resolution.
- The instrument sets the resolution to 5½ digits after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary][:VOLTage]:AC

[SENSe:]SECondary:VOLTage:AC:RANGe <range>|MIN|MAX|DEF
[SENSe:]SECondary:VOLTage:AC:RANGe? [MIN|MAX]

This command selects the measurement range for secondary AC voltage measurements.

WARNING The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|750 V Default: 10 V	+1.00000000E+01
Selects the 10 volt range: SEC:VOLT:AC:RANG 10	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.

See also

- CONFigure:SECondary[:VOLTage]:AC
- [SENSe:]SECondary:VOLTage:AC:RANGe:AUTO

[SENSe:]SECondary:VOLTage:AC:RANGe:AUTO <mode>
[SENSe:]SECondary:VOLTage:AC:RANGe:AUTO?

This command disables or enables auto ranging for secondary AC voltage measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input signal detected.

WARNING The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: SEC:VOLT:AC:RANG:AUTO OFF	

Remarks

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- With auto ranging enabled, the instrument selects the appropriate range based on the input signal detected.
- Selecting a discrete range (see [SENSe:]SECondary:VOLTage:AC:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure:SECondary[:VOLTage]:AC
- [SENSe:]SECondary:VOLTage:AC:RANGe

[SENSe:]SECondary:VOLTage:AC:RESolution <resolution>|MIN|MAX|DEF
[SENSe:]SECondary:VOLTage:AC:RESolution?

This command selects the measurement resolution for secondary AC voltage measurements.

Parameter	Typical Return
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	SLOW, MED or FAST
Sets the measurement resolution to Fast: SEC:VOLT:AC:RES FAST	

Remarks

- For the <resolution> parameter, you can substitute MIN or MAX for a numeric value. MIN selects the smallest value accepted, which gives the highest resolution; MAX selects the largest value accepted, which gives the least resolution.
- The instrument sets the resolution to 5½ digits after a Factory Reset (*RST command).

See also:

- CONFigure:SECondary[:VOLTage]:AC

[SENSe:][PRIMary:]VOLTage[:DC]:RANGe <range>|MIN|MAX|DEF
[SENSe:][PRIMary:]VOLTage[:DC]:RANGe? [MIN|MAX]

This command selects the measurement range for primary DC voltage measurements.

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|1000 V Default: 10 V	+1.00000000E+01
Selects the 10 volt range: VOLT:DC:RANG 10	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL (positive overload) or -OL (negative overload) from the front panel or "±9.9E+37" from the remote interface.
- The instrument is set to 1000 V, with auto ranging enabled, after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary][:VOLTage][:DC]
- [SENSe:][PRIMary:]VOLTage[:DC]:RANGe:AUTO

[SENSe:][PRIMary:]VOLTage[:DC]:RANGe:AUTO <mode>
[SENSe:][PRIMary:]VOLTage[:DC]:RANGe:AUTO?

This command disables or enables auto ranging for primary DC voltage measurements. Autoranging is convenient because the instrument automatically selects the range for each measurement based on the input signal detected.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: VOLT:DC:RANG:AUTO OFF	

Remarks

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- With auto ranging enabled, the instrument selects the appropriate range based on the input signal detected.
- Selecting a discrete range (see [SENSe:][PRIMary:]VOLTage[:DC]:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary][:VOLTage][:DC]
- [SENSe:][PRIMary:]VOLTage[:DC]:RANGe

[SENSe:][PRIMary:]VOLTage[:DC]:RESolution <resolution>|MIN|MAX|DEF
[SENSe:][PRIMary:]VOLTage[:DC]:RESolution? [MIN|MAX]

This command selects the measurement resolution for primary DC voltage measurements.

Parameter	Typical Return
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	SLOW, MED or FAST
The following command sets the measurement resolution to Fast: VOLT:DC:RES FAST	

Remarks

- For the <resolution> parameter, you can substitute MIN or MAX for a numeric value. MIN selects the smallest value accepted, which gives the highest resolution; MAX selects the largest value accepted, which gives the

least resolution.

- The instrument sets the resolution to 5½ digits after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary][:VOLTage][:DC]

[SENSe:]SECondary:VOLTage[:DC]:RANGe <range>|MIN|MAX|DEF
[SENSe:]SECondary:VOLTage[:DC]:RANGe? [MIN|MAX]

This command selects the measurement range for secondary DC voltage measurements.

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|1000 V Default: 10 V	+1.00000000E+01
Selects the 10 volt range: SEC:VOLT:DC:RANG 10	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL (positive overload) or -OL (negative overload) from the front panel or "±9.9E+37" from the remote interface.
- The instrument is set to 1000 V, with auto ranging enabled, after a Factory Reset (*RST command).

See also

- CONFigure:SECondary[:VOLTage][:DC]
- [SENSe:]SECondary:VOLTage[:DC]:RANGe:AUTO

[SENSe:]SECondary:VOLTage[:DC]:RANGe:AUTO <mode>
[SENSe:]SECondary:VOLTage [:DC]:RANGe:AUTO?

This command disables or enables auto ranging for secondary DC voltage measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input signal detected.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: SEC:VOLT:DC:RANG:AUTO OFF	

Remarks

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range

- With auto ranging enabled, the instrument selects the appropriate range based on the input signal detected.
- Selecting a discrete range (see [SENSe:]SECondary:VOLTage[:DC]:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure:SECondary[:VOLTage][:DC]
- [SENSe:]SECondary:VOLTage[:DC]:RANGe

[SENSe:]SECondary:VOLTage[:DC]:RESolution <resolution>|MIN|MAX|DEF
[SENSe:]SECondary:VOLTage[:DC]:RESolution? [MIN|MAX]

This command selects the measurement resolution for secondary DC voltage measurements.

Parameter	Typical Return
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	SLOW, MED or FAST
Sets the measurement resolution to FAST: SEC:VOLT:DC:RES FAST	

Remarks

- For the <resolution> parameter, you can substitute MIN or MAX for a numeric value. MIN selects the smallest value accepted, which gives the highest resolution; MAX selects the largest value accepted, which gives the least resolution.
- The instrument sets the resolution to 5½ digits after a Factory Reset (*RST command).

See also

- CONFigure:SECondary[:VOLTage][:DC]

[SENSe:][PRIMary:]CURRent:AC:RANGe <range>|MIN|MAX|DEF
[SENSe:][PRIMary:]CURRent:AC:RANGe? [MIN|MAX]

This command selects the measurement range for primary AC current measurements.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: 100 mA	+1.00000000E-01
Selects the 100 mA range: CURR:AC:RANG 0.1	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives

an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.

- The instrument selects auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:CURRent:AC
- [SENSe:][PRIMary:]CURRent:AC:RANGe:AUTO

[SENSe:][PRIMary:]CURRent:AC:RANGe:AUTO <mode>
[SENSe:][PRIMary:]CURRent:AC:RANGe:AUTO?

This command disables or enables auto ranging for primary AC current measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input signal detected.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: CURR:AC:RANG:AUTO OFF	

Remarks

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- With auto ranging enabled, the instrument selects the appropriate range based on the input signal detected.
- Selecting a discrete range (see [SENSe:][PRIMary:]CURRent:AC:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:CURRent:AC
- [SENSe:][PRIMary:]CURRent:AC:RANGe

[SENSe:][PRIMary:]CURRent:AC:RESolution <resolution>|MIN|MAX|DEF
[SENSe:][PRIMary:]CURRent:AC:RESolution? [MIN|MAX]

This command selects the measurement resolution for primary AC current measurements.

Parameter	Typical Return
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	SLOW, MED or FAST
Sets the measurement resolution to FAST: CURR:AC:RES FAST	

Remarks

- For the <resolution> parameter, you can substitute MIN or MAX for a numeric value. MIN selects the smallest value accepted, which gives the highest resolution; MAX selects the largest value accepted, which gives the least resolution.
- The instrument sets the resolution to 5½ digits after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:CURRent[:DC]

[SENSe:]SECondary:CURRent:AC:RANGe <range>|MIN|MAX|DEF
[SENSe:]SECondary:CURRent:AC:RANGe? [MIN|MAX]

This command selects the measurement range for secondary AC current measurements.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: 100 mA	+1.00000000E-01
Selects the 100 mA range: SEC:CURR:AC:RANG 0.1	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.
- The instrument selects auto ranging after a Factory Reset (*RST command).

See also

- CONFigure:SECondary:CURRent:AC
- [SENSe:]SECondary:CURRent:AC:RANGe:AUTO

[SENSe:]SECondary:CURRent:AC:RANGe:AUTO <mode>
[SENSe:]SECondary:CURRent:AC:RANGe:AUTO?

This command disables or enables auto ranging for secondary AC current measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input signal detected.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: SEC:CURR:AC:RANG:AUTO OFF	

Remarks

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- With auto ranging enabled, the instrument selects the appropriate range based on the input signal detected.
- Selecting a discrete range (see [SENSe:]SECondary:CURRent:AC:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure:SECondary:CURRent:AC
- [SENSe:]SECondary:CURRent:AC:RANGe

[SENSe:]SECondary:CURRent:AC:RESolution <resolution>|MIN|MAX|DEF
[SENSe:]SECondary:CURRent:AC:RESolution? [MIN|MAX]

This command selects the measurement resolution for secondary AC current measurements.

Parameter	Typical Return
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	SLOW, MED or FAST
Sets the measurement resolution toFAST: SEC:CURR:AC:RES FAST	

Remarks

- For the <resolution> parameter, you can substitute MIN or MAX for a numeric value. MIN selects the smallest value accepted, which gives the highest resolution; MAX selects the largest value accepted, which gives the least resolution.
- The instrument sets the resolution to 5½ digits after a Factory Reset (*RST command).

See also

- CONFigure:SECondary:CURRent:AC

[SENSe:][PRIMary:]CURRent[:DC]:RANGe <range>|MIN|MAX|DEF
[SENSe:][PRIMary:]CURRent[:DC]:RANGe? [MIN|MAX]

This command selects the measurement range for primary DC current measurements.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: 100 mA	+1.00000000E-01
Selects the 100 mA range: CURR:DC:RANG 0.1	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL (positive overload) or -OL (negative overload) from the front panel or "±9.9E+37" from the remote interface.
- The instrument selects auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:CURRent[:DC]
- [SENSe:][PRIMary:]CURRent[:DC]:RANGe:AUTO

[SENSe:][PRIMary:]CURRent[:DC]:RANGe:AUTO <mode>
[SENSe:][PRIMary:]CURRent[:DC]:RANGe:AUTO?

This command disables or enables auto ranging for primary DC current measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input signal detected.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables autoranging: CURR:DC:RANG:AUTO OFF	

Remarks

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- With auto ranging enabled, the instrument selects the appropriate range based on the input signal detected.
- Selecting a discrete range (see [SENSe:][PRIMary:]CURRent[:DC]:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:CURRent[:DC]
- [SENSe:][PRIMary:]CURRent[:DC]:RANGe

[SENSe:][PRIMary:]CURRent[:DC]:RESolution <resolution>|MIN|MAX|DEF
[SENSe:][PRIMary:]CURRent[:DC]:RESolution? [MIN|MAX]

This command selects the measurement resolution for primary DC current measurements. Specify the resolution in the same units as the selected measurement function, not in number of digits.

Parameter	Typical Return
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	SLOW, MED or FAST
Sets the measurement resolution to FAST: `CURR:DC:RES FAST`	

Remarks

- For the <resolution> parameter, you can substitute MIN or MAX for a numeric value. MIN selects the smallest value accepted, which gives the highest resolution; MAX selects the largest value accepted, which gives the least resolution.
- The instrument sets the resolution to 5½ digits after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:CURRent[:DC]

[SENSe:]SECondary:CURRent[:DC]:RANGe <range>|MIN|MAX|DEF
[SENSe:]SECondary:CURRent[:DC]:RANGe? [MIN|MAX]

This command selects the measurement range for secondary DC current measurements.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: 100 mA	+1.00000000E-01
Selects the 100 mA range: `SEC:CURR:DC:RANG 0.1`	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: OL (positive overload) or -OL (negative overload) from the front panel or "±9.9E+37" from the remote interface.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure:SECondary:CURRent[:DC]
- [SENSe:]SECondary:CURRent[:DC]:RANGe:AUTO

[SENSe:]SECondary:CURRent[:DC]:RANGe:AUTO <mode>
[SENSe:]SECondary:CURRent[:DC]:RANGe:AUTO?

This command disables or enables auto ranging for secondary DC current measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input signal detected.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables autoranging: SEC:CURR:DC:RANG:AUTO OFF	

Remarks

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- With auto ranging enabled, the instrument selects the appropriate range based on the input signal detected.
- Selecting a discrete range (see [SENSe:]SECondary:CURRent[:DC]:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure:SECondary:CURRent[:DC]
- [SENSe:]SECondary:CURRent[:DC]:RANGe

[SENSe:]SECondary:CURRent[:DC]:RESolution <resolution>|MIN|MAX|DEF
[SENSe:]SECondary:CURRent[:DC]:RESolution? [MIN|MAX]

This command selects the measurement resolution for secondary DC current measurements. Specify the resolution in the same units as the selected measurement function, not in number of digits.

Parameter	Typical Return
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	SLOW, MED or FAST
Sets the measurement resolution to FAST: SEC:CURR:DC:RES FAST	

Remarks

- For the <resolution> parameter, you can substitute MIN or MAX for a numeric value. MIN selects the smallest value accepted, which gives the highest resolution; MAX selects the largest value accepted, which gives the least resolution.
- The instrument sets the resolution to 5½ digits after a Factory Reset (*RST command).

See also

- CONFigure:SECondary:CURRent[:DC]

[SENSe:][PRIMary:]RESistance:RANGe <range>|MIN|MAX|DEF
[SENSe:][PRIMary:]RESistance:RANGe? [MIN|MAX]

This command selects the measurement range for 2-wire resistance measurements.

Parameter	Typical Return
<range>: 100 Ω|1 kΩ|10 kΩ|100 kΩ|1 MΩ|10 MΩ|100 MΩ Default: 1 kΩ	+1.00000000E+03
Selects the 10 kΩ range: RES:RANG 10E+3	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:RESistance
- [SENSe:][PRIMary:]RESistance:RANGe:AUTO

[SENSe:][PRIMary:]RESistance:RANGe:AUTO <mode>
[SENSe:][PRIMary:]RESistance:RANGe:AUTO?

This command disables or enables auto ranging for 2-wire resistance measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input signal detected.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: RES:RANG:AUTO OFF	

Remarks

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- With auto ranging enabled, the instrument selects the appropriate range based on the input signal detected.
- Selecting a discrete range will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:RESistance
- [SENSe:][PRIMary:]RESistance:RANGe

[SENSe:][PRIMary:]RESistance:RESolution <resolution>|MIN|MAX|DEF
[SENSe:][PRIMary:]RESistance:RESolution? [MIN|MAX]

This command selects the measurement resolution for 2-wire resistance measurements.

Parameter	Typical Return
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	SLOW, MED or FAST
Sets the measurement resolution to FAST: RES:RES FAST	

Remarks

- For the <resolution> parameter, you can substitute MIN or MAX for a numeric value. MIN selects the smallest value accepted, which gives the highest resolution; MAX selects the largest value accepted, which gives the least resolution.
- The instrument sets the resolution to 5½ digits after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:RESistance

[SENSe:][PRIMary:]RESistance:OCOMpensated <mode>
[SENSe:][PRIMary:]RESistance:OCOMpensated?

This command enables or disables offset compensation for resistance measurements. Offset compensation removes the effects of small dc voltages in circuit being measured. This technique involves taking the difference between two resistance measurements, with the current source set to normal value and a lower value respectively.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: OFF	0 (OFF) or 1 (ON)
Enables offset compensation: RES:OCOM ON	

Remarks

- This command affects both the 2-wire and 4-wire resistance measurements. All FRESistance and RESistance commands affect the equivalent settings for all resistance measurements.
- Applies only to resistance measurements on the 100 Ω, 1 kΩ, and 10 kΩ ranges.
- The instrument disables offset compensation after a Factory Reset (*RST command) or an Instruments Preset (SYSTem:PRESet command).

[SENSe:][PRIMary:]FRESistance:RANGe <range>|MIN|MAX|DEF
[SENSe:][PRIMary:]FRESistance:RANGe?

This command selects the measurement range for 4-wire resistance measurements.

Parameter	Typical Return
<range>: 100 Ω|1 kΩ|10 kΩ|100 kΩ|1 MΩ|10 MΩ|100 MΩ Default: 1 kΩ	+1.00000000E+03
Selects the 10 kΩ range: FRES:RANG 10E+3	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL"from the front panel or "±9.9E+37" from the remote interface.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:FRESistance
- [SENSe:][PRIMary:]FRESistance:RANGe:AUTO

[SENSe:][PRIMary:]FRESistance:RANGe:AUTO <mode>
[SENSe:][PRIMary:]FRESistance:RANGe:AUTO?

This command disables or enables auto ranging for 4-wire resistance measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input signal detected.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: FRES:RANG:AUTO OFF	

Remarks

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range

- With auto ranging enabled, the instrument selects the appropriate range based on the input signal detected.
- Selecting a discrete range will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:FRESistance
- [SENSe:][PRIMary:]FRESistance:RANGe

[SENSe:][PRIMary:]FRESistance:RESolution <resolution>|MIN|MAX|DEF
[SENSe:][PRIMary:]FRESistance:RESolution?

This command selects the measurement resolution for 4-wire resistance measurements.

Parameter	Typical Return
<resolution>: SLOW|MEDium|FAST Default: SLOW (5½ digits)	SLOW, MED or FAST
Sets the measurement resolution to FAST: FRES:RES FAST	

Remarks

- For the <resolution> parameter, you can substitute MIN or MAX for a numeric value. MIN selects the smallest value accepted, which gives the highest resolution; MAX selects the largest value accepted, which gives the least resolution.
- The instrument sets the resolution to 5½ digits after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:FRESistance

[SENSe:][PRIMary:]FRESistance:OCOMpensated <mode>
[SENSe:][PRIMary:]FRESistance:OCOMpensated?

This command enables or disables offset compensation for resistance measurements. Offset compensation removes the effects of small dc voltages in circuit being measured. This technique involves taking the difference between two resistance measurements, with the current source set to normal value and a lower value respectively.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: OFF	0 (OFF) or 1 (ON)
Enables offset compensation: FRES:OCOM ON	

Remarks

- This command affects both the 2-wire and 4-wire resistance measurements. All FRESistance and RESistance commands affect the equivalent settings for all resistance measurements.

- Applies only to resistance measurements on the 100 Ω, 1 kΩ, and 10 kΩ ranges.
- The instrument disables offset compensation after a Factory Reset (*RST command) or an Instruments Preset (SYSTem:PRESet command).

[SENSe:][PRIMary:]VOLTage[:DC]:IMPedance:AUTO <mode>
[SENSe:][PRIMary:]VOLTage[:DC]:IMPedance:AUTO?

This command disables or enables the automatic input impedance mode for dc voltage measurements. Normally, the instrument's input resistance is fixed at 10 MΩ for all dc voltage measurements to minimize noise pickup. In the automatic input impedance mode ("AUTO ON"), the input impedance is automatically varied according to range. For the 100 mV and 1 V ranges, the input impedance is automatically set to "HI-Z" (>10 GΩ) to reduce the effects of measurement loading errors on these lower ranges. For the 10 V, 100 V and 1000 V ranges, the input impedance remains at 10 MΩ.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables the automatic input impedance mode: VOLT:IMP:AUTO OFF	

Remarks

- This command affects dc voltage measurements only.
- Normally, the instrument's input resistance is fixed at 10 MΩ for all dc voltage measurements to minimize noise pickup.
- In the default mode ("AUTO OFF"), the input impedance for dc voltage measurements is fixed at 10 MΩ for all ranges. — In the automatic input impedance mode ("AUTO ON"), the input impedance for dc voltage measurements is automatically selected according to range. The impedance is set to "HI-Z" (>10 GΩ) for the 100 mV and 1 V ranges. The 10 V, 100 V and 1000 V ranges remain at a 10 MΩ input impedance.
- This setting is reset to the default (fixed, 10 MΩ) by the *RST and SYSTem:PRESet commands.

[SENSe:][PRIMary:]FREQuency:APERture <seconds>|MIN|MAX|DEF
[SENSe:][PRIMary:]FREQuency:APERture? [MIN|MAX]

This command selects the aperture time (also called gate time) for frequency measurements.

Parameter	Typical Return
<seconds>: 100 ms|1 s Default: 1 s	+1.00000000E-01
Sets the aperture to 100 ms: FREQ:APER 0.1	

Remarks

- This command sets the aperture for frequency measurements.
- The instrument sets the aperture time to one second after a Factory Reset (*RST command) or an Instrument Preset (SYSTem:PRESet command).

See also

- CONFigure[:PRIMary]:FREQuency

[SENSe:][PRIMary:]FREQuency:VOLTage:RANGe <range>|MIN|MAX|DEF
[SENSe:][PRIMary:]FREQuency:VOLTage:RANGe? [MIN|MAX]

This command selects the voltage range for primary frequency measurements.

WARNING The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|750 V Default: 10 V	+1.00000000E+01
Selects the 10 volt range for frequency measurements: FREQ:VOLT:RANG 10	

Remarks

- Selecting a discrete range will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:FREQuency
- [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe:AUTO

[SENSe:][PRIMary:]FREQuency:VOLTage:RANGe:AUTO <mode>
[SENSe:][PRIMary:]FREQuency:VOLTage:RANGe:AUTO?

This command disables or enables voltage auto ranging for primary frequency measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input AC voltage detected.

WARNING The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: FREQ:VOLT:RANG:AUTO OFF	

Remarks

- Autorange thresholds:
  Down range at: <10% of range (AC voltage)
  Up range at: >120% of range (AC voltage)
- With auto ranging enabled, the instrument selects the appropriate voltage range based on the input signal detected.
- Selecting a discrete range (see [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:FREQuency
- [SENSe:][PRIMary:]FREQuency:VOLTage:RANGe

[SENSe:][PRIMary:]FREQuency:CURRent:RANGe <range>|MIN|MAX|DEF
[SENSe:][PRIMary:]FREQuency:CURRent:RANGe? [MIN|MAX]

This command selects the current range for frequency on AC current measurements.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: 100 mA	+1.00000000E-01
Selects the 10 mA current range for frequency measurements: FREQ:CURR:RANG 10e-3	

Remarks

- Selecting a discrete range will disable the autoranging.
- The instrument enables autoranging after a Factory Reset (*RST command) or an Instrument Preset (SYSTem:PRESet command).

See also

- CONFigure[:PRIMary]:FREQuency

[SENSe:][PRIMary:]FREQuency:CURRent:RANGe:AUTO <mode>
[SENSe:][PRIMary:]FREQuency:CURRent:RANGe:AUTO?

This command disables or enables current auto ranging for primary frequency measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input AC current detected.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging; FREQ:CURR:RANG:AUTO OFF	

Remarks

- Selecting a discrete range (see [SENSe:][PRIMary:]FREQuency:CURRent:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).
- With auto ranging enabled, the instrument selects the appropriate voltage range based on the input signal detected.
- Autorange thresholds:
  - Lower range at: <10% of range (AC current)
  - Upper range at: >120% of range (AC current)

See also

- CONFigure[:PRIMary]:FREQuency

[SENSe:]SECondary:FREQuency:APERture <seconds>|MIN|MAX|DEF
[SENSe:]SECondary:FREQuency:APERture? [MIN|MAX]

This command selects the aperture time (also called gate time) for secondary frequency measurements.

Parameter	Typical Return
<seconds>: 100 ms|1 s Default: 1 s	+1.00000000E-01
Sets the aperture to 100 ms: SEC:FREQ:APER 0.1	

Remarks

- This command sets the aperture for frequency measurements.
- The instrument sets the aperture time to one second after a Factory Reset (*RST command) or an Instrument Preset (SYSTem:PRESet command).

[SENSe:]SECondary:FREQuency:VOLTage:RANGe <range>|MIN|MAX|DEF
[SENSe:]SECondary:FREQuency:VOLTage:RANGe? [MIN|MAX]

This command selects the voltage range for secondary frequency measurements.

WARNING The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.

Parameter	Typical Return
<range>: 100 mV|1 V|10 V|100 V|750 V Default: 10 V	+1.00000000E+01
Selects the 10 volt range for frequency measurements: SEC:FREQ:VOLT:RANG 10	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "VAC Overload" from the front panel or "±9.9E+37" from the remote interface.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure:SECondary:FREQuency
- [SENSe:]SECondary:FREQuency:VOLTage:RANGe:AUTO

[SENSe:]SECondary:FREQuency:VOLTage:RANGe:AUTO <mode>
[SENSe:]SECondary:FREQuency:VOLTage:RANGe:AUTO?

This command disables or enables voltage auto ranging for secondary frequency measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input AC voltage detected.

WARNING The SAFETY LIMIT on the front HI/LO input terminals is 750 VAC (rms) for a sinusoidal waveform or 1000 V (peak) for any other waveform. Connections to AC MAINS are further limited to CAT II (300V). See the "Safety Information" section in the Keysight EDU34450A 5½ Digit Digital Multimeter User's Guide for a complete discussion of the safety features, and the safe operation of this instrument.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: SEC:FREQ:VOLT:RANG:AUTO OFF	

Remarks

- Autorange thresholds:
  Down range at: <10% of range (AC voltage)
  Up range at: >120% of range (AC voltage)
- With auto ranging enabled, the instrument selects the appropriate voltage range based on the input signal detected.
- Selecting a discrete range (see [SENSe:]SECondary:FREQuency:VOLTage:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure:SECondary:FREQuency
- [SENSe:]SECondary:FREQuency:VOLTage:RANGe

[SENSe:]SECondary:FREQuency:CURRent:RANGe <range>|MIN|MAX|DEF
[SENSe:]SECondary:FREQuency:CURRent:RANGe? [MIN|MAX]

This command selects the current range for frequency on AC current measurements.

Parameter	Typical Return
<range>: 10 mA|100 mA|1 A|3 A Default: 100 mA	+1.00000000E-01
Selects the 10 mA current range for frequency measurements: SEC:FREQ:CURR:RANG 10e-3	

Remarks

- Selecting a discrete range will disable the autoranging.
- The instrument enables autoranging after a Factory Reset (*RST command) or an Instrument Preset (SYSTem:PRESet command).

See also

- CONFigure[:SECondary]:FREQuency

[SENSe:]SECondary:FREQuency:CURRent:RANGe:AUTO <mode>
[SENSe:]SECondary:FREQuency:CURRent:RANGe:AUTO?

This command selects the current range for frequency on AC current measurements.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: SEC:FREQ:CURR:RANG:AUTO OFF	

Remarks

- Selecting a discrete range (see [SENSe:][PRIMary:]FREQuency:CURRent:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).
- With auto ranging enabled, the instrument selects the appropriate current range based on the input signal detected.
- Autorange thresholds:
  Lower range at: <10% of range (AC current)
  Upper range at: >120% of range (AC current)

See also

- CONFigure[:SECondary]:FREQuency

[SENSe:][PRIMary:]TEMPerature:TRANsducer:THERmistor:TYPE <type>
[SENSe:][PRIMary:]TEMPerature:TRANsducer:THERmistor:TYPE?

This command selects the thermistor type for 2-wire temperature measurements.

Parameter	Typical Return
<type>: 5000 Default: 5000	+5000
Selects a 5 kΩ thermistor: TEMP:TRAN:THER:TYPE 5000	

Remarks

- The instrument supports standard 5 kΩ thermistors.
- The instrument sets the thermistor type to "5000" after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:TEMPerature

[SENSe:][PRIMary:]CAPacitance:RANGe <range>|MIN|MAX|DEF
[SENSe:][PRIMary:]CAPacitance:RANGe? [MIN|MAX]

This command selects the measurement range for capacitance measurements.

Parameter	Typical Return
<range>: 1 nF|10 nF|100 nF|1 µF|10 µF|100 µF|1 mF|10 mF Default: 1 µF	+1.00000000E-02
Selects the 1 nF range: CAP:RANG 1 nF or CAP:RANG 0.000000001 or CAP:RANG 1.0E-9	

Remarks

- Selecting a discrete range will disable auto ranging.
- If the input signal is greater than can be measured on the selected range (manual ranging), the instrument gives an overload indication: "OL" from the front panel or "±9.9E+37" from the remote interface.
- The instrument selects auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:CAPacitance
- [SENSe:][PRIMary:]CAPacitance:RANGe:AUTO

[SENSe:][PRIMary:]CAPacitance:RANGe:AUTO <mode>
[SENSe:][PRIMary:]CAPacitance:RANGe:AUTO?

This command disables or enables auto ranging for capacitance measurements. Auto ranging is convenient because the instrument automatically selects the range for each measurement based on the input signal detected.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables auto ranging: CAP:RANG:AUTO OFF	

Remarks

- Auto range thresholds:
  Down range at: <10% of range
  Up range at: >120% of range
- With auto ranging enabled, the instrument selects the appropriate range based on the input signal detected.
- Selecting a discrete range (see [SENSe:][PRIMary:]CAPacitance:RANGe command) will disable auto ranging.
- The instrument enables auto ranging after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]:CAPacitance
- [SENSe:][PRIMary:]CAPacitance:RANGe

[SENSe:][PRIMary:]FUNCtion "<function>"
[SENSe:][PRIMary:]FUNCtion?

This command selects the primary measurement function (all function-related measurement attributes are retained).

The query command returns an ASCII string enclosed in double quotes. The short form of the function name is always returned (e.g., "CURR:AC", "FREQ", "TEMP").

Parameter	Typical Return
<function>: CAPacitance|CONTinuity|CURRent:AC|CURRent [:DC]|DIODe|FREQuency|RESistance |FRESistance |TEMPerature|VOLTage:AC|VOLTage[:DC]	"<ASCII string>"
Select the AC voltage function (double or single quotes are allowed): FUNC "VOLT:AC" or FUNC 'VOLT:AC'	

Remarks

- If you change the measurement function, all measurement attributes of the previous function (range, resolution, etc.) are remembered. If you return to the original function, all previously-defined measurement attributes will be restored.
- This command has no default value. However, the instrument defaults to DC volts after a Factory Reset (*RST command).

See also

- CONFigure[:PRIMary]?

[SENSe:]SECondary:FUNCtion "<function>"
[SENSe:]SECondary:FUNCtion?

This command selects the secondary measurement function (all function-related measurement attributes are retained).

The query command returns an ASCII string enclosed in double quotes. The short form of the function name is always returned (e.g., "CURR:AC", "FREQ", "TEMP").

Parameter	Typical Return
<function>: CURRent:AC | CURRent[:DC] | FREQuency | | VOLTage:AC | VOLTage[:DC]	"<ASCII string>"
Select the AC voltage function (double or single quotes are allowed): SEC:FUNC "VOLT:AC" or SEC:FUNC 'VOLT:AC'	

Remarks

- If you change the measurement function, all measurement attributes of the previous function (range, resolution, etc.) are remembered. If you return to the original function, all previously-defined measurement attributes will be restored.
- This command has no default value. However, the instrument defaults to DC volts after a Factory Reset (*RST command).

See also

- CONFigure:SECondary?

STATus Subsystem

Command Summary

- STATus:OPERation:CONDition?
- STATus:OPERation:ENABle
- STATus:OPERation:ENABle?
- STATus:OPERation[:EVENt]?
- STATus:PRESet
- STATus:QUEStionable:CONDition?
- STATus:QUEStionable:ENABle
- STATus:QUEStionable:ENABle?
- STATus:QUEStionable[:EVENt]?

STATus:OPERation:CONDition?

This command queries the condition register for the Standard Operation Register group. This is a read only register and the bits are not cleared when you read the register.

Parameter	Typical Return
(none)	+32
Reads the condition register (bit 5 is set): STAT:OPER:COND?	

Remarks

- The condition register bits reflect the current condition. If a condition goes away, the corresponding bit is cleared in the condition register.

See also

- STATus:OPERation:ENABle
- STATus:OPERation[:EVENt]?

STATus:OPERation:ENABle <enable_value>
STATus:OPERation:ENABle?

This command enables bits in the enable register for the Standard Operation Register group. The selected bits are then reported to the Status Byte.

NOTE For more information on the SCPI Status System for the EDU34450A 5½ Digit Digital Multimeter, see the Status System Diagram.

Parameter	Typical Return
<enable value>: A decimal value which corresponds to the binary-weighted sum of the bits in the register.	+32
Enables bit 5 (decimal value = 32) in the enable register: STAT:OPER:ENAB 32	

Remarks

- Use the <enable_value> parameter to specify which bits will be reported to the Status Byte. The decimal value specified corresponds to the binary-weighted sum of the bits you wish to enable in the register. For example, to enable bit 5 (decimal value = 32) and bit 8 (decimal value = 256), the corresponding decimal value would be 288 (32 + 256).
- The *CLS (clear status) command will not clear the enable register but it does clear all bits in the event register.
- The STATus:PRESet command will clear all bits in the enable register.
- The *RST command has no effect on this register.
- The *PSC command affects whether this register is cleared at power on.

See also

- STATus:OPERation:CONDition?
- STATus:OPERation[:EVENt]?
- STATus:PRESet

STATus:OPERation[:EVENt]?

This command queries the event register for the Standard Operation Register group. This is a read-only register and the bits are cleared when you read the register.

Parameter	Typical Return
(none)	+256
Reads the event register (bit 8 is set): STAT:OPER?	

Remarks

- Once a bit is set, it remains set until cleared by reading the event register or the *CLS (clear status) command.
- The *RST and *PSC commands have no effect on this register.

See also

- STATus:OPERation:ENABle

STATus:PRESet

This command clears all bits in the Questionable Data enable register and the Standard Operation enable register.

Parameter	Typical Return
(none)	(none)
Clears the enable register bits: STAT:PRES	

Remarks

- See STATus Subsystem Introduction for an overview of the status system.

STATus:QUEStionable:CONDition?

This query queries the condition register for the Questionable Data Register group. This is a readonly register and the bits are not cleared when you read the register.

Parameter	Typical Return
(none)	+4096
Reads the condition register (bit 12 is set): STAT:QUES:COND?	

Remarks

- The condition register bits reflect the current condition. If a condition goes away, the corresponding bit is cleared in the condition register.
- A Factory Reset (*RST command) will clear all bits in the condition register.

See also

- STATus:OPERation:ENABle
- STATus:OPERation[:EVENt]?

STATus:QUEStionable:ENABle <enable_value>
STATus:QUEStionable:ENABle?

This command enables bits in the enable register for the Questionable Data Register group. The selected bits are then reported to the Status Byte.

NOTE For more information on the SCPI Status System for the EDU34450A 5½ Digit Digital Multimeter, see the Status System Diagram.

Parameter	Typical Return
<enable value>: A decimal value which corresponds to the binary-weighted sum of the bits in the register.	+512
Enables bit 9 (decimal value = 512) in the enable register: STAT:QUES:ENAB 512	

Remarks

- Use the <enable_value> parameter to specify which bits will be reported to the Status Byte. The decimal value specified corresponds to the binary-weighted sum of the bits you wish to enable in the register. For example, to enable bit 0 (decimal value = 1), bit 1 (decimal value = 2), and bit 12 (decimal value = 4096), the corresponding decimal value would be 4099 (1 + 2 + 4096).
- The *CLS (clear status) command will not clear the enable register but it does clear all bits in the event register.
- The STATus:PRESet command will clear all bits in the enable register.
- The *RST command has no effect on this register.
- The *PSC command affects whether this register is cleared at power on.

See also

- STATus:QUEStionable:CONDition?
- STATus:QUEStionable[:EVENt]?
- STATus:PRESet

STATus:QUEStionable[:EVENt]?

This query queries the event register for the Questionable Data Register group. This is a read-only register and the bits are cleared when you read the register.

Parameter	Typical Return
(none)	+1024
Reads the event register (bit 10 is set): STAT:QUES?	

Remarks

- Once a bit is set, it remains set until cleared by reading the event register or the *CLS (clear status) command.
- The *RST, STATus:PRESet, and *PSC commands have no effect on this register.

See also

- STATus:QUEStionable:CONDition?
- STATus:QUEStionable:ENABle?

Command Summary

- SYStem:BEEPer:STATe
- SYStem:BEEPer:STATe?
- SYSTem:BEEPer[:IMMediate]
- SYSTem:COMMunicate:LAN:CONTrol?
- SYSTem:COMMunicate:LAN:DHCP
- SYSTem:COMMunicate:LAN:DHCP?
- SYSTem:COMMunicate:LAN:DNS[1|2]
- SYSTem:COMMunicate:LAN:DNS[1|2]?
- SYSTem:COMMunicate:LAN:DOMain?
- SYSTem:COMMunicate:LAN:GATEway
- SYSTem:COMMunicate:LAN:GATEway?
- SYSTem:COMMunicate:LAN:HOSTname
- SYSTem:COMMunicate:LAN:HOSTname?
- SYSTem:COMMunicate:LAN:IPADdress
- SYSTem:COMMunicate:LAN:IPADdress?
- SYSTem:COMMunicate:LAN:MAC?
- SYSTem:COMMunicate:LAN:SMASk
- SYSTem:COMMunicate:LAN:SMASk?
- SYSTem:COMMunicate:LAN:TELNet:PROMpt
- SYSTem:COMMunicate:LAN:TELNet:PROMpt?
- SYSTem:COMMunicate:LAN:TELNet:WMESsage
- SYSTem:COMMunicate:LAN:TELNet:WMESsage?
- SYSTem:COMMunicate:LAN:UPDate
- SYSTem:COMMunicate:TCPip:CONTrol?
- SYSTem:DATE
- SYSTem:DATE?
- SYSTem:ERRor?
- SYSTem:LFRequency
- SYSTem:LOCal

- SYSTem:PRESet
- SYSTem:SET
- SYSTem:SET?
- SYSTem:TIME
- SYSTem:TIME?
- SYSTem:VERSion?

SYSTem:BEEPer:STATe <mode>
SYSTem:BEEPer:STATe?

This command disables or enables the beeper tone. The factory default is ON.

Parameter	Typical Return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables the beeper state: SYST:BEEP:STAT OFF	

Remarks

- Turning off the beeper does not disable the key click generated when you press a front-panel key.
- A beep tone is always emitted (even with the beep state turned OFF) in the following cases:
  - The continuity threshold is exceeded.
  - A SYST:BEEP command is sent.
- A beep tone is emitted only if the beep state is ON in the following cases:
  - An error is generated.
  - A set LO or HI limit is exceeded in a limit test.
  - A stable reading is captures in the reading hold mode.
  - A forward-biased diode is measured in the diode test function.
- The beeper setting is stored in non-volatile memory, and does not change when power has been off or after a Factory Reset (*RST command).

See also

- SYSTem:BEEPer[:IMMediate]

SYSTem:BEEPer[:IMMediate]

This command issues a single beep immediately from the instrument. This may be useful for program development and troubleshooting.

Parameter	Typical Return
(none)	(none)
Issues a single beep from the instrument: SYST:BEEP	

Remarks

- This command overrides the current beeper state (see SYSTem:BEEPer:STATe command). This means that you can issue a single beep even if the beeper is turned off.

See also

- SYSTem:BEEPer:STATe

SYSTem:COMMunicate:LAN:CONTrol?

This query reads and returns the control connection port number for Socket communications. Connection is used to send and receive commands and queries. If 0 is returned, the interface does not support a Socket Control connection.

Parameter	Typical return
(none)	+5000 (if the interface does not support sockets)
Returns the control connection port number: SYST:COMM:LAN:CONT?	

Remarks

- This query is only used when programming over Sockets.
- You can use the Socket Control connection to send a Device Clear to the instrument or to detect pending Service Request (SRQ) events.

SYSTem:COMMunicate:LAN:DHCP <mode>
SYSTem:COMMunicate:LAN:DHCP?

This command enables (On) or disables (Off) the use of the Dynamic Host Configuration Protocol (DHCP) for the instrument.

ON: The instrument will try to obtain an IP address from a DHCP server. If a DHCP server is found, it will assign a dynamic IP address, Subnet Mask, and Default Gateway to the instrument. If a DHCP server is not found, the instrument uses AutoIP to automatically configure its IP setting in the Automatic Private IP Addressing range (169.254.xxx.xxx).

OFF: The instrument will use the static IP address, Subnet Mask, and Default Gateway during power-on.

NOTE **If you change this setting, you must execute a SYSTem:COMMunicate:LAN:UPDate command to activate the setting.**

Parameter	Typical return
<mode>: ON|1|OFF|0 Default: ON	0 (OFF) or 1 (ON)
Disables DHCP: SYST:COMM:LAN:DHCP OFF SYST:COMM:LAN:UPD	

Remarks

- Most site LANs have a DHCP server.
- If a DHCP LAN address is not assigned by a DHCP server, then an AutoIP address static IP will be assumed after approximately two minutes.
- The DHCP setting is stored in non-volatile memory, and does not change when power has been off, after a Factory Reset (*RST) or after an Instrument Preset (SYSTem:PRESet).

SYSTem:COMMunicate:LAN:DNS[1|2] "<*address*>"
SYSTem:COMMunicate:LAN:DNS[1|2]? [CURRent | STATic]

This command assigns static IP addresses of Domain Name System (DNS) servers. A primary and a secondary server address () may be assigned. If DHCP is available and enabled, DHCP will auto-assign these server addresses. These auto-assigned server addresses take precedence over the static addresses assigned with this command. Contact your LAN administrator for details.

NOTE **If you change this setting, you must execute a SYSTem:COMMunicate:LAN:UPDate command to activate the setting.**

Parameter	Typical return
<*address*>: Four-byte dot notation ("nnn.nnn.nnn.nnn"), where "nnn" in each case is a byte value in the range of 0 through 255. [CURRent | STATic Default: CURRent	"198.105.232.4"
Set a static primary DNS address: SYST:COMM:LAN:DNS "198.105.232.4" SYST:COMM:LAN:UPD	

Remarks

- CURRent - Returns address currently being used by the instrument.
- STATic - Returns address from non-volatile memory. This address is used if DHCP is disabled or unavailable.
- The assigned DNS address is used for the DNS server if DHCP is disabled. Otherwise, the DNS server address is auto-assigned by DHCP.
- The setting is non-volatile, and does not change when power has been off, after a Factory Reset (*RST command) or after an Instrument Preset (SYSTem:PRESet command).

SYSTem:COMMunicate:LAN:DOMain?

This query reads the current network domain name and returns an ASCII string enclosed in double quotes.

Parameter	Typical return
(none)	"example.com"
Returns the domain name being used by the instrument: SYST:COMM:LAM:DOM?	

Remarks

- If Dynamic Domain Name System (DNS) is available on your network and your instrument uses DHCP, the domain name is assigned by the Dynamic DNS service at power-on.
- If a domain name has not been assigned, a null string (" ") is returned.

SYSTem:COMMunicate:LAN:GATEway "<*address*>"
SYSTem:COMMunicate:LAN:GATEway? [CURRent|STATic]

This command assigns a default gateway for the instrument. The specified IP Address sets the default gateway, which allows the instrument to communicate with systems that are not on the local subnet. Thus, this is the default gateway where packets are sent that are destined for a device not on the local subnet, as determined by the Subnet Mask setting. Contact your LAN administrator for details.

NOTE If you change this setting, you must execute a SYSTem:COMMunicate:LAN:UPDate command to activate the setting.

Parameter	Typical return
<*address*>: Four-byte dot notation ("nnn.nnn.nnn.nnn"), where "nnn" in each case is a byte value in the range of 0 through 255.	"198.105.232.4"
[CURRent | STATic] Default: CURRent	
Set a default gateway address: SYST:COMM:LAN:GATE "198.105.232.4" SYST:COMM:LAN:UPD	

Remarks

- CURRent - Returns address currently being used by the instrument.
- STATic - Returns address from non-volatile memory. This address is used if DHCP is disabled or unavailable.
- If DHCP is enabled (SYSTem:COMMunicate:LAN:DHCP ON command), the specified default gateway is not used. However, if the DHCP server fails to assign a valid IP address, the currently configured default gateway is used.
- The setting is non-volatile, and does not change when power has been off, after a Factory Reset (*RST command) or after an Instrument Preset (SYSTem:PRESet command).
- A gateway value of "0.0.0.0" indicates that subnetting is not being used.

SYSTem:COMMunicate:LAN:HOSTname "<*name*>"
SYSTem:COMMunicate:LAN:HOSTname? [CURRent|STATic]

This command assigns a hostname to the instrument. A hostname is the host portion of the domain name, which is translated into an IP address. If Dynamic Domain Name System (Dynamic DNS) is available on your network and your instrument uses DHCP, the hostname is registered with the Dynamic DNS service at power-on. If DHCP is enabled (SYSTem:COMMunicate:LAN:DHCP ON), the DHCP server can change the specified hostname.

NOTE **If you change this setting, you must execute a SYSTem:COMMunicate:LAN:UPDate command to activate the setting.**

Parameter	Typical return
<*name*>: A string of up to 15 characters. Must start with letter (A-Z) May contain letters, numbers (0-9), or dashes ("-") Default: "K-<*instrument model number*>-nnnnn", where "nnnnn" is the last five digits of the instrument's serial number. [CURRent | STATic] Default: CURRent	"LAB1-EDU34450A"
Define a hostname: SYST:COMM:LAN:HOST "LAB1-EDU34450A" SYST:COMM:LAN:UPD	

Remarks

- CURRent - Returns hostname currently being used by the instrument.
- STATic - Returns desired hostname from non-volatile memory, that may not be the actual name used by the instrument if DHCP is enabled.
- If host name has not been assigned, the query returns a null string ("").
- This parameter is set to its default value when the instrument is shipped from the factory.
- The setting is non-volatile, and does not change when power has been off, after a Factory Reset (*RST) or after an Instrument Preset (SYSTem:PRESet).

SYSTem:COMMunicate:LAN:IPADdress "<*address*>"
SYSTem:COMMunicate:LAN:IPADdress? [CURRent|STATic]

This command assigns a static Internet Protocol (IP) address for the instrument. If DHCP is enabled (SYSTem:COMMunicate:LAN:DHCP ON), the specified static IP address is not used. Contact your LAN administrator for details.

NOTE **If you change this setting, you must execute a SYSTem:COMMunicate:LAN:UPDate command to activate the setting.**

Parameter	Typical return
<*address*>: Four-byte dot notation ("nnn.nnn.nnn.nnn"), where "nnn" in each case is a byte value in the range 0 through 255. [CURRent | STATic] Default: CURRent	"198.105.232.4"
Sets a static IP address: SYST:COMM:LAN:IPAD "198.105.232.4" SYST:COMM:LAN:UPD	

Remarks

- CURRent - Returns address currently being used by the instrument.
- STATic - Returns static address from non-volatile memory. This address is used if DHCP is disabled or unavailable.
- The setting is non-volatile, and does not change when power has been off, after a Factory Reset (*RST) or after an Instrument Preset (SYSTem:PRESet).

SYSTem:COMMunicate:LAN:MAC?

This query returns the instrument's Media Access Control (MAC) address as an ASCII string of 12 hexadecimal characters (0-9 and A-F) enclosed in quotation marks.

NOTE **Your network administrator may need the instrument's MAC address in order to assign a static IP address for this device.**

Parameter	Typical return
(none)	"0030D3001041"
Returns the MAC address: SYST:COMM:LAN:MAC?	

Remarks

- Query reads the MAC address and returns an ASCII string enclosed in double quotes.
- The instrument's MAC address is unique to the instrument. It is set at the factory and cannot be changed.
- The setting is non-volatile, and does not change when power has been off, after a Factory Reset (*RST) or after an Instrument Preset (SYSTem:PRESet).
- MAC address also known as the link-layer address, the Ethernet (station) address, LANIC ID, or Hardware Address. This is an unchangeable 48-bit address assigned by the manufacturer to each unique Internet device.

SYSTem:COMMunicate:LAN:SMASk "<*mask*>"
SYSTem:COMMunicate:LAN:SMASk? [CURRent|STATic]

This command assigns a subnet mask for the instrument to use in determining whether a client IP address is on the same local subnet. When a client IP address is on a different subnet, all packets must be sent to the Default Gateway. Contact your LAN administrator for details.

NOTE **If you change this setting, you must execute a SYSTem:COMMunicate:LAN:UPDate command to activate the setting.**

Parameter	Typical return
<*mask*>: Four-byte dot notation ("nnn.nnn.nnn.nnn"), where "nnn" in each case is a byte value in the range 0 through 255. Default: "255.255.0.0" [CURRent | STATic] Default: CURRent	"198.105.232.4"
Sets the subnet mask: SYST:COMM:LAN:SMAS "255.255.254.0" SYST:COMM:LAN:UPDate	

Remarks

- CURRent - Returns subnet mask currently being used by the instrument.
- STATic - Returns subnet mask from non-volatile memory. This address is used if DHCP is disabled or unavailable.
- A value of "0.0.0.0" or "255.255.255.255" indicates that subnetting is not being used.
- The setting is non-volatile, and does not change when power has been off, after a Factory Reset (*RST) or after an Instrument Preset (SYSTem:PRESet).

SYSTem:COMMunicate:LAN:TELNet:PROMpt "<*string*>"
SYSTem:COMMunicate:LAN:TELNet:PROMpt?

This command sets the command prompt displayed when communicating the instrument with Telnet.

Parameter	Typical return
<string>: A string of up to 15 characters	"Command"
Defines the command prompt: SYST:COMM:LAN:TELN:PROM "Command"	

Remarks

- Query returns the command prompt as ASCII strings enclosed in double quotes.
- Instrument uses LAN port 5024 for SCPI Telnet sessions, and port 5025 for SCPI Socket sessions.
- Telnet port is an alternate way to send SCPI commands to the instrument.

- Telnet session can typically be started as follows from a host computer shell:
  telnet <*IP_address*> <*port*>

  For example:
  telnet 169.254.4.10 5024

  To exit a Telnet session, press <Ctrl-D>.
- The setting is non-volatile, and does not change when power has been off, after a Factory Reset (*RST) or after an Instrument Preset (SYSTem:PRESet).

SYSTem:COMMunicate:LAN:TELNet:WMESsage "<*string*>"
SYSTem:COMMunicate:LAN:TELNet:WMESsage?

This command sets the welcome message displayed when communicating the instrument with Telnet.

Parameter	Typical return
<string>: A string of up to 63 characters Default: "Welcome to Keysight's <*instrument model number*> Data Acquisition System"	"Welcome to the Telnet Session"
Define a welcome message: SYST:COMM:LAN:TELN:WMES "Welcome to the Telnet Session"	

Remarks

- Query returns the command prompt as ASCII strings enclosed in double quotes.
- Instrument uses LAN port 5024 for SCPI Telnet sessions and port 5025 for SCPI Socket sessions.
- The setting is non-volatile, and does not change when power has been off, after a Factory Reset (*RST) or after an Instrument Preset (SYSTem:PRESet).

SYSTem:COMMunicate:LAN:UPDate

This command stores any changes made to the LAN settings into non-volatile memory and restarts the LAN driver with the updated settings.

Parameter	Typical return
(none)	(none)

Parameter	Typical return
Configures the instrument to use statically assigned LAN settings (disables DHCP): SYST:COMM:LAN:DHCP OFF SYST:COMM:LAN:DNS "198.105.232.4" SYST:COMM:LAN:DNS2 "198.105.232.5" SYST:COMM:LAN:GAT "198.105.232.1" SYST:COMM:LAN:HOST "LAB1-DAQ970A" SYST:COMM:LAN:IPAD "198.105.232.101" SYST:COMM:LAN:WINS "198.105.232.4" SYST:COMM:LAN:WINS "198.105.232.5" SYST:COMM:LAN:UPD	
Configures the instrument back to use DHCP (enables DHCP): SYST:COMM:LAN:DHCP OFF SYST:COMM:LAN.UPD	

Remarks

- Be very careful when you execute this command, because your instrument may not work on the LAN if you update the instrument with invalid LAN settings.
- If your instrument does not work after you execute this command, perform the LAN Reset through instrument's front panel softkey to restore the settings to reset values and reset the LAN, or use another I/O interface, such as USB, to correct the settings.
- This command must be sent after changing the settings for DHCP, DNS, gateway, hostname, IP address, or sub-net mask.

SYSTem:COMMunicate:TCPip:CONTrol?

This query returns the initial socket control connection port number. After the control port number is obtained, a control socket connection can be opened.

Parameter	Typical Return
(none)	5000 (0 if sockets are not supported)
Queries the control connection port number: SYSTem:COMMunicate:TCPip:CONTrol?	

Remarks

- The control socket connection can only be used by a client to send a Device Clear to the instrument or to detect Service Request (SRQ) events.
- Refer to "Using Sockets" in the User's Guide for more information.

SYSTem:DATE <yyyy>,<mm>,<dd>
SYSTem:DATE?

This command sets the date of the power supply's real-time clock. The range of values for the year is from 2000 – 2099.

The query returns the date in the form +2017,+7,+26.

Parameter	Typical Return
<yyyy>,<mm>,<dd>	<yyyy,mm,dd>
Sets the date to April 1, 2020: SYSTem:DATE 2020,4,1	

SYSTem:ERRor?

This command reads and clears one error from the instrument's error queue. A record of up to 20 errors can be stored in the instrument's error queue. For a complete listing of the EDU34450A 5½ Digit Digital Multimeter's error messages, see SCPI Error Messages.

Parameter	Typical Return
(none)	-113,"Undefined header"
Reads and clears one error: SYST:ERR?	

Remarks

- The instrument beeps once each time a command syntax or hardware error is generated.
- Errors are retrieved in first-in-first-out (FIFO) order. The first error returned is the first error that was stored.
- Errors are cleared as you read them.
- If more than 20 errors have occurred, the last error stored in the queue (the most recent error) is replaced with **-350,"Error queue overflow"**. No additional errors are stored until you remove errors from the queue. If no errors have occurred when you read the error queue, the instrument responds with **+0,"No error"**.
- Error conditions are also summarized in the Status Byte Register. For more information on the SCPI Status System for the Keysight 34450A, see Status System Introduction.
- The error queue is cleared by the *CLS (Clear Status) command (for the I/O session), and when power is cycled (for all errors). All errors are cleared when you read the error queue. However, the error queue is not cleared by a Factory Reset (*RST command).

See also

- *CLS
- *SRE

SYSTem:LFRequency 50|60
SYSTem:LFRequency?

This command sets the line frequency with a 20 ms delay.

Parameter	Typical Return
50|60 Default: 50	"50" or "60"
Sets the line frequency to 50 Hz: SYST:LFR 50	

SYSTem:LOCal

This command places the instrument in the local mode. All front-panel keys are fully functional.

Parameter	Typical Return
(none)	(none)
Sets the multimeter in the local mode: SYSTem:LOCk	

SYSTem:PRESet

This command is included for compatibility with other products and performs the same actions as the *RST command. See Factory Reset State for a complete listing of the instrument's Factory configuration.

Parameter	Typical Return
(none)	(none)
Resets the instrument: SYSTem:PRESet	

Remarks

- This command does not affect any previously-stored instrument states (see *SAV command).

SYSTem:SET 0|1|2|3|4|5|6|7|8|9
SYSTem:SET?

The command sets the instrument to a specified state. It can be used to get an instrument state and later restore the instrument back to that state.

The query returns the instrument present stored state (store 0-9).

Parameter	Typical Return
0|1|2|3|4|5|6|7|8|9	0, 1, 2, 3, 4, 5, 6, 7, 8, or 9
Sets the instrument state to 3: SYST:SET 3	

SYSTem:TIME <hh>,<mm>,<ss>
SYSTem:TIME?

The command sets the real time clock in hours (hh), minutes (mm), and seconds (ss). The values may range from 0,0,0 (midnight) to 23,59,59 (one second before midnight).

The query returns the real time clock in hours (hh), minutes (mm), and seconds (ss).

Parameter	Typical Return
<0 - 23>,<0 - 59>,<0 - 59>	+<hh>,+<mm>,+<ss>
Sets the real time clock to 13:30:15: SYST:TIME 13,30,15	

SYSTem:VERSion?

This command returns the version of the SCPI (Standard Commands for Programmable Instruments) standard with which the instrument is in compliance. The instrument complies with the rules and conventions of the indicated version of the SCPI standard.

NOTE You cannot query the SCPI version from the front panel.

Parameter	Typical Return
(none)	1997.0
Returns the SCPI version: SYST:VERS?	

Remarks

- The command returns a string in the form "YYYY.V", where "YYYY" represents the year of the version and "V" represents a version for that year (e.g., 1997.0).

See also

- Introduction to SCPI Language

TRIGger Subsystem

Refer to Triggering the Multimeter for an explanation of local and remote triggering capabilities.

Command Summary

- TRIGger:COUNt
- TRIGger:COUNt?
- TRIGger:SOURce
- TRIGger:SOURce?
- TRIGger:DELay
- TRIGger:DELay?

Triggering the Multimeter

From the front panel (Local mode), the multimeter always auto–triggers. Auto triggering takes continuous readings at the fastest rate possible for the selected measurement configuration.

From the remote interface, triggering the multimeter is a three–step process:

1. Configure the multimeter for the measurement by selecting the function, range, resolution, and so on.
2. Specify the multimeter's trigger source. Choices are a software (bus) trigger from the remote interface or an immediate internal trigger (default trigger source).
3. If bus is the trigger source, the measurement is triggered when the *TRG command is executed.

Immediate Triggering

The immediate triggering mode is available from the remote interface only. When you place the multimeter in the wait–for–trigger state (INITiate command), the trigger is issued immediately. This is the default trigger source for remote interface operation. The TRIGger:SOURce IMMediate command selects the immediate trigger source. When the trigger source is immediate, the measurement will be made upon execution of the INITiate, READ? or MEAS? command.

The CONFigure and MEASure? commands automatically set the trigger source to IMMediate.

Software (Bus) Triggering

- The bus trigger mode is available from the remote interface only. The TRIGger:SOURce BUS command selects the bus trigger source.
- The bus trigger mode is initiated by sending a bus trigger command (*TRG), after selecting BUS as the trigger source.
- A MEASure? command overwrites the BUS trigger (sets it to IMMediate) and triggers the DMM and returns a measurement.
- A CONFigure command overwrites the BUS trigger (sets it to IMMediate).
- The READ? command does not overwrite the BUS trigger, and if selected, generates an error. It will only trigger the instrument and return a measurement when the IMMediate trigger is selected.
- The INITiate command only initiates the measurement and needs a trigger (BUS or IMMediate) to make the actual measurement.

MEASure? Examples

The MEAS? command is the easiest way to trigger a measurement and return the reading. For example, the following command triggers a measurement for the present measurement function, range, and resolution, and sends the reading to the output buffer.

```
MEAS?
```

You can specify the measurement function, range, and resolution withe the MEAS? command. For example:

```
MEAS:RES? 1000,FAST
```

BUS Triggering Example

The following command selects the bus (software) trigger source. Note that the *TRG command will not be accepted unless the instrument is in the "wait-for-trigger" state (INIT command).

```
TRIG:SOUR BUS
INIT
*TRG
FETCH?
```

Note: Attempting to use the READ? command with BUS triggering, generates an error.

CONFigure + INITiate + FETCH? Example

The following program segment shows how to use the FETCh? command with the CONFigure and INITiate commands. CONFigure sets the trigger source to immediate. The INITiate command places the instrument in the "wait-for-trigger" state. Since the trigger source is immediate, the measurement is made following execution of the INIT command. The FETCh? command retrieves the reading from the instrument's output buffer.

```
CONF:VOLT:DC 10,FAST
INIT
FETC?
```

CONFigure + READ? Example

The following program segment shows how to use the READ? command with the CONFigure command. CONFigure sets the trigger source to immediate. Sending the READ? command is similar to sending the INITiate command followed immediately by the FETCh? command. Since the trigger source is immediate, the measurement is made following execution of the READ? command.

```
CONF:VOLT:DC 10,FAST
READ?
```

Immediate Trigger + READ? Example

The following program segment shows how to use the READ? command with the IMMediate trigger source. Sending the READ? command is similar to sending the INITiate command followed immediately by the FETCh? command. Since the trigger source is immediate, the measurement is made following execution of the READ? command.

```
TRIG:SOUR IMM
READ?
```

TRIGger:COUNt <count>|MIN|MAX|DEF|INFinity
TRIGger:COUNt? MIN|MAX

This command selects the number of triggers that will be accepted by the meter before returning to the "idle" trigger state. This command returns the trigger count in the form "+1.00000000E+00". For a continuous trigger (INFinity), the query command returns "+9.90000000E+37".

Parameter	Typical Return
<count>: 1 to 5000 triggers Default: 1 trigger	+<count>
Set the trigger count to 10: TRIG:COUN 10	

Remarks

- Selects/Setting the number of trigger the meter will take before return to idle.
- You can use the specified trigger count in conjunction with a sample count (see SAMPle:COUNt command) which selects the number of readings (samples) the meter will take per trigger.
- In this case, the total number of reading returned will be the product of the sample count and trigger count.
- Number of Readings = Sample Count x Trigger Count
- MIN = 1 trigger
- MAX = 5000 triggers
- DEF = 1 trigger

TRIGger:DELay <seconds>|MIN|MAX|DEF
TRIGger:DELay? [MIN|MAX]

This command sets the delay between the trigger signal and the first measurement.

Parameter	Typical Return
<seconds>: 0 to 3600 s Default: 0 s	+2.00000000E+00
Sets a 2-second trigger delay: TRIGger:DELay 2	

Remarks

- Trigger delay does not change after a Factory Reset (*RST command) or an Instrument Preset (SYSTem:PRESet command).

See also

- TRIGger:SOURce

TRIGger:SOURce <source>
TRIGger:SOURce?

This command selects the trigger source for measurements. The instrument will accept a software (bus) command or an immediate (continuous) trigger.

Parameter	Typical Return
<source>: IMMediate|BUS	IMM or BUS
Selects the bus (software) trigger source: TRIG:SOUR BUS	

Remarks

- After selecting the trigger source, you must place the instrument in the "wait-for-trigger" state using the INITiate command. A trigger will not be accepted from the selected trigger source until the instrument is in the "wait-for-trigger" state. The INITiate command only initiates the measurement and needs a trigger (BUS or IMMediate) to make the actual measurement.
- For the IMMediate (continuous) source, the trigger signal is always present. When you place the instrument in the "wait-for-trigger" state, the trigger is issued immediately.
- For the BUS (software) source, the instrument is triggered by the *TRG command received over the remote interface. The *TRG command will not be accepted unless the multimeter is in the "wait-for-trigger" state.
- A CONFigure or MEASure? command overwrites the BUS trigger and sets the trigger source to IMMediate.
- The READ? command does not overwrite the BUS trigger, and if selected, generates an error. It will only trigger the instrument and return a measurement when the IMMediate trigger is selected.
- The instrument selects the IMMediate trigger source after a Factory Reset (*RST command) or an Instrument Preset (SYSTem:PRESet command).

See also

- *TRG

Command Summary

- UNIT:TEMPerature

UNIT:TEMPerature <units>
UNIT:TEMPerature?

This command selects the units (°C or °F) to be used for temperature measurements.

Parameter	Typical Return
<units>: C|CEL|F|FAR	C or F
Sets the temperature units to °F: UNIT:TEMP F	

Remarks

- The command also accepts "CEL" or "FAR" for the units parameter, but the query returns "C" or "F".
- The temperature unit selection is stored in non-volatile memory. The selection does not change after a Factory Reset (*RST command).

See also

- CONFigure[PRIMary]:TEMPerature
- MEASure:[PRIMary:]TEMPerature?

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