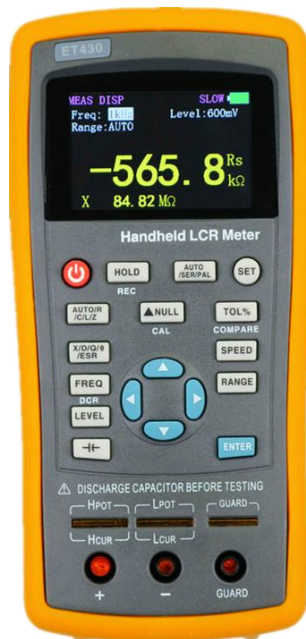


East Tester®

ET43 Handheld Bridge SCPI Communication Protocol



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1 SCPI command syntax

1.1 Grammar practice

Take the following two commands as examples to illustrate the meaning of symbols in the SCPI command:

```
[SOURce[1|2]:]VOLTage:UNIT {VPP|VRMS|DBM}  
[SOURce[1|2]:]FREQuency:CENTer {<frequency>|MINimum|MAXimum|DEFAULT}
```

According to command syntax, most commands (and some parameters) are represented in a mixture of upper and lower case letters. For shorter program lines, you can send commands in abbreviated format. If you want better program readability, you can send long-form commands. For example, in the syntax above, VOLT and VOLTAGE are acceptable formats. You can use uppercase or lowercase letters. Therefore, VOLTAGE, volt, and Volt are all acceptable formats. Other formats, such as VOL and VOLTAG, are invalid and cause errors.

Braces ({}) contain the parameter options for the given command string. Braces are not sent with the command string.

Bar (|) separated by a given command string multiple parameter selection. For example, in the above command, {VPP | VRMS | DBM} said can specify "VPP", "VRMS" or "DBM" one of the parameters. A bar is not sent with a command string.

The Angle brackets (< >) in the second example indicate that a value must be specified for the parameter inside the brackets. For example, in the syntax statement above, the argument in Angle brackets is < frequency >. Angle brackets are not sent with the command string. You must specify a value for the parameter (for example, "FREQ:CENT 1000") unless you select other options shown in the syntax (for example, "FREQ:CENT MIN").

Some syntax elements, such as nodes and parameters, are contained within square brackets ([]). This means that the element is optional and can be omitted. Angle brackets are not sent with the command string. If no value is specified for the optional parameter, the instrument selects the default value. In the example above, the "SOURce" [1] | 2 says you can through the "SOURce" or "SOURce1", or "SOUR1" or "SOUR" refers to the SOURce channel 1. Also, since the entire Source node is optional (in square brackets), you can refer to channel 1 by omitting the Source node entirely. This is because channel 1 is the default channel for the Source node. On the other hand, to refer to channel 2, you can only use "SOURce2" or "SOUR2" in the program line.

1.2 Command separator

The colon (:) is used to separate the command keyword from the keyword at the next level. Spaces must be inserted to separate the parameters from the command key. If a command requires more than one argument, the adjacent arguments must be separated by a comma, as follows:

```
APPL: SIN e3 455, 1.15, 0.0
```

In this example, the APPLy command specifies a sine wave with a frequency of 455 kHz, an amplitude of 1.15 V, and a DC offset of 0.0 V.

The semicolon (;) Used to separate multiple commands within the same subsystem and to minimize typing. For example, send the following command string:

```
TRIG:SOUR EXT; The COUNT ten
```

It has the same effect as sending the following commands:

TRIG: SOUR EXT

TRIG:COUNT 10

ET43 command set

The section entitled "Description" describes the use of the command or the actions it performs.

The section entitled "Parameters" describes the parameters required to send the command. When the parameter is a numeric or string type in $\langle \rangle$, the definition of the parameter, the allowable numeric range, the default (factory setting) value, and so on are given, and when the parameter is a selection type in $\{ \}$, the description of each option is given.

The section titled "Command Syntax" indicates that the command does not require an answer, and the instrument only needs to execute the corresponding action according to the command. The section titled "Query Grammar" indicates that the command requires an answer and the instrument needs to return data to the upper computer. Please refer to "Query Return" for the specific answer content. Command Syntax and Query Syntax are both syntaxes sent to ET43 from external controllers.

This communication agreement provides that:

NR1: Integer, such as 123

NR2: Decimal number (fixed point number), e.g. 12.3

NR3: floating point number, e.g., 12.3E+5

NRF: NR1, NR2, or NR3

NL: carriage return, integer 10

2.1 IEEE488.2 mandatory commands

*IDN?

The description command is used to query instrument information

Query syntax *IDN?

Query returns the manufacturer $\langle \rangle$, $\langle \text{model} \rangle$, $\langle \text{the firmware} \rangle$, $\langle \text{the hardware} \rangle$, $\langle \text{SN} \rangle$
 $\langle \text{NL} \rangle$

Note: $\langle \text{Manufacturer} \rangle$ gives the manufacturer, $\langle \text{model BBB} \rangle$ gives the machine model, $\langle \text{firmware BBB2} \rangle$ gives the software version number, $\langle \text{hardware BBB3} \rangle$ gives the hardware version number, and $\langle \text{SN BBB4} \rangle$ gives the serial number.

2.2 SCPI Instrument Requirements Command

2.2.1 System subsystem command set

:VERSion?

Describes the SCPI version number that the querying instrument conforms to

Query syntax SYSTem: VERSion?

The query returns 1999.0 $\langle \text{NL} \rangle$

2.3 ET43 command set

2.4.1 Aperture subsystem command set

The Aperture subsystem command is used to set the measurement speed mode. Characters? The current measurement speed mode can be queried.

Command syntax APERTure {FAST | MEDium | missile}

parameter

	describe
FAST	Set the measurement speed mode to FAST
Medium (default value)	Set the measurement speed mode to MEDIUM
SLOW	Set the measurement speed mode to Slow

Query syntax Aperture?

Query returns {FAST | MEDium | missile} < NL >

2.4.2 BIAS subsystem command set

:VOLTage[:LEVel]

Sets the DC bias voltage, character? The current DC bias voltage can be queried.

Command syntax BIAS:VOLTage[:LEVel] <numeric>

parameter

	< numeric >
The scope of	0 ~ 500
The preset value	0
unit	mV

Query syntax BIAS:VOLTage[:LEVel]?

The query returns <NR3><NL bbb>

2.4.3 Compareator subsystem command set

The COMPArator subsystem command is used to set the COMPArator functions, including comparison switch Settings, tolerance, and nominal Settings.

[:STATe]

Describes setting comparator function on or off to query the current comparator function status.

Command syntax COMPArator: [STATe] {ON | OFF | 1 | 0}

parameter

	describe
ON or 1	Start the comparator function.
OFF or 0 (default value)	Disable the comparator function.

Query syntax COMPArator[:STATe]?

The query returns <NR1><NL bbb>

: TOLerance:RANGe

Describes the setting of comparator tolerances

Command syntax COMPArator: how: RANGe < value >

parameter

	<value>
The scope of	1 ~ 50
unit	%

The query syntax COMPArator: how: RANGE?

<value><NL bbb>

:TOLerance:NOMinal

Describes the nominal value that sets the comparator function.

The nominal value of the current tolerance mode can be queried.

Command syntax COMPArator: how: NOMinal < numeric >

parameter

	<numeric>
The preset value	0

The query syntax COMPArator: how: NOMinal?

The query returns <NR3><NL bbb>

: TOLerance:RESult

The comparison results that describe the query comparator functionality.

The query syntax COMPArator: how: the RESult?

Query returns {PASS | FAIL} < NL >

2.4.4 Correction subsystem command set

The CORRection subsystem command set is used to set up open and short circuit corrections

Open – or short-circuit correction depends on the hardware

:EXECute

Describes on/short circuit correction for all frequency points.

Command syntax CORRection:EXECute

The query returns <NL>

2.4.5 Display subsystem command set

Display subsystem command set is mainly used to set the DISPlay interface

:PAGE

Describe the page you want to display. You can query the current page

Command syntax DISPlay: PAGE {MEASurement | SYSTem}

parameter

	describe
Measurement (default value)	Set the DISPLAY page to < MEAS DISPLAY>
SYSTem	Set the display page to < System Info >

Query syntax DISPlay:PAGE?

Query returns {MEASurement | SYSTem} < NL >

2.4.10 FETCh command

Describe the query measurement results.

Query syntax FETCh?

Query returns < NR3 >, < NR3 >, < NR3 >, < NR3 > < NL >

Parameter returns primary parameter mode and series-parallel model, primary parameter, secondary parameter mode, secondary parameter (relative mode returns Δ , difference parameter, nominal primary parameter mode and cross-parallel model, nominal primary parameter).

Ex. :

Query: the FETCh?

Returns: the Cp, e - 3, 1 D, 0.1025

2.4.11 Frequency subsystem command set

The Frequency subsystem command set is mainly used to set the measurement FREQuency of the instrument. You can query the current measurement frequency

Command syntax FREQuency[:CW] <numeric>

parameter

	<numeric>
The scope of	10 to 100000
The preset value	1000
unit	Hz
The resolution of the	Depends on the frequency set.

Query syntax FREQuency[:CW]?

The query returns <NR3><NL bbb>

2.4.12 Function subsystem command set

The FUNCtion subsystem command is mainly used to set "FUNCtion", range, current and voltage monitoring switches, and deviation display mode and nominal Settings, etc.

:DEV:MODE

Describes the set relative measurement mode, character?The current deviation measurement mode status can be queried.

Command syntax FUNCtion: DEV: MODE {ON | OFF}

parameter

	describe
ON	Turn on relative measurement mode
OFF (default value)	Disable relative measurement mode

Function :DEV:MODE?

Query returns {ON | OFF} < NL >

:IMPedance:A

Description Set the measurement main parameter, character?Can query the status of the current range.

Command syntax FUNCtion: IMPedance: A {AUTO | | Z | R | | C L DCR | ECAP}

parameter

	describe
AUTO	The main parameter automatic
R	resistance
C	capacitance
L	inductance
Z	impedance
DCR	Dc resistance
ECAP	Electrolytic capacitor

Function :IMPedance:A?

Query returns {AUTO | | Z | R | | C L DCR | ECAP} < NL >

:IMPedance:B

Describes setting measurement sub parameters, characters?Can query the status of the current range.

Command syntax FUNCTION: IMPedance: B {X | D | | Q THR | ESR}

parameter

	describe
X	reactance
D	Dissipation factor
Q	The quality factor
THR	radian
ESR	Equivalent series resistance

Function :IMPedance:B?

Query returns {X | | D | Q THR | ESR} < NL >

:IMPedance:EUUivalent

Describes setting measurement parameters for serial and parallel properties, characters?Can query the status of the current range.

Function :IMPedance: valence

parameter

	describe
SERial	In series
PALlEl	parallel

Function :IMPedance: valence?

Query returns {SERial | PALlEl} < NL >

:IMPedance:RANGe:AUTO

Describes the automatic conversion range function for starting impedance measurement, character?Can query the status of the current range.

Command syntax FUNCTION: IMPedance: RANGe: AUTO {ON | OFF | 1 | 0}

parameter

	describe
On or 1 (default value)	Automatic conversion range turned on
OFF or 0	Automatic conversion range closed, set range to 100 Ω

The query syntax FUNCTION: IMPedance: RANGe: AUTO?

The query returns <NR1><NL bbb>

:IMPedance:RANGe[:VALue]

Description used to set the instrument range, characters?You can query the current range parameters. This command turns off the automatic conversion range function.

Function :IMPedance:RANGe[:VALue] <numeric>

parameter

	<numeric>
The scope of	AUTO 100 1000 10000 100000
The preset value	100
unit	Ω

Function :IMPedance:RANGe[:VALue]?

The query returns <Numeric><NL bbb>

2.4.17 System subsystem command set

:BEEPer[:IMMediate]

Describe the sound of the prompt. The prompt sound can be emitted even if it has been disabled by the :SYSTem:BEEPer:STATe command.

Command syntax SYSTem:BEEPer[:IMMediate]

:BEEPer:STATe

Describes setting the prompt tone on or off.

Command syntax SYSTem: BEEPer: STATe {ON | OFF | 1 | 0}

parameter

	describe
ON or 1	Start prompt
OFF or 0 (default value)	Disable prompt tone

Query syntax System :BEEPer:STATe?

The query returns <NR1><NL bbb>

:LOCal

Describes placing the instrument in a local operating state. (The program command sets the instrument to local or remote operation and switches with the power key of the instrument interact.)

The command syntax SYSTem:LOCal

:RESet

Describes resetting instrument Settings and correcting data.

The command syntax SYSTem:PRESet

:REMote

Describes setting the instrument to remote operation.

Command syntax SYSTem:REMote

:RWLock

This command also sets the instrument to the remote operation state, but unlike the previous command, this command cannot press the LOCAL key to switch to the LOCAL operation state. It requires the SYSTEM: LOCAL command to restore.

The command syntax SYSTem:RWLock

2.4.19 VOLTAGE subsystem command set

The VOLTage subsystem command set is mainly used to set the measuring LEVel VOLTage of the instrument. If the signal is set using :CURRent[:LEVel], the query command returns error number -230. Characters? You can query the current measurement level voltage.

Command grammar VOLTage[:LEVel] <numeric>

parameter

	<numeric>
The scope of	10 to 1100
The preset value	600mV
unit	mV

Query grammar VOLTage[:LEVel]?

The query returns <NR3><NL bbb>