



UNI-T UTR2810E Desktop LCR Digital Bridge User Manual

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UTR2810E SCPI Programming Manual

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Introduction

This chapter will specifically introduce all UTR2810E RS232C commands. These commands are all conform to SCPI standard command set. The description of each command contains the following details

Command Name: Name of SCPI command

Command Syntax: Command format includes all the essential and optional parameters

Query Syntax: Query format includes all the essential and optional parameters

Query Return: Return data format of UTR2810E

Symbol Stipulation and Definition

The following symbol stipulations and definitions are used to describe the RS232C command in this chapter.

< > parameter of command are enclosed in angle brackets.

[] item are enclosed in square brackets, which can be optional or ignore.

{ } usually, curly braces includes several optional parameters, which one parameter can be selected.

The following symbol definitions will be used in the command:

<NL> Line break (decimal system 10)

Blank A single ASCII character (decimal system 0-9, 11-32)

Example, carriage return (decimal system 13) or blank (decimal system 32)

Command Structure

UTR2810E command divide into two types: common command and SCPI command. Common command is defined by IEEE standard definition, which apply to all instruments. SCPI command adopted three layers tree structure, the top layer is subsystem command. The lower commands of the subsystem command are valid only when the subsystem command is selected. Colon is used to separate the top and low command.

Basic rule of tree command structure

- Ignore case sensitive

example

LIMIT:NOMINAL <value> = limit:nominal <value> = LiMiT:NoMiNaL <value> blank (presents one blank) cannot lie in before or after a colon. example WrongLIMIT:NOMINAL <value>

RightLIMIT:NOMINAL <value>

Command can be word abbreviation or fully spelled words .

Example

LIMIT:NOMINAL <value> = LIM:NOM <value>

The query command constitutes by question mark (?) after the command

Example

LIMIT: NOMINAL_C?

Semicolon (;) is used to separate multiple commands in one set of command, rule of multiple commands as follows

On a multiple command line, use a semicolon (;) to separate multiple commands of the same level under the same subsystem command.

Example

LIMIT:NOMINAL <value>; BIN <n> <low limit>,<high limit>

Colon (;) separator with colon presents the latter command will restart from the top of tree command.

Example

LIMIT:NOMINAL <value>;LIMIT:BIN <n> <low limit>,<high limit>

Contraction Rule of Command

Each command and characteristic parameters have two spell formats at least, abbreviation and full spell.

Sometimes the two format are totally the same. Follow these rules for abbreviations,

- If the word length are four letter or short of four letter, the abbreviation and full spelled format is the same.
- If the word length are longer than four letter and the fourth letter is vowel, then the abbreviation format should be the former three letter.

If the fourth letter is consonant, then the abbreviation format should be the former four letter

Example,
LIMIT can be abbreviate to LIM
RANGE can be abbreviate to RANG
FREQUENCY can be abbreviate to FREQ

- If the abbreviation is not a word but a phrase, the full spelling is the first letter of the word plus the full spelling of the last word. On the basis of the full format, the abbreviation can be obtained by using the above rules.

Example:

The full spell of Source RESistor is SRESISTOR according to abbreviation rule, the short form is SRES.

Command Title and Parameter

UTR2810E control command contains command title and the related parameter. Command title can be full spelling or abbreviation format. Full spelling is easy to understand the command meaning; abbreviation format is to improving computer input efficiency. The parameter can be either of the following forms,

Character data and character string data

Character data constituted by ASCII character. Abbreviation rule is the same as command title. Character string data constituted by ASCII characters enclosed in double quotation mark ("").

Numerical data

Integer (NR1), fixed-point number (NR2), or floating-point number (NR3). Numerical range is $\pm 9.9E37$.

Take NR1 as example

123

+123

-123

Take NR2 as example

12.3

+1.234

-123.4

Take NR3 as example

12.3E+5

123.4E-56

Reference Command

DISPlay Command

Display: PAGE command is to set the display mode. Display: PAGE? query returns the display setting of the current test result.

Command Syntax:	DISPlay:PAGE {BINSetup,MEASurement,SYSetup}
Parameter:	BINSetup: sorting setting page Measurement: measuring display page SYSetup: system setting page

Query Syntax: **DISPlay: PAGE BINSetup**

Query Response: **{DIRect,PERcent,ABSolute}, <NL>**

Function Subsystem Command

Function Subsystem Tree

FUNction		{L_Q,C_D,R_X,Z_RAD,G_B,Y_R,L_r}
	:IMPedance: AUTO	{ON, OFF}
	:IMPedance: RANGE	{3,10,30,100,300,1k,3k,10k,30k,100k,300k}

Function Command

Function command is to set type of Parameter AB. FUNction? query returns the current testing parameter (the main and secondary parameter can be arbitrary selection, there are 42 kinds of test mode, only take several mode to make example.)

Command Syntax:	FUNction {L_Q,C_D,R_X,Z_RAD,G_B,Y_R,L_r}
Parameter	L_Q: inductance_quality factor C_D: capacitance_loss R_X: resistance_reactance Z_RAD: impedance_arc G_B: conductance_susceptance Y_R: admittance_resistance L_r: inductance_angle
Query Syntax:	FUNction?
Query	{L_Q,C_D,R_X,Z_RAD,G_B,Y_R,L_r}, <NL>

Response

Function:IMPedance: AUTO Command

Function:IMPedance: AUTO command is to set automatic range switch of parameter.

Function: IMPedance: AUTO? query returns the current range mode.

Command Syntax	Function:IMPedance:AUTO {ON,OFF}
Parameter	ON enable automatic range OFF disable automatic range
Query Syntax	Function:IMPedance:AUTO?
Query Response	{ON,OFF}, <NL>

Function:IMPedance: RANGE Command

Function:IMPedance: RANGE command is to set range number.

Function:IMPedance: RANGE? query returns the current range number.

Command Syntax	Function:IMPedance:RANGe {3,10,30,100,300,1k,3k,10k,30k,100k,300k}
Parameter	3 3Ω range 10 10Ω range 30 30Ω range 100 100Ω range 300 300Ω range 1k 1kΩ range 3k 3kΩ range 10k 10kΩ range 30k 30kΩ range 100k 100kΩ range 300k 300kΩ range
Query Syntax	Function:IMPedance: RANGe?
Query Response	{3,10,30,100,300,1k,3k,10k,30k,100k,300k}, <NL>

FREQuency Command

Frequency command is to set the frequency of test signal source.
Frequency? query returns the current frequency of test signal source.

Command Syntax	FREQuency {100,120,1k,10k}
Parameter	100: set test frequency as 100 Hz. 120 set test frequency as 120 Hz. 1k: set test frequency as 1 kHz. 10k set test frequency as 10 kHz.
Query Syntax	Frequency?
Query Response	{100,120,1k,10k}, <NL>

LEVel Subsystem Command

LEVel Subsystem Tree

Level	: VOLTage	{1.0V,0.3V,0.1V}
	: resistance	{30,100}

Level: VOLTage Command

Leve l: V OLTage command is to set output voltage of test signal source.
Level: VOLTage? query returns the output voltage of test signal source.

Command Syntax	Level:VOLTage {1.0V,0.3V,0.1V}
Parameter	1.0V: set the output voltage of signal source as 1.0V. 0.3V set the output voltage of signal source as 0.3V. 0.1V: set the output voltage of signal source as 0.1V.
Query Syntax	Level: VOLTage?
Query Response	{1.0V,0.3V,0.1V}, <NL>

Level: SRESistance Command

Level: SRESistance command is to set output resistance of signal source.

Level: resistance? query returns the current output resistance setting of signal source.

Command Syntax	Level:SRESistance {30,100}
Parameter	30: set the output resistance of signal source as 30 Ω . 100 set the output resistance of signal source as 100 Ω .
Query Syntax	Level: resistance?
Query Response	{30,100}, <NL>

SPEED Command

SPEED command is to set test speed. SPEED? query returns the current setting of test speed.

Command Syntax	SPEED {SLOW,MEDium,FAST}
Parameter	SLOW: slow speed about 3 time/s. Medium medium speed about 6.25 time/s. FAST: fast speed about 20 time/s
Query Syntax	SPEED?
Query Response	{SLOW,MEDIUM,FAST}, <NL>

MODE Command

MODE command is to set test equivalent mode. MODE? query returns the current test equivalent mode

Command Syntax	MODE {SER,PAR}
Parameter	SER: serial equivalent mode PAR parallel equivalent mode
Query Syntax	MODE?
Query Response	{SER,PAR}, <NL>

Correction Subsystem Command

Correction Subsystem Tree

Correction	:OPEN: STATe	{ON, OFF}
	:SHORT: STATe	{ON, OFF}
	: OPEN	
	: SHORT	

Correction:OPEN: STATe Command

Correction:OPEN: STATE command is to set the status of open circuit zero switch.
 Correction:OPEN: STATE? query returns the current status open circuit zero switch.

Command Syntax	Correction:OPEN:STATE {ON,OFF}
Parameter	ON: enable open circuit zero switch OFF disable open circuit zero switch
Query Syntax	Correction:OPEN: STATE?
Query Response	{ON,OFF} <NL>

Correction:SHORT: STATE Command

Correction:SHORT: STATE command is to set the status of open circuit zero switch.
 Correction:SHORT: STATE? query returns the current status open circuit zero switch.

Command Syntax	Correction:SHORT:STATE {ON,OFF}
Parameter	ON: enable open circuit zero switch OFF disable open circuit zero switch
Query Syntax	Correction:SHORT: STATE?
Query Response	{ON,OFF} <NL>

Correction: OPEN Command

Correction: OPEN command is to perform open circuit zero function Only when the open circuit zero switch status is ON, the circuit can be cleared correctly.

Command Syntax	Correction: OPEN
Query Response	open circuit clearing is success

Correction: SHORT Command

Correction: SHORT command is to perform open circuit zero function Only when the open circuit zero switch status is ON, the circuit can be cleared correctly.

Command Syntax	Correction: SHORT
Query Response	short circuit is success

Trigger Command

Trigger Subsystem Tree

TRIGger	: SOURce	{INT,BUS,MAN,EXT}
*TRG(TRIGger)	Instrument perform one time test and return test result	

Trigger:SOURce Command

Trigger: SOURce command is to set trigger mode.

Trigger: SOURce? query returns the current trigger mode.

Command Syntax	Trigger:SOURce {INT,BUS,MAN,EXT}
Parameter	Internal: internal trigger mode External external trigger mode Immediate: generate a test immediately
Query Syntax	Trigger: SOURce?
Query Response	{INT,BUS,MAN,EXT} <NL>

Trigger Command

TRIGger (*TRG)

Command Syntax	TRIGger or (*TRG)
Query Response	Trigger start

Fetch

Fetch? query returns the last test results of the main and secondary parameter.

Command Syntax	Fetch?
Query Response	<primary>,<secondary> <NL>

COMPARATOR Subsystem Command

COMPARATOR Subsystem Tree

COMPARATOR	: state	{ON, OFF}
	: state	{ON, OFF}
	: MODE	{ABS,PER,SEQ}
	:Tolerance: NOMinal	<value>
	:Tolerance: BIN<n>	<low limit>,<high limit>
	:SEQuence: BIN	<value>,<value>,<value>,<value>
	: SLIMit	<value>,<value>

COMPARATOR:STATAe Command

COMPARATOR: STATAe command is to set the comparator status of the main parameter.

COMPARATOR: STATAe? query returns the comparator status of the main parameter.

Command Syntax	COMParator:STATAe {ON,OFF}
Parameter	ON: enable the comparator of the main parameter OFF disable the comparator of the main parameter
Query Syntax	COMParator: STATAe?
Query Response	{ON,OFF}, <NL>

COMParator: STATBe Command

COMParator: STATBe command is to set comparator status of secondary parameter.

COMParator: STATBe? query returns the comparator status of secondary parameter.

Command Syntax	COMParator:STATBe {ON,OFF}
Parameter	ON: enable the comparator of secondary parameter OFF disable the comparator of secondary parameter
Query Syntax	COMParator: STATBe?
Query Response	{ON,OFF}, <NL>

COMParator: MODE Command

COMParator: MODE command is to set the comparative mode.

COMParator: MODE? query returns the current comparative mode.

Command Syntax	COMParator:MODE {ABS,PER,SEQ}
Parameter	ABS: absolute deviation mode PER percentage deviation mode SEQ: sequential mode
Query Syntax	COMParator: MODE?
Query Response	{ABS,PER,SEQ}, <NL>

COMParator:TOLerance: NOMinal Command

COMParator:TOLerance: NOMinal command is to set the current nominal value. The comparator uses this nominal value to calculate absolute and percentage deviations.

COMParator:TOLerance: NOMinal? query returns the current nominal value.

Command Syntax	COMParator:TOLerance:NOMinal <value>
Parameter	<value> the nominal value in the form of NR1, NR2,NR3
Query Syntax	COMParator:TOLerance: NOMinal?
Query Response	<NR3> <NL>

COMParator:TOLerance:BIN<n> Command

COMParator:TOLerance: BIN<n> command is to set the current upper/lower limit of BIN<n>

COMParator:TOLerance: BIN<n>? query returns to the current upper/lower limit

Command Syntax	COMParator:TOLerance:BIN <n> <low limit>,<high limit>
Parameter	<n> 1 to 3 (NR1), range number <low limit> the nominal value in the form of NR1,NR2 or NR3 <high limit> the nominal value in the form of NR1,NR2 or NR3
Query Syntax	COMParator:TOLerance:BIN <n>?
Query Response	<NR3>,<NR3> <NL>

COMParator:SEQuence: BIN Command

COMParator:SEQuence: BIN command is to set the current limit value of sequential mode.

COMParator:SEQuence: BIN? query returns the current limit value of sequential mode.

Command Syntax	COMParator:SEQuence:BIN <value>,<value>,<value>,<value>
Parameter	<value> the nominal value in the form of NR1,NR2,NR3
Query Syntax	COMParator:SEQuence:BIN ?
Query Response	<NR3>,<NR3>,<NR3>,<NR3> <NL>

COMParator:SLIMit Command

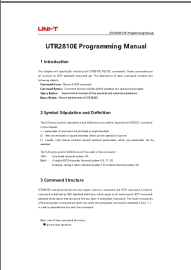
COMParator: SLIMit command is to set the limit value of secondary parameter.

COMParator: SLIMit? query returns the limit value of secondary parameter.

Command Syntax	COMParator:SLIMit <value>,<value>
Parameter	<value> the nominal value in the form of NR1, NR2,NR3
Query Syntax	COMParator: SLIMit ?
Query Response	<NR3>,<NR3> <NL>

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Documents / Resources

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