UTR2810E Programming Manual

1 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

2 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)

3 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,

Wrong: LIMIT︶:︶NOMINAL <value>

Right: LIMIT: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>

4 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**.

5 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±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

6 Refernce Command

6.1 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,SYSsetup}**
Parameter:	BINSetup: sorting setting page MEASurement: measuring display page SYSsetup**:** system setting page

Query Syntax:	**DISPlay:PAGE BINSetup**
Query Response:	**{DIRect,PERcent,ABSolute}, <NL>**

6.2 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}**

6.2.1 FUNCtion Command

FUNCtion command is to set type of Parameter A, B. 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：	

6.2.2 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>**

6.2.3 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>**

6.3 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>**

6.4 LEVel Subsystem Command

LEVel Subsystem Tree

LEVel	**:VOLTage**	**{1.0V,0.3V,0.1V}**
	:SRESistance	**{30,100}**

6.4.1 LEVel:VOLTage Command

LEVel:VOLTage 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>**

6.4.2 LEVel:SRESistance Command

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

LEVel:SRESistance? 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:SRESistance?**
Query Response：	**{30,100}, <NL>**

6.5 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>**

6.6 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>**

6.7 CORRection Subsystem Command

CORRection Subsystem Tree

CORRection	**:OPEN:STATe**	**{ON,OFF}**
	:SHORt:STATe	**{ON,OFF}**
	:OPEN	
	:SHORt	

6.7.1 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>**

6.7.2 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>**

6.7.3 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

6.7.4 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

6.8 TRIGger Command

TRIGger Subsystem Tree

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

6.8.1 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>**

6.8.2 TRIGger Command

TRIGger (*TRG)

Command Syntax: TRIGger or (*TRG)

Query Response: TRIGger start

6.9 FETCh?

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

Query Syntax: **FETCh?**

Query Response: **<primary>,<secondary> <NL>**

6.10 COMParator Subsystem Command

COMParator Subsystem Tree

COMParator	**:STATAe**	**{ON,OFF}**
	:STATBe	**{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>**

6.10.1 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>**

6.10.2 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>**

6.10.3 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>**

6.10.4 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>**

6.10.5 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>**

6.10.6 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	**COMParator:SEQuence:BIN <value>,<value>,<value>,<value>**

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

6.10.7 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>**