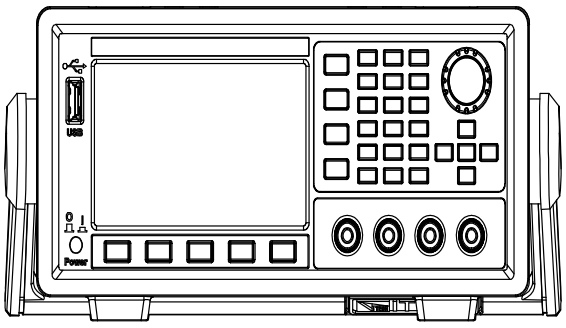
Bipolar DC Power Supply / Battery Simulator

Series IT6400 Programming Guide



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Safety Statement

CAUTION

“Caution” signs indicate danger. It is required to pay attention to the contents of these signs during implementation of operations.
The damage to the product or loss of important data may be caused in case of improper operation steps or failure to follow operation steps. Do not continue to implement any improper operation indicated in “Caution” signs when the specified conditions are not fully understood or these conditions are not satisfied.

WARNING

“Warning” indicates danger. It is required to pay attention to the contents of these signs during implementation of operation steps. Personal casualties may be caused in case of improper operation steps or failure to follow these operation steps. Do not continue to implement any improper operation indicated in “Warning” signs when the specified conditions are not fully understood or these conditions are not satisfied.

Note

“Instructions” indicates operation instructions. It is required to refer to the contents of these signs during operation steps. These signs are used for providing tips or supplementary information for operators.

Certification and Quality Assurance

IT6400 series power supply completely reaches nominal technical indicators in the manual.

Warranty service

ITECH Company will provide one-year warranty services for the product materials and manufacturing (excluding the following limitations).

- When warranty service or repair is needed, please send the product to the service unit specified by ITECH Company.
- When the product is sent to ITECH Company for warranty service, the customer must pay the one-way freight to the maintenance department of ITECH, and ITECH will be responsible for return freight.
- If the product is sent to ITECH for warranty service from other countries, the customer will be responsible for all the freight, duties and other taxes.

Limitation of Warranty

This Warranty will be rendered invalid in case of the following:

- Damage caused by circuit installed by customer or using customer own products or accessories;
- Product which has been modified or repaired by the customer;
- Damage caused by circuit installed by customer or not operating our products under designated environment;
- The product model or serial number is altered, deleted, removed or made illegible by customer;
- Damage caused by accidents, including but not limited to lightning, water, fire, abuse or negligence.

Safety signs

⎓	Direct current	|	ON (power on)
~	Alternating current	○	OFF (power off)
≂	Both direct and alternating current	⎍	Power-on state
⏚	Protective conductor terminal	⎍	Power-off state
⏚	Earth (ground) terminal	⏚	Reference terminal
⚠	Caution, risk of electric shock	+	Positive terminal
⚠	Warning, risk of danger (refer to this manual for specific Warning or Caution information)	−	Negative terminal
⏚	Frame or chassis terminal	-	-

Safety Precautions

General safety precautions below must be followed in each phase of instrument operation. In case of failure to follow these precautions or specific warnings in other parts of the manual, violation against the safety standards related to the design, manufacture and purpose of the instrument will occur. If the user does not follow these precautions, ITECH will bear no responsibility arising there from.

WARNING

- The power supply is provided with a three-core power cord during delivery and should be connected to a three-core junction box. Before operation, be sure that the power supply is well grounded.
- Use electric wires of appropriate load. All loading wires should be capable of bearing maximum short-circuit of electronic load without overheating.
- Ensure the voltage fluctuation of mains supply is less than 10% of the working voltage range in order to reduce risks of fire and electric shock.
- To prevent burnout, please pay special attention to positive and negative polarities of power supply during connection!
- Do not use damaged equipment. Please check the housing before using the equipment. Check whether the instrument is subject to cracking or is lack of plastic. Do not operate the instrument in the environment with explosive gas, steam or dust.
- Observe all tags on the equipment before connection.
- Do not install alternative parts on the instrument or perform any unauthorized modification.
- Do not use the equipment when the removable cover is dismantled or loose.
- Please use the power adapter supplied by the manufacturer to avoid accidental injury.
- We do not accept responsibility for any direct or indirect financial damage or loss of profit that might occur when using the instrument.
- This instrument is used for industrial purposes. Do not apply this product to IT power supply system.
- Do not use the equipment on the life support system or other equipment with safety requirements.

CAUTION

- If the equipment is not used in the manner specified by the manufacturer, its protection may be damaged.
- Always use dry cloth to clean the equipment housing. Do not clean the inside of the instrument.
- Do not block the air vent of the equipment.

Environmental conditions

The IT6400 series power supply can only be used indoors or in low condensation areas. The following table shows general environmental requirements for this instrument.

Environmental conditions	Requirement
Operating temperature	0°C - 40°C
	0°C - 40°C
Operating humidity	20% - 80% (non condensing)
Storage temperature	-20°C - 70°C
Altitude	Operating up to 2,000 meters
Pollution	Grade 2 pollution
Installation category	II

Note

To make accurate measurements, allow the instrument to warm up for 30 min before operation.

Regulation tag

CE	The CE mark indicates that the product complies with all the relevant European legal directives. The specific year (if any) affixed refers to the year when the design was approved.
	The instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard the electrical/electronic product in domestic household waste.
	This symbol indicates the time period during which no hazardous or toxic substances are expected to leak or deteriorate during normal use. The expected service life of the product is 10 years. The product can be used safely during the 10-year Environment Friendly Use Period (EFUP). Upon expiration of the EFUP, the product must be immediately recycled.

Waste electrical and electronic equipment (WEEE) directive

Waste electrical and electronic equipment (WEEE) directive, 2002/96/EC

The product complies with tag requirements of the WEEE directive (2002/96/EC). This tag indicates that the electronic equipment cannot be disposed of as ordinary household waste.

Product Category

According to the equipment classification in Annex I of the WEEE directive, this instrument belongs to the “Monitoring” product.

If you want to return the unnecessary instrument, please contact the nearest sales office of ITECH.

Compliance Information

Complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:

- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Low-Voltage Directive (Safety) 2014/35/EU

Conforms with the following product standards:

EMC Standard

IEC 61326-1:2012/ EN 61326-1:2013 [1][2][3]

Reference Standards

CISPR 11:2009+A1:2010/ EN 55011:2009+A1:2010 (Group 1, Class A)

IEC 61000-4-2:2008/ EN 61000-4-2:2009

IEC 61000-4-3:2006+A1:2007+A2:2010/ EN 61000-4-3:2006+A1:2008+A2:2010

IEC 61000-4-4:2004+A1:2010/ EN 61000-4-4:2004+A1:2010

IEC 61000-4-5:2005/ EN 61000-4-5:2006

IEC 61000-4-6:2008/ EN 61000-4-6:2009

IEC 61000-4-11:2004/ EN 61000-4-11:2004

1. The product is intended for use in non-residential/non-domestic environments. Use of the product in residential/domestic environments may cause electromagnetic interference.
2. Connection of the instrument to a test object may produce radiations beyond the specified limit.
3. Use high-performance shielded interface cable to ensure conformity with the EMC standards listed above.

Safety Standard

IEC 61010-1:2010/ EN 61010-1:2010

Content

Chapter1 Remote Control

1.1 Overview

This chapter will provide following remote configuration introductions:

- SCPI Command Introduction
- Command type
- Command format
- Data format
- Remote Operation

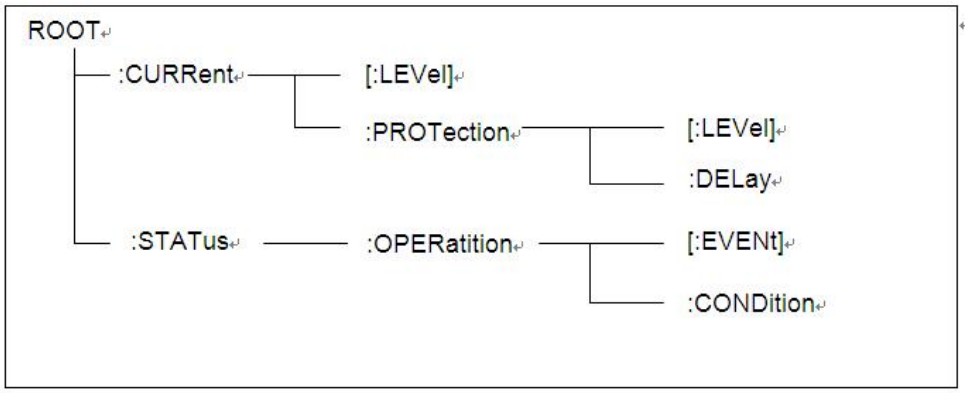
1.2 SCPI Command Introduction

SCPI is short for Standard Commands for Programmable Instruments which defines a communication method of bus controller and instrument. It is based on ASCII and supply for testing and measuring instruments. SCPI command is based on hierarchical architecture which also known as tree system. In this system, Relevant Command is returned to a common node or root, so that a subsystem is formed.

1.3 Command Type of SCPI

SCPI has two types of commands, common and subsystem.

- Common commands generally are not related to specific operation but to controlling overallelectronic load functions, such as reset, status, and synchronization. All commoncommands consist of a three-letter mnemonic preceded by an asterisk: *RST *IDN? *SRE 8.
- Subsystem commands perform specific electronic load functions. They are organized into an inverted tree structure with the "root" at the top. The following figure shows a portion of a subsyste command tree, from which you access the commands located along the various paths.



Multiple commands in a message

Multiple SCPI commands can be combined and sent as a single message with one message terminator. There are two important considerations when sending several commands within a single message:

- Use a semicolon to separate commands within a message.
- Head paths influence how the instrument interprets commands.

We consider the head path as a string which will be inserted in front of every command of a message. As for the first command of a message, the head path is a null string; for each subsequent command, the head path is a string which is defined to form the current command until and including the head of the last colon separator. A message with two combined commands: CURR:LEV 3;PROT:STAT OFF

The example indicates the effect of semicolon and explains the concept of head path. Since the head path is defined to be "CURR" after "curr: lev 3", the head of the second command, "curr", is deleted and the instrument explains the second command as: CURR:PROT:STAT OFF

If "curr" is explicitly included in the second command, it is semantically wrong. Since combining it with the head path will become "CURR:CURR:PROT:STAT OFF", resulting in wrong command.

Movement in the subsystem

In order to combine commands from different subsystems, you need to be able to reset the header path to a null string within a message. You do this by beginning the command with a colon (:), which discards any previous header path. For example, you could clear the output protection and check the status of the Operation Condition register in one message by using a root specifier as follows:

PROTection:CLEAr;:STATus:OPERation:CONDition?

The following message shows how to combine commands from different subsystems as well as within the same subsystem:

POWer:LEVel 200;PROTection 28; :CURRent:LEVel 3;PROTection:STATe ON

Note the use of the optional header LEVel to maintain the correct path within the voltage and current subsystems, and the use of the root specifier to move between subsystems.

Including Common Commands

You can combine common commands with subsystem commands in the same message. Treat the common command as a message unit by separating it with a semicolon (the message unit separator). Common commands do not affect the header path; you may insert them anywhere in the message.

VOLTage:TRIGgered 17.5;:INITialize;*TRG

OUTPut OFF;*RCL 2;OUTPut ONIT872X-3X SCPI Communication protocol 17

Case sensitivity

Common commands and SCPI commands are not case sensitive. You can use upper or lowerfor example:

*RST = *rst

:DATA? = :data?

:SYSTem:PRESet = :system:preset

Long-form and short-form versions

A SCPI command word can be sent in its long-form or short-form version. The long-form version are listed in the following chapters. However, the short-form version is indicated by upper case characters. Examples:

:SYSTem:PRESet long-form

:SYST:PRES short form

:SYSTem:PRES long-form and short-form combination

Note that each command word must be in long-form or short-form, and not something in between.

For example, :SYSTe:PRESe is illegal and will generate an error. The command will not be executed.

Query

Observe the following precautions with queries:

- Set up the proper number of variables for the returned data. For example, if you are reading back a measurement array, you must dimension the array according to the number of measurements that you have placed in the measurement buffer.
- Read back all the results of a query before sending another command to the electronic load. Otherwise a Query Interrupted error will occur and the unreturned data will be lost.

1.4 Command Format

Formats for command display are as follows:

[SOURce[1|2]:]VOLTage:UNIT {VPP|VRMS|DBM}

[SOURce[1|2]:]FREQuency:CENTer {<frequency>|MINimum|MAXimum|DEFault}

Based on the command syntax, most commands (and certain Parameter) are expressed in both upper and lower cases. Upper case refers to abbreviation of commands. Shorter program line may send commands in abbreviated format. Long-format commands may be sent to ensure better program readability.

For example, both formats of VOLT and VOLTAGE are acceptable in the above syntax statements. Upper or lower case may be used. Therefore, formats of

VOLTAGE, volt and Volt are all acceptable. Other formats (such as VOL and VOLTAG) are invalid and will cause errors.

- Parameter options with given command strings are included in the brace ({ }). The brace is not sent along with command strings.
- Vertical stripes (|) separate several parameter options with given command strings. For example, {VPP|VRMS|DBM} indicates that you may assign "APP", "VRMS" or "DBM" in the above commands. Vertical stripes are not sent along with command strings.
- Angle brackets (< >) in the second example indicates that a value must be assigned to the parameter in the brace. For example, the parameter in the angle bracket is <frequency> in the above syntax statements. Angle brackets are not sent along with command strings. You must assign a value (such as "FREQ:CENT 1000") to the parameter, unless you select other options displayed in the syntax (such as "FREQ:CENT MIN").
- Some syntax elements (such as nodes and Parameter) are included in square brackets ([ ]). It indicates that these elements can be selected and omitted. Angle brackets are not sent along with command strings. If no value is assigned to the optional Parameter, the instrument will select a default value. In the above examples, "SOURce[1|2]" indicates that you may refer to source channel 1 by "SOURce" or "SOURce1" or "SOUR1" or "SOUR". In addition, since the whole SOURce node is optional (in the square bracket), you can refer to the channel 1 by omitting the whole SOURce node. It is because the channel 1 is the default channel for SOURce language node. On the other hand, if you want to refer to channel 2, "SOURce2" or "SOUR2" must be used in the program line.

Colon (:)

It is used to separate key words of a command with the key words in next level. As shown below:

APPL:SIN 455E3,1.15,0.0

In this example, APPLy command assigns a sine wave with frequency of 455 KHz, amplitude of 1.15 V and DC offset of 0.0 V.

Semicolon (;)

It is used to separate several commands in the same subsystem and can also minimize typing. For example, to send the following command string:

TRIG:SOUR EXT; COUNT 10

has the same effect as sending the following two commands:

TRIG:SOUR EXT

TRIG:COUNT 10

Question mark (?)

You can insert question marks into a command to query current values of most

Parameter. For example, the following commands will trigger to set the count as 10:

TRIG:COUN 10

Then, you may query count value by sending the following command:

TRIG:COUN?

You may also query the allowable minimum or maximum count as follows:

TRIG:COUN?MIN

TRIG:COUN?MAX

Comma (,)

If a command requires several Parameter, then a comma must be used to separate adjacent Parameter.

Space

You must use blank characters, [TAB] or [Space] to separate Parameter with key words of commands.

Generic commands (*)

Execute functions like reset, self inspection and status operation. Generic commands always start with a asterisk (*) and occupy 3 character sizes, including one or more Parameter. Key words of a command and the first parameter are separated by a space. Semicolon (;) can separate several commands as follows:

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

Command terminator

Command strings sent to the instrument must end with a <Newline> (<NL>) character. IEEE-488 EOI (End or Identify) information can be used as <NL> character to replace termination command string of <NL> character. It is acceptable to place one <NL> after a <Enter>. Termination of command string always resets current SCPI command path to root level.

NOTE

As for every SCPI message with one query sent to the instrument, the instrument will use a <NL> or newline sign (EOI) to terminate response of return. For example, if "DISP:TEXT?" is sent, <NL> will be placed after the returned data string to terminate response. If an SCPI message includes several queries separated by semicolon (such as "DISP?;DISP:TEXT?"), <NL> will terminate response returned after response to the last query. In all cases, the program must read <NL> in response before another command is sent to the instrument, otherwise errors will be caused.

1.5 Data Type

SCPI language defines several data types used for program message and response messages.

- Numerical parameter

Commands requiring numerical Parameter support the notations of all common decimal notations, including optional signs, decimal points, scientific notation, etc. Special values of numerical Parameter are also acceptable, such as MIN, MAX and DEF. In addition, suffixes for engineering units can also be sent together with numerical Parameter (including M, k, m or u). If the command accepts only some specific values, the instrument will automatically round the input Parameter to acceptable values. The following commands require numerical Parameter of frequency value:

[SOURce[1|2]:]FREQuency:CENTer {<Frequency>|MINimum|MAXimum}

- Discrete parameter

Discrete Parameter are used for settings with limited number of programming values (such as IMMediate, EXTernal or BUS). They can use short and long format like key words of commands. They may be expressed in both upper and lower case. The query response always returns uppercase Parameter in short format. The following commands require discrete Parameter in voltage unit:

[SOURce[1|2]:]VOLTage:UNIT {VPP|VRMS|DBM}

- Boolean parameter

Boolean Parameter refer to true or false binary conditions. In case of false conditions, the instrument will accept "OFF" or "0". In case of true conditions, the instrument will accept "ON" or "1". In query of Boolean settings, the instrument will always return "0" or "1". Boolean Parameter are required by the following commands:

DISPlay {OFF|0|ON|1}

- ASCII string Parameter

String Parameter may actually include all ASCII character sets. Character strings must start and end with paired quotation marks; and single quotation marks or double quotation marks are both allowed. Quotation mark separators may also act as one part of a string, they can be typed twice without any character added between them. String parameter is used in the following command:

DISPlay:TEXT <quoted string>

For example, the following commands display message of "WAITING..." (without quotation marks) on the front panel of the instrument.

DISP:TEXT "WAITING..."

Single quotation marks may also be used to display the same message.

DISP:TEXT 'WAITING...'

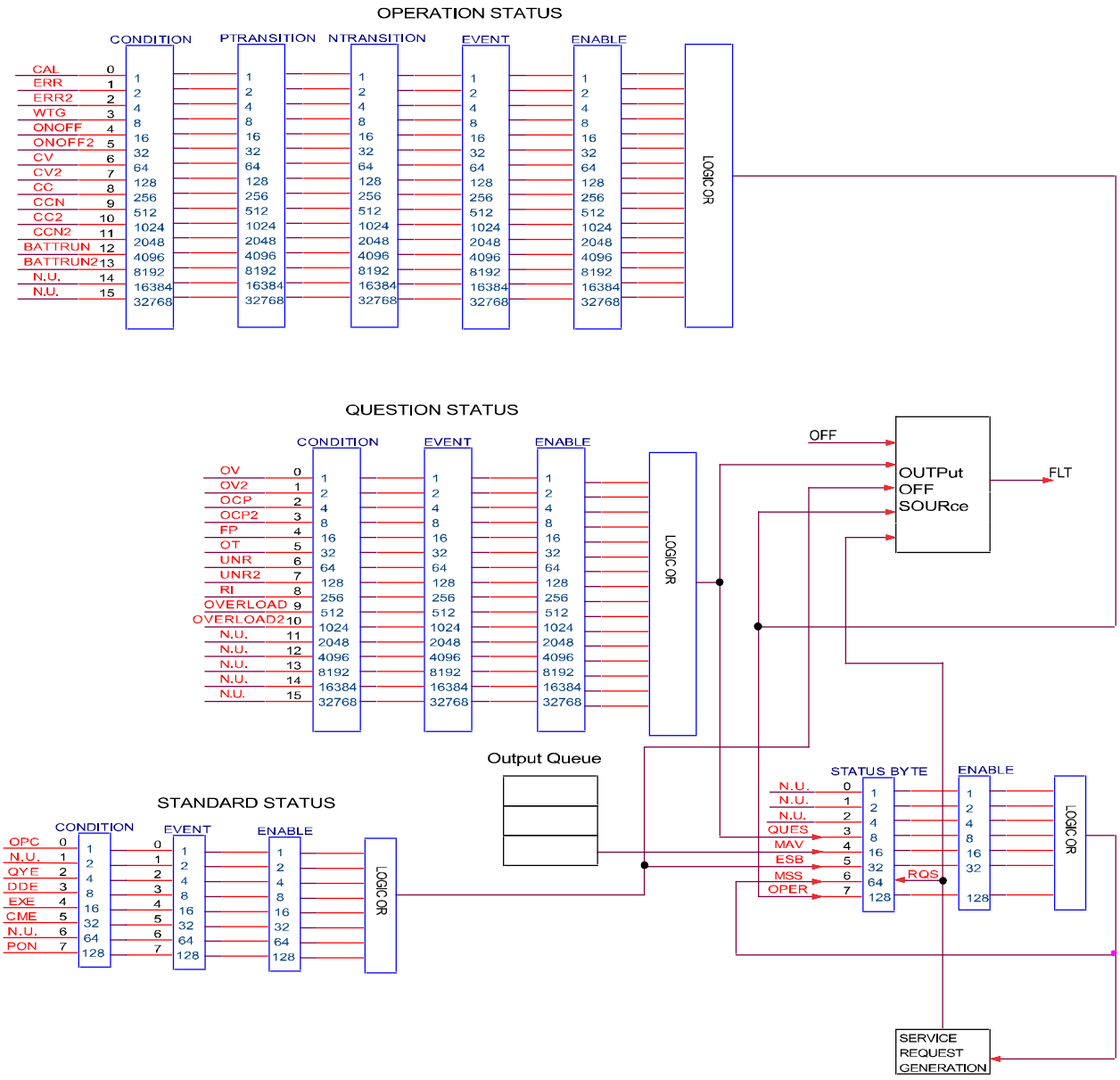
1.6 SCPI Register

You can get the condition of power supply and read parameter from the operation register. The power supply can get the different state by 4 condition registers. These registers are status byte register, standard event register, quest condition register and operation status register. The status byte register stores the information of 3 other register. You can get each register's meaning from the following table:

Bit	Signal	Meaning
Operation status register		
0	CAL	Calibrating. The power supply is calculating new calibration parameter.
1	ERR	The power supply (CH1) has error.
2	ERR2	The power supply (CH2) has error.
3	WTG	Waiting. The power supply is waiting for trigger signal.
4	ONOFF	The power supply (CH1) output status is on.
5	ONOFF2	The power supply (CH2) output status is on.
6	CV	The dc source is in constant voltage mode.
7	CV2	Output 2 is operating in constant voltage mode.
8	CC	The dc source is in constant current mode.
9	CCN	The dc source is in negative constant current mode.
10	CC2	Output 2 is operating in constant current mode.
11	CCN2	Output 2 is operating in negative constant current mode.
12	BATTRUN	The power supply (CH1) is under battery running status.
13	BATTRUN2	The power supply (CH2) is under battery running status.
14		This bit is not used.
15		This bit is not used.
Questionable Status Group		
0	OV	Over voltage. The overvoltage protection has tripped.
1	OV2	Over voltage. Output 2 overvoltage protection has tripped.
2	OCP	Over current. The overcurrent protection has tripped.
3	OCP2	Over current. Output 2 overcurrent protection has tripped
4	FP	Any key of the front panel is pressed when the power supply is under Local Mode.

5	OT	Over temperature. The overtemperature protection has tripped.
6	UNR	The power supply (CH1) has abnormal voltage output.
7	UNR2	The power supply (CH2) has abnormal voltage output.
8	RI	The power supply is external and in Output Disable mode.
9	OVERLOAD	The power supply (CH1) has overload current and is set.
10	OVERLOAD 2	The power supply (CH2) has overload current and is set.
11-15		Bits 11-15 are not used.
Standard Event Status Group		
0	OPC	Operation Complete. Operation of power supply is completed.
1		This bit is not used.
2	QYE	Query Error. Data of output array is missing.
3	DDE	Device-Dependent Error. Data stored in register is missing or error occurs in preliminary checkout.
4	EXE	Execution Error. Order parameter overflows or the condition is not right.
5	CME	Command Error.Command syntax or semantic error occurs when receiving information.
6		This bit is not used.
7	PON	Power-On.It is 1 when power supply is reset.
Status Byte and Service Request Enable Registers		
0-2		Bits 0-2 are not used.
3	QUES	Questionable Status Summary. Indicates if an enabled questionable event has occurred.
4	MAV	Message Available Summary. Indicates if the Output Queue contains data.
5	ESB	Event Status Summary. Indicates if an enabled standard event has occurred.
6	RQS/ MSS	Master Status Summary. Request Service.
7	OPER	Operation Status Summary. Indicates if an operation event has occurred.

Structure of condition register as following:



1.7 Remote Operation

IT6400 series power supply is provided with three communication interfaces to communicate with a computer for selection, including USB, LAN and GPIB.

USB Interface

Use cables with double USB interface to connect power and PC. All power functions are programmable over the USB.

The USB488 interface capabilities of the power are described below:

- The interface is 488.2 USB488 interface.
- The interface accepts REN_CONTROL, GO_TO_LOCAL, and LOCAL_LOCKOUT requests.

- The interface accepts MsgID = TRIGGER USBTMC command message and forwards TRIGGER requests to the function layer.

The USB488device capabilities of the power are described below:

- The device understands all mandatory SCPI commands.
- The device is SR1 capable.
- The device is RL1 capable.
- The device is DT1 capable.

GPIB Interface

First connect GPIB port of power to GPIB card of PC with IEEE488 BUS. They must be sufficient contact and tighten the screws. And then set address. The address can be set from 0 to 30.

Select "**Menu > System > Sys Com**" to enter Communication Configuration page. Select GPIB by pressing arrow keys, and then set the GPIB address, press [OK] to confirm. The power operates from a GPIB address set from the front panel. The GPIB address is stored in non-volatile memory.

LAN Interface

Select "**Menu > System > Sys Com**" to enter communication configuration page. Select LAN by pressing arrow keys and then configure Gateway, IP, Mask and Socket Port in the LAN option. Use a cross network cable through LAN interface to connect PC.

Chapter2 Programming Examples

This chapter displays the programming examples to remotely control IT6400 power supply using SCPI commands.

- If the user want to change the settings of the instrument, for instance, the output setting value, the command SYST:REM must be sent to the instrument after finishing the connection between the instrument and PC.

Example1: Identifying the Power Supply in Use

You can verify whether you are communicating with the right power supply.

To query the identification of the power supply, send the command:

```
*IDN?
```

To check the power supply error queue, send the command:

```
SYST:ERR?
```

Example2: Setting the Common Output Arguments

```
SYSTem:REMote
CURRent 1
CURRent2 3
VOLTage 5
VOLTage 3;VOLTage2 5
VOLTage2?
OUTPut1 ON
OUTPut2 ON
MEASure:VOLTage?
MEASure:CURRent?
MEASure:POWer?
```

Example3: List Function

The following procedure shows how to generate a simple 3-step list of voltage and current changes.

```
SYSTem:REMote
LIST:TERMinate LAST
LIST:GROup 5
LIST:PERiod 2
LIST:TOTal 3
LIST:POINt 0
```

```
LIST:PARameter 5,2,0,5
LIST:POINt 1
LIST:PARameter 3,1,0,5
LIST:POINt 2
LIST:PARameter 1,2,0,5
LIST:SAVE
LIST:GROup:SELect 5
LIST:TRIGer:ENABle
LIST ON
OUTP 1
LIST:TRIGer
```

Example4: Discharge Function

```
SYSTem:REMote
BATT:MODE DISCharge
BATTery:TIME:SHUT:STATe ON
BATTery:TIME:SHUT 20
BATTery:VOLTage 2
BATTery:CURRent 1
BATT:STAR
BATT:STOP
```

Example5: Charge Function

```
SYSTem:REMote
BATT:MODE CHARge
BATTery:CAPacity:SHUT:STATe ON
BATTery:CAPacity:SHUT 10000.0
BATTery:VOLTage 2
BATTery:CURRent 1
BATT:STAR
BATT:STOP
```

Example6: SIMulator Function

```
SYSTem:REMote
BATT:MODE SIMulator
BATTery:CURRent:SHUT:STATe ON
BATTery:CURRent:SHUT 2
BATTery:GROup 7
```

```
BATTery:TOTal 5
BATTery:POINt 0
BATTery:PARameter 100,3.3,0.2
BATTery:POINt 1
BATTery:PARameter 500,3.32,0.15
BATTery:POINt 2
BATTery:PARameter 1000,3.4,0.1
BATTery:POINt 3
BATTery:PARameter 1500,3.5,0.05
BATTery:POINt 4
BATTery:PARameter 1800,3.7,0.03
BATT:SAVE
BATT:REC:SEL 7
BATT:STAR
```

Chapter3 IEEE-488 Commands

Common commands begin with an * and consist of three letters (command) or three letters and a ?(query). They are defined by the IEEE 488.2 standard to perform common interface functions. Common commands and queries are categorized under System, Status, or Trigger functions and are listed at the end of this chapter.

If a command has a corresponding query that simply returns the data or status specified by the command, then both command and query are included under the explanation for the command. If a query does not have a corresponding command or is functionally different from the command, then the query is listed separately.

Menmonic	Name	Description
*CLS	Clear status	Clear event registers and Error Queue.
*ESE <NRf>	Event enable command	Programs the Standard Event Enable Register.
*ESE?	Event enable query	Read the Standard Event Enable Register.
*ESR?	Event status query	Read the Standard Event Status Register and clear it.
*IDN?	Identification query	Return instrument identification.
*OPC	Operation complete command	Set the Operation Complete bit in the Standard Event Status Register after all pending commands have been executed.
*OPC?	Operation complete query	Places an ASCII “1” into the output queue when all pending selected device operations have been completed.
*RCL <NRf>	Recall Command	Returns the Power supply to the setup configuration stored in the specified memory location.
*RST	Reset Command	Returned the Power supply to the *RST default conditions.
*SAV <NRf>	Save Command	Saves the current setup to the specified memory location.
*SRE <NRf>	Service request enable command	Programs the Service Request Enable register.
*SRE?	Service request enable	Reads the Service Request Enable

	query	Register.
*STB?	Read status byte query	Reads the Status Byte Register.
*TRG	Trigger Command	Send a trigger to Power supply.
*TST?	Self-test query	Perform selftest, then return result.
*WAI	Wait to continue command	Wait until all previous commands are executed.

*CLS — Clear Status

This command clears the bits of the following registers:

- Standard Event Register
- Operation Event Register
- Questionable Event Register
- Error Queue

Command syntax

*CLS

Arguments

None

*ESE <NRf> — Event Enable

This command programs the Standard Event Status Enable register bits. The programming determines which events of the Standard Event Status Event register (see *ESR?) are allowed to set the ESB (Event Summary Bit) of the Status Byte register. A "1" in the bit position enables the corresponding event. All of the enabled events of the Standard Event Status Event Register are logically ORed to cause the Event Summary Bit (ESB) of the Status Byte Register to be set.

Command syntax

*ESE <NRf>

Arguments

0 to 255

Default Value

see *PSC

Example

*ESE 129

Query syntax

*ESE?

Returns

<NR1>

Related Command

*ESR? *PSC *STB?

*ESR?

This query reads the Standard Event Status Event register. Reading the register clears it. The bit configuration of this register is the same as the Standard Event Status Enable register (see *ESE). See chapter “Programming the Status Registers” for a detailed explanation of this register.

Query syntax

*ESR?

Arguments

None

Returns

<NR1> (register value)

Related Command

*CLS *ESE *ESE? *OPC

*IDN?

This query requests the power supply to identify itself. It returns the data in four fields separated by commas.

Query syntax

*IDN?

Arguments

None

Returns

<AARD> Field Information
ITECH Ltd manufacturer
IT64XX Mode
XXXX….. serial number
1.21-1.28 firmware - version

*OPC

This command causes the interface to set the OPC bit (bit 0) of the Standard Event Status register when the power supply has completed all pending operations. (See for the bit configuration of the Standard Event Status registers.)

Pending operations are complete when:

- All commands sent before *OPC have been executed. This includes overlapped commands. Most commands are sequential and are completed before the next command is executed. Overlapped commands are executed in parallel with other commands. Commands that affect trigger actions are overlapped with subsequent commands sent to the power supply. The *OPC command provides notification that all overlapped commands have been completed.
- All triggered actions are completed and the trigger system returns to the Idle state.

*OPC does not prevent processing of subsequent commands but Bit 0 will not be set until all pending operations are completed. The query causes the interface to place an ASCII "1" in the Output Queue when all pending operations are completed.

Command syntax

*OPC

Arguments

None

Query syntax

*OPC?

Returns

<NR1>

Related Command

*TRIG *WAI

*PSC

This command controls whether a service request will generate when the power supply is re-generalized.

- 1 OR ON: when the power supply is generated, the values in the Status Byte Enable register, Operational Event Enable register, Query Event Enable register and Standard Event Enable register are cleared.
- 0 OR OFF: the values in the Status Byte Enable register, Operational Event Enable register, Query Event Enable register and Standard Event Enable register are saved in NVM, which will be used at regenerating.

Command syntax

*PSC <bool>

Arguments

0|1|ON|OFF

Query syntax

*PSC?

Returns

0|1

*RCL

This command restores the power supply to a state that was previously stored in memory with a *SAV command to the specified location. All states are recalled with the following exceptions: CAL:STATe is set to OFF
The trigger system is set to the Idle state by an implied ABORt command (this cancels any uncompleted trigger actions)
NOTE: The device state stored in location 0 is automatically recalled at power turn-on.

Command syntax

*RCL <NRf>

Arguments

0 to 49

Example:

*RCL 3

Related Command

*PSC *RST *SAV

*RST

This command resets ALL channels of the power supply to the following factory-defined states.

Command syntax

*RST

Arguments

None

*SAV

This command stores the present state of the power supply to a specified location in memory. Up to 50 states can be stored. If a particular state is desired at power-on, it should be stored in location 0. It then will be recalled at power-on if the power-on state is set to RCL0. Use *RCL to retrieve instrument states. NOTE:*SAV does not save the programmed trigger values ([SOURce:]CURRent:TRIGGer, [SOURce:]RESistance:TRIGGer, [SOURce:]VOLTage:TRIGGer). Programming an *RCL, or a *RST command causes the triggered settings to revert to their [IMMediate] settings.

Command syntax

*SAV <NRf>

Arguments

0 to 49

Example

*SAV 3

Related Command

*PSC *RST *RCL

*SRE

This command sets the condition of the Service Request Enable Register. This register determines which bits from the Status Byte Register (see *STB for its

bit configuration) are allowed to set the Master Status Summary (MSS) bit and the Request for Service (RQS) summary bit. A 1 in any Service Request Enable Register bit position enables the corresponding Status Byte Register bit and all such enabled bits then are logically ORed to cause Bit 6 of the Status Byte Register to be set.

When the controller conducts a serial poll in response to SRQ, the RQS bit is cleared, but the MSS bit is not. When *SRE is cleared (by programming it with 0), the power supply cannot generate an SRQ to the controller. The query returns the current state of *SRE.

Command syntax

*SRE <NRf>

Arguments

0 to 255

Default Value

see *PSC

Example

*SRE 128

Query syntax

*SRE?

Returns

<NR1> (register binary value)

Related Command

*ESE *ESR *PSC

*STB?

This query reads the Status Byte register, which contains the status summary bits and the Output Queue MAV bit. Reading the Status Byte register does not clear it. The input summary bits are cleared when the appropriate event registers are read (see chapter “Programming the Status Registers” for more information). A serial poll also returns the value of the Status Byte register, except that bit 6 returns Request for Service (RQS) instead of Master Status Summary (MSS). A serial poll clears RQS, but not MSS. When MSS is set, it indicates that the power supply has one or more reasons for requesting service.

Command syntax

*STB?

Arguments

None

Returns

<NR1> (register value)

Related Command

*SRE *ESR *ESE

*TRG

This command generates a trigger to any system that has BUS selected as its source (for example, TRIG:SOUR BUS). The command has the same affect as the Group Execute Trigger (<GET>) command.

Command syntax

*TRG

Arguments

None

Related Command

ABOR INIT TRIG:IMM

*TST?

This query causes the power supply to do a self-test and report any errors.

Command syntax

*TST?

Arguments

None

Returns

<NR1>

0 indicates the power supply passes its self test. Non-zero indicates an error code.***WAI**

This command instructs the power supply not to process any further commands until all pending operations are completed.

Pending operations are complete when:

All commands sent before *WAI have been executed. This includes overlapped commands. Most commands are sequential and are completed before the next command is executed. Overlapped commands are executed in parallel with other commands. Commands that affect input voltage or state, relays, and trigger actions are overlapped with subsequent commands sent to the power supply. The *WAI command prevents subsequent commands from being executed before any overlapped commands have been completed.

All triggered actions are completed and the trigger system returns to the Idle state. *WAI can be aborted only by sending the power supply a GPIB DCL (Device Clear) command.

Command syntax

*WAI

Arguments

None

Related Command

*OPC

Chapter4 Status commands

STATus Subsystem, These commands program the power supply status registers.

STATus:QUEStionable?

This query returns the value of the Questionable Event register. The Event register is a read-only register that holds (latches) all events that pass into it. Reading the Questionable Event register clears it. This command is not channel specific, it applies to the entire mainframe.

Command syntax

STATus:QUEStionable[:EVENt]?

Arguments

None

Example

STAT:QUES:EVEN?

Returns

<NR1> (register value)

Related Command

*CLS

STATus:QUEStionable:ENABle

This command sets or reads the value of the Questionable Enable register. This register is a mask for enabling specific bits from the Questionable Event register to set the questionable summary (QUES) bit of the Status Byte register.This bit (bit 3) is the logical OR of all the Questionable Event register bits that are enabled by the Questionable Status Enable register. This command is not channel specific, it applies to the entire mainframe.

Command syntax

STATus:QUEStionable:ENABle <NR1>

Arguments

0 to 65535

Default Value

0

Example

STAT:QUES:ENAB 32 STAT:QUES:ENAB 1

Query syntax

STATus:QUEStionable:ENABle?

Returns

<NR1> (register value)

Related Command

STAT:QUES?

STATus:QUEStionable:PTRansition

This command sets or reads the positive value of the questionable condition register. When the bit value of the questionable condition register changes from 0 to 1, and the corresponding bit of ptransition register is 1, then the corresponding bit value of questionable event register turns into 1.

Command syntax

STATus:QUEStionable:PTRansition <NR1>

Arguments

0 to 65535

Default Value

0

Example

STAT:QUES:PTRansition 32
STAT:QUES:PTRansition 1

Query syntax

STATus:QUEStionable:PTRansition?

Returns

<NR1> (register value)

Related Command

STAT:QUES?

STATus:QUEStionable:NTRansition

This command sets or reads the negative value of the questionable condition register. When the bit value of the questionable condition register changes from 1 to 0, and the corresponding bit of ntransition register is 1, then the corresponding bit value of questionable event register turns into 1.

Command syntax

STATus:QUEStionable:NTRansition <NR1>

Arguments

0 to 65535

Default Value

0

Example

STAT:QUES:NTRansition 32
STAT:QUES:NTRansition 1

Query syntax

STATus:QUEStionable:NTRansition?

Returns

<NR1> (register value)

Related Command

STAT:QUES?

STATus:QUEStionable:CONDition?

This query returns the value of the Questionable Condition register. That is a read-only register that holds the real-time (unlatched) questionable status of the power supply. This command is not channel specific, it applies to the entire mainframe.

Query syntax

STATus:QUEStionable:CONDition?

Arguments

None

Example

STAT:QUES:COND?

Returns

<NR1> (register value)

Related Command

STAT:OPER:COND?

STATus:OPERation?

This query returns the value of the Operation Event register. The Event register is a read-only register that holds (latches) all events that are passed by the Operation NTR and/or PTR filter. Reading the Operation Event register clears it. This command is not channel specific, it applies to the entire mainframe.

Query syntax

STATus:OPERation[:EVENt]?

Arguments

None

Example

STAT:OPER:EVEN?

Returns

<NR1> (register value)

Related Command

*CLS

STATus:OPERation:ENABle

This command and its query set and read the value of the Operation Enable register. This register is a mask for enabling specific bits from the Operation Event register to set the operation summary bit (OPER) of the Status Byte

register. The operation summary bit is the logical OR of all enabled Operation Event register bits. This command is not channel specific, it applies to the entire mainframe.

Command syntax

STATus:OPERation:ENABle <NR1>

Arguments

0 to 65535

Default Value

0

Example

STAT:OPER:ENAB 32
STAT:OPER:ENAB 1

Query syntax

STATus:OPERation:ENABle?

Returns

<NR1> (register value)

Related Command

STAT:OPER?

STATus:OPERation:CONDition?

This query returns the value of the Operation Condition register. That is a read-only register that holds the real-time (unlatched) operational status of the power supply. This command is not channel specific, it applies to the entire mainframe.

Query syntax

STATus:OPERation:CONDition?

Arguments

None

Example

STAT:OPER:COND?

Returns

<NR1> (register value)

Related Command

STAT:QUES:COND?

STATus:PRESet

When this command is sent, the SCPI event registers are affected as follows:

All bits of the following registers are cleared to zero (0):

- Questionable Event Enable Register.
- Channel summary Event Enable Register.
- Operation Event Enable Register

NOTE Registers not included in the above list are not affected by this command.

Command syntax

STATus:PRESet

Arguments

None

Example

STAT:PRES

Chapter5 System commands

System commands control the system-level functions of the power supply that are not directly related to input control or measurement functions.

SYSTem:POSetup

This command is used to select the power-on defaults. With RST selected, the instrument powers up to the *RST default conditions. With the SAV0 parameter selected, the instrument powers-on to the setup that is saved in the specified location using the *SAV command.

Command syntax

SYSTem:POSetup <CRD>

Arguments

RST | SAV0

RST Value:

RST

Example

SYST:POS RST

Query syntax

SYSTem:POSetup?

Returns

<CRD>

Related Command

*RST *SAV

SYSTem:VERSion?

This query returns the SCPI version number to which the power supply complies to. The value is of the form YYYY.V, where YYYY is the year and V is the revision number for that year.

Query syntax

SYSTem:VERSion?

Arguments

None

Example

SYST:VERS?

Returns

<NR2>

SYSTem:ERRor?

This query returns the next error number followed by its corresponding error message string from the remote programming error queue.
The queue is a FIFO (first-in, first-out) buffer that stores errors as they occur. As it is read, each error is removed from the queue.
When all errors have been read, the query returns “0, No Error”. If more errors are accumulated than the queue can hold, the last error in the queue is “-350, Too Many Errors”.

Query syntax

SYSTem:ERRor?

Arguments

None

Returns

<NR1>, <SRD>

Example

SYST:ERR?

SYSTem:CLEar

This action command is used to clear the Error Queue of messages.

Command syntax

SYSTem:CLEar

Arguments

None

Example

SYST:CLE

Related Command

SYST:ERR?

SYSTem:LOCal

This command places the power supply in local mode during remote operation. The front panel keys are functional.

Command syntax

SYSTem:LOCal

Arguments

None

Example

SYST:LOC

Related Command

SYST:REM SYST:RWL

SYSTem:REMote

This command places the power supply in remote mode. When the power supply is under the remote operation mode, except Print key, other keys on the panel are disabled. By sending SYSTem:LOCal command, switch to local operation mode. The output parameters of the power supply are not affected by change of the operation modes.

Command syntax

SYSTem:REMote

Arguments

None

Example

SYST:REM

Related Command

SYST:LOC SYST:RWL

SYSTem:RWLock

This command places the electronic load in remote mode. All front panel keys including the Print key are disabled. Use SYSTem:LOCal to return the front panel to the local state.

Command syntax

SYSTem:RWLock

Arguments

None

Example

SYST:RWL

Related Command

SYST:REM SYST:LOC

SYSTem:DATE

This command is used to set the system date.

Command syntax

SYSTem:DATE <NR1>,<NR1>,<NR1>

Arguments

<NR1>,<NR1>,<NR1>

Example

SYSTem:DATE 15,5,22

Query syntax

SYSTem:DATE?

Returns

<NR1>

SYSTem:TIME

This command is used to set the system time.

Command syntax

SYSTem:TIME <NR1>,<NR1>,<NR1>

Arguments

<NR1>,<NR1>,<NR1>

Example

SYSTem:TIME 8,45,22

Query syntax

SYSTem:TIME?

Returns

<NR1>

SYSTem:COMMunicate:SELect

This command is used to select the communication interface.

Arguments

USB|GPIB |LAN

Example

SYST:COMM:SEL USB

Query syntax

SYSTem:COMMunicate:SELect?

Returns

USB|GPIB |LAN

SYSTem:COMMunicate:PROTocol?

This command queries system communication protocol.

Command syntax

SYSTem:COMMunicate:PROTocol?

Arguments

None

Example

SYST:COMM:PROT?

Related Command

<CRD>

SYSTem:COMMunicate:GPIB:ADDRess

This command sets the GPIB communication address of the system.

Command syntax

SYSTem:COMMunicate:GPIB:ADDRess <NR1>

Arguments

<NR1>

Example

SYST:COMM:GPIB:ADDR 1

Query syntax

SYSTem:COMMunicate:GPIB:ADDRess?

Returns

<NR1> 1-30

SYSTem:COMMunicate:LAN:IP

This command sets the static IP address of system network.

Command syntax

SYSTem:COMMunicate:LAN:IP <SRD>

Arguments

<SRD>

Example

SYST:COMM:LAN:IP "192.168.1.10"

Query syntax

SYSTem:COMMunicate:LAN:IP?

Returns

<SRD>

SYSTem:COMMunicate:LAN:GATEway

This command sets the network gateway of system.

Command syntax

SYSTem:COMMunicate:LAN:GATEway <SRD>

Arguments

<SRD>

Example

SYST:COMM:LAN:GATEway "192.168.0.1"

Query syntax

SYSTem:COMMunicate:LAN:GATEway?

Returns

<SRD>

SYSTem:COMMunicate:LAN:MASK

This command sets the subnet mask of system network.

Command syntax

SYSTem:COMMunicate:LAN:MASK <SRD>

Arguments

<SRD>

Example

SYST:COMM:LAN:MASK "255.255.255.0"

Query syntax

SYSTem:COMMunicate:LAN:MASK?

Returns

<SRD>

Related Command

SYSTem:COMMunicate:LAN:SOCKetport

This command sets the socket value of the system network.

Command syntax

SYSTem:COMMunicate:LAN:SOCKetport <NR1>

Arguments

<NR1>

Example

SYST:COMM:LAN:SOCK 3000

Query syntax

SYSTem:COMMunicate:LAN:SOCKetport?

Returns

<NR1>

SYSTem:SAVe

This command saves the system parameters. If this instruction is not added, system parameters will not be saved after the power is OFF.

Command syntax

SYSTem:SAVE

Arguments

None

Example

SYST:SAVE

CALibrate:INITialize

This command is used to initialize the calibration parameters.

Command syntax

CALibrate:INITialize

Example

CAL:INIT

Chapter6 Display commands

Display commands control the front panel display of the dc source. Annunciators are not affected.

DISPlay:CHANnel

Selects the output channel that will be displayed on the front panel. Select 1 to display Channel 1; select 2 to display Channel 2; and select 3 to display two channels.

Command syntax

DISPlay:CHANnel <channel>

Arguments

1 | 2 | 3

RST Value:

3

Example

DISPLAY:CHANNEL 2

Query syntax

DISPlay:CHANnel?

Returns

<NR1> 1 or 2 or 3

DISPlay:SCREen

This command sets the display module. This equipment comprises 4 display modules: MENU, HOME, GRAPh, |BATTery.

Command syntax

DISPlay[:WINDow]:SCREen <mode>

Arguments

MENU| HOME| GRAPh| BATTery

RST Value

MENU

Example

DISP:SCRE MENU

Query syntax

DISPlay[:WINDow]:SCREen?

Returns

<CRD> MENU| HOME| GRAPh| BATTery

DISPlay:BRIGhtness

This command sets the LCD display brightness. The parameter ranges from 1 to 10.

Command syntax

DISPlay:BRIGhtness <num>

Arguments

1-10

Example

DISPLAY:BRIGhtness 2

Query syntax

DISPlay:BRIGhtness?

Returns

<NR1> 1-10

Chapter7 Measurement Commands

Measurement commands consist of measure and sense commands.

Measure commands measure the output voltage or current. Measurements are performed by digitizing the instantaneous output voltage or current for a specified number of samples, storing the results in a buffer, and calculating the measured result. Two types of measurement commands are available: MEASure and FETCh. MEASure commands trigger the acquisition of new data before returning the reading. FETCh commands return a reading computed from previously acquired data.

Use MEASure when the measurement does not need to be synchronized with any other event. Use FETCh when it is important that the measurement be synchronized with either a trigger or with a particular part of the output waveform.

MEASure:ARRay:CURRent[n][:DC]?

FETCh:ARRay:CURRent[n][:DC]?

These queries return an array containing the instantaneous output current in amps. The output voltage or current is digitized whenever a measure command is sent or an acquire trigger occurs. The time interval is set by SENSe:SWEep:TINTerval. The position of the trigger relative to the beginning of the data buffer is determined by SENSe:SWEep:OFFSet. The number of points returned is set by SENSe:SWEep:POINts.

Command syntax

MEASure:ARRay:CURRent[n][:DC]?
FETCh:ARRay:CURRent[n][:DC]?

Arguments

None

Example

MEAS:ARR:CURR?
FETC:ARR:CURR2?

Returns

<NR3> [,<NR3>]

Related Command

SENS:SWE:TINT SENS:SWE:OFFS

MEASure:ARRay:VOLTage[n][:DC]?

FETCh:ARRay:VOLTage[n][:DC]?

These queries return an array containing the instantaneous output voltage in volts. The output voltage or current is digitized whenever a measure command is sent or an acquire trigger occurs. The time interval is set by SENSe:SWEep:TINTerval. The position of the trigger relative to the beginning of the data buffer is determined by SENSe:SWEep:OFFSet. The number of points returned is set by SENSe:SWEep:POINts.

Command syntax

MEASure:ARRay:VOLTage[n][:DC]?
FETCh:ARRay:VOLTage[n][:DC]?

Arguments

None

Example

MEAS:ARR:VOLT? FETC:ARR:VOLT2?

Returns

<NR3> [,<NR3>]

Related Command

SENS:SWE:TINT SENS:SWE:OFFS

MEASure:CURRent[n]?

FETCh:CURRent[n]?

These queries return the dc output current.

Command syntax

MEASure[:SCALar]:CURRent [n]?
FETCh[:SCALar]:CURRent [n]?

Arguments

None

Example

MEAS:CURR?
FETC:CURR2?

Returns

<NR3>

Related Command

MEAS:VOLT?
FECT:VOLT2?

MEASure:CURRent[n]:ACDC?

FETCh:CURRent[n]:ACDC?

These queries return the ac+dc rms output current.

Command syntax

MEASure[:SCALar]:CURRent[n]:ACDC?
FETCh[:SCALar]:CURRent[n]:ACDC?

Arguments

None

Example

MEAS:CURR:ACDC?
FETC:CURR:ACDC?

Returns

<NR3>

Related Command

MEAS:VOLT:ACDC?

MEASure:CURRent[n]:HIGH?

FETCh:CURRent[n]:HIGH?

These queries return the High level current of a current pulse waveform. The instrument first measures the minimum and maximum data points of the pulse waveform. It then generates a histogram of the pulse waveform using 16 bins between the maximum and minimum data points. The bin containing the most data points above the 50% point is the high bin. The average of all the data points in the high bin is returned as the High level. If no high bin contains more than 1.25% of the total number of acquired points, then the maximum value is returned by these queries.

Command syntax

MEASure[:SCALar]:CURRent[n]:HIGH?
FETCh[:SCALar]:CURRent[n]:HIGH?

Arguments

None

Example

MEAS:CURR:HIGH?
FETC:CURR:HIGH?

Returns

<NR3>

Related Command

MEAS:CURR:LOW?
CALC:REF:HIGH

MEASure:CURRent[n]:LOW?

FETCh:CURRent[n]:LOW?

These queries return the Low level current of a current pulse waveform. The instrument first measures the minimum and maximum data points of the pulse waveform. It then generates a histogram of the pulse waveform using 16 bins between the maximum and minimum data points. The bin containing the most data points below the 50% point is the low bin. The average of all the data

points in the low bin is returned as the Low level. If no low bin contains more than 1.25% of the total number of acquired points, then the minimum value is returned by these queries.

Command syntax

MEASure[:SCALar]:CURRent[n]:LOW?
FETCh[:SCALar]:CURRent[n]:LOW?

Arguments

None

Example

MEAS:CURR:LOW?
FETC:CURR:LOW?

Returns

<NR3>

Related Command

MEAS:CURR:HIGH?
CALC:REF:LOW

MEASure:CURRent[n]:MAXimum?

FETCh:CURRent[n]:MAXimum?

These queries return the maximum output current.

Command syntax

MEASure[:SCALar]:CURRent[n]:MAXimum?
FETCh[:SCALar]:CURRent[n]:MAXimum?

Arguments

None

Example

MEAS:CURR:MAX?
FETC:CURR:MAX?

Returns

<NR3>

Related Command

MEAS:CURR:MIN?

MEASure:CURRent[n]:MINimum?

FETCh:CURRent[n]:MINimum?

These queries return the minimum output current.

Command syntax

MEASure[:SCALar]:CURRent[n]:MINimum?

FETCh[:SCALar]:CURRent[n]:MINimum?

Arguments

None

Example

MEAS:CURR:MIN?

FETC:CURR:MIN?

Returns

<NR3>

Related Command

MEAS:CURR:MAX?

MEASure:DVM[n]?

FETCh:DVM[n]?

These queries measure dc voltage.

Command syntax

MEASure[:SCALar]:DVM[n] [:DC]?

FETCh[:SCALar]:DVM[n] [:DC]?

Arguments

None

Example

MEAS:DVM:DC?
FETC:DVM:DC?

Returns

<NR3>

MEASure:DVM[n]:ACDC?

FETCh:DVM[n]:ACDC?

These queries measure ac+dc (rms) voltage.

Command syntax

MEASure[:SCALar]:DVM[n]:ACDC?
FETCh[:SCALar]:DVM[n]:ACDC?

Arguments

None

Example

MEAS:DVM:ACDC?
FETC:DVM:ACDC?

Returns

<NR3>

MEASure:VOLTage[n]?

FETCh:VOLTage[n]?

These queries return the dc output voltage.

Command syntax

MEASure[:SCALar]:VOLTage[n] [:DC]?
FETCh[:SCALar]:VOLTage[n] [:DC]?

Arguments

None

Example

MEAS:VOLT?
FETC:VOLT:DC?

Returns

<NR3>

Related Command

MEAS:CURR?

MEASure:VOLTage[n]:ACDC?

FETCh:VOLTage[n]:ACDC?

These queries return the ac+dc rms output voltage.

Command syntax

MEASure[:SCALar]: VOLTage [n]:ACDC?
FETCh[:SCALar]: VOLTage [n]:ACDC?

Arguments

None

Example

MEAS:VOLT:ACDC?
FETC:VOLT:ACDC?

Returns

<NR3>

Related Command

MEAS:CURR:ACDC?

MEASure:VOLTage[n]:HIGH?

FETCh:VOLTage[n]:HIGH?

These queries return the High level voltage of a voltage pulse waveform. The instrument first measures the minimum and maximum data points of the pulse waveform. It then generates a histogram of the pulse waveform using 16 bins

between the maximum and minimum data points. The bin containing the most data points above the 50% point is the high bin. The average of all the data points in the high bin is returned as the High level. If no high bin contains more than 1.25% of the total number of acquired points, then the maximum value is returned by these queries.

Command syntax

MEASure[:SCALar]:VOLTage [n]:HIGH?
FETCh[:SCALar]:VOLTage [n]:HIGH?

Arguments

None

Example

MEAS:VOLT:HIGH?
FETC:VOLT:HIGH?

Returns

<NR3>

Related Command

MEAS:CURR:LOW?

MEASure:VOLTage[n]:LOW?

FETCh:VOLTage[n]:LOW?

These queries return the Low level voltage of a voltage pulse waveform. The instrument first measures the minimum and maximum data points of the pulse waveform. It then generates a histogram of the pulse waveform using 16 bins between the maximum and minimum data points. The bin containing the most data points below the 50% point is the low bin. The average of all the data points in the low bin is returned as the Low level. If no low bin contains more than 1.25% of the total number of acquired points, then the minimum value is returned by these queries.

Command syntax

MEASure[:SCALar]:VOLTage [n]:LOW?
FETCh[:SCALar]:VOLTage [n]:LOW?

Arguments

None

Example

MEAS:VOLT:LOW?
FETC:VOLT:LOW?

Returns

<NR3>

Related Command

MEAS:CURR:HIGH?

MEASure:VOLTage[n]:MAXimum?

FETCh:VOLTage[n]: MAXimum?

These queries return the maximum output voltage.

Command syntax

MEASure[:SCALar]:VOLTage[n]:MAXimum?
FETCh[:SCALar]:VOLTage[n]:MAXimum?

Arguments

None

Example

MEAS:VOLT:MAX?
FETC:VOLT:MAX?

Returns

<NR3>

Related Command

MEAS:CURR:MIN?

MEASure:VOLTage[n]:MINimum?

FETCh:VOLTage[n]:MINimum?

These queries return the minimum output voltage.

Command syntax

MEASure[:SCALar]:VOLTage [n]:MINimum?

FETCh[:SCALar]:VOLTage [n]:MINimum?

Arguments

None

Example

MEAS:VOLT:MIN?

FETC:VOLT:MIN?

Returns

<NR3>

Related Command

MEAS:CURR:MAX?

MEASure[:SCALar]:POWer[n][:DC]?

FETCh[:SCALar]:POWer[n][:DC]?

This command reads back power value, where [n] means channel. If it is omitted, default to Channel 1.

Command syntax

MEASure[:SCALar]:POWer [n][:DC]?

FETCh[:SCALar]:POWer [n][:DC]?

Arguments

None

Example

MEAS:POW2?

Returns

<NR3>

Unit

W (watt)

Related Command

MEAS:CURR? DC
FECT:CURR? RMS

SENSe:CURRent[n]:DETector

This command lets you select the type of detector used for output current measurements. Two choices for detecting current measurements are available:
ACDC This is the preferred choice for all dynamic current measurements. It is especially important to use ACDC detection when measuring pulse or other waveforms with frequency contents greater than several kilohertz.
DC Select *DC* only if you are making dc current measurements and you require a dc measurement offset accuracy better than 2mA on the High current measurement range.

Command syntax

SENSe:CURRent[n]:DETector <detector>

Arguments

ACDC or DC

RST Value

ACDC

Example

SENS:CURR:DET ACDC
SENS:CURR:DET DC

Query syntax

SENSe:CURRent[n]:DETector?

Returns

<CRD>

SENSe[n]:CURRent:MODE

This command sets the current sampling mode, where [n] means number of channels. If n is omitted, default to Channel 1. Parameter AUTo and HIGH mean two current measurement ranges. Auto: when current is lower than 5MA, sampling will automatically switch to low-current measurement; when current is higher than 5MA, sampling will automatically switch to high-current measurement; HIGH: the current is always in high-current sampling; when current is lower than 5MA, no sampling switch over is done.

Command syntax

SENSe[n]:CURRent[:DC]:MODE[:UPPer] <NRf+>

Arguments

AUTo|HIGH

Example

SENS:CURR:MODE AUTo

Query syntax

SENSe[n]:CURRent[:DC]:MODE[:UPPer]?

Returns

<CRD>

SENSe[n]:FUNCtion

This command configures the sensing function for triggered measurements. The dc source has up to three measurement sensors as described below. The query returns the function setting.

CURRent Senses the current measurement at the instrument outputs.

DVM Senses the voltage measurement at the DVM inputs.

VOLTage Senses the voltage measurement at instrument the outputs.

Command syntax

SENSe[n]:FUNCtion <function>

Arguments

"VOLTage" | "CURRent" | "DVM"

Example

SENS:FUNC "VOLT"

Query syntax

SENSe[n]:FUNCtion?

Returns

<SRD>

SENSe[n]:SWEep:POINts

This command defines the number of points in a measurement.

Command syntax

SENSe[n]:SWEep:POINts<NRf+>

Arguments

50 through 600

Example

SENS:SWE:POIN 600

Query syntax

SENSe[n]:SWEep:POINts?

Returns

<NR3>

Related Command

SENS:SWE:TINT SENS:SWE:OFFS MEAS:ARR

SENSe[n]:SWEep:TINTerval

This command defines the time period between samples. The value that you enter for the time interval will be rounded to the nearest 33.33 microsecond increment.

Command syntax

SENSe[n]:SWEep:TINTerval <NRf+>

Arguments

33.33 microseconds through 1 seconds

RST Value

33.33 microseconds

Example

SENS:SWE:TINT 66.66E-6

Query syntax

SENSe[n]:SWEep:TINTerval?

Returns

<NR3>

Related Command

SENS:SWE:POIN SENS:SWE:OFFS MEAS:ARR

SENSe[n]:SWEep:FREQuency

This command sets the sampling interval, i.e., sampling rate. In general, the set value can be exactly divided by 30000, as the maximum sampling rate of the equipment is 30K.

Command syntax

SENSe[n]:SWEep:FREQuency <NRf+>

Arguments

1-30000

RST Value

30000

Example

SENS:SWE:FREQ 15000

Query syntax

SENSe[n]:SWEep:FREQuency?

Returns

<NR3>

Related Command

SENS:SWE:POIN SENS:SWE:OFFS MEAS:ARR

SENSe[n]:WINDow

This command sets the window function that is used in dc and in ac+dc rms

measurement calculations. The following functions can be selected:

HANNing A signal conditioning window that reduces errors in dc and rms measurement calculations in the presence of periodic signals such as line ripple. It also reduces jitter when measuring successive pulse waveforms. The Hanning window multiplies each point in the measurement sample by the function $\cos^4$. Do not use the Hanning window when measuring single-shot pulse waveforms.

RECTangular A window that returns measurement calculations without any signal conditioning. This window may be used for pulse measurements where the exact period of the pulse waveform is known and the measurement interval can be set accordingly using the SENSe:SWEep:TINTerval command.

AVERaging Average measurement.

NOTE: Neither window function alters the instantaneous voltage or current data returned in the measurement array.

Command syntax

SENSe[n]:WINDow[:TYPE] <type>

Arguments

HANNing | RECTangular | AVERaging

RST Value

HANNing

Example

SENS:WIND RECT

Query syntax

SENSe[n]:WINDow[:TYPE]?

Returns

<CRD>

SENSe[n]:WINDow:STATe

This command sets ON or OFF of the window function. If n is omitted, default to Channel 1. Parameters include ON, OFF, 1 and 0.

Command syntax

SENSe[n]:WINDow:STATe <bool>

Arguments

0|1|ON|OFF

Example

SENS:WIND:STAT ON

Query syntax

SENSe[n]:WINDow:STATe?

Returns

< NR1> 0 1

SENSe[n]:SAVE

This command sets the SENSE setting parameter saving. If n is omitted, default to Channel 1.

Command syntax

SENSe[n]:SAVE

Arguments

None

Example

SENSe[n]:SAVE

Chapter8 Output command

OUTPut Subsystem, source output function, OVP, OCP, voltage value, current value upper limit setting, source output speed setting, source isolation output control. Instrument command, Output command, Source command.

INSTrument:COUPle:OUTPut:STATe

This command sets the couple output of instrument channel. If state is 1, ON and OFF are simultaneous; if state is 0, ON and OFF are separate. Parameters include 1, 0, ON and OFF.

Command syntax

INSTrument:COUPle:OUTPut:STATe<bool>

Arguments

0|1|ON|OFF

Example

INST:COUP:OUTP:STAT 1
INST:COUP:OUTP:STAT OFF

Query syntax

INSTrument:COUPle:OUTPut:STATe?

Returns

0|1

OUTPut[n][:STATe]

This command enables or disables the instrument output. [n] means number of channels. If n is omitted, default to Channel 1. Parameters include 1, 0, ON and OFF.

Command syntax

OUTPut[n][:STATe] <bool>

Arguments

0|1|ON|OFF

Example

OUTP 1 OUTP OFF

Query syntax

OUTPut[n][:STATe]?

Returns

0|1

OUTPut:RELay:MODE

This command sets the output relay mode. In IT6402/IT6412/IT6412S, only Channel 1 has this function; and Channel 2 has not.

Command syntax

OUTPut[n]:RELay:MODE <type>

Arguments

BATTery | NORMal

Example

OUTP:REL:MODE BATTery
OUTP:REL:MODE NORMal

Query syntax

OUTPut[n]:RELay:MODE?

Returns

BATTery | NORMal

OUTPut:COMPensation:MODE

This command programs the output compensation circuit. This circuit compensates the output of the dc source according to the input capacitance of the phone being tested as well as the type of output connections being used. The following table summarizes the four programmable compensation modes.

Mode Description

LLocal Used for slower response with short load leads or bench operation. This produces the slowest output response, but provides the best stability (no external capacitor needed).

LRemote Used for slower response with long load leads using remote sensing.

HLocal Use for faster response with short load leads or bench operation (no external cap needed).

HRemote Used for faster response with long load leads using remote sensing. This produces the fastest output response, but requires an external capacitor for stable operation.

NOTE: Standard dc source units are shipped from the factory with the output compensation set to HRemote mode.

Command syntax

OUTPut[n]:COMPensation:MODE <setting>

Arguments

LLOCAL | LREMOTE | HLOCAL | HREMOTE

RST Value

HREMOTE

Example

OUTP:COMP:MODE HREMOTE

Query syntax

OUTPut[n]:COMPensation:MODE?

Returns

<CRD>

Related Command

OUTP:TYPE HIGH

OUTP[n]:TYPE[:CAPacitance] <type>

This command sets the output type as High (Fast) and Low (Slow) output.

Command syntax

OUTPut:TYPE[:CAPacitance] < type >

Arguments

LOW|HIGH

RST Value

HIGH

Example

OUTP:TYPE HIGH

Query syntax

OUTPut:TYPE[:CAPacitance]?

Returns

<CRD>

OUTPut:DFI

This command enables or disables the discrete fault indicator (DFI) output from the dc source.

Command syntax

OUTPut:DFI[:STATe] <bool>

Arguments

0 | 1 | OFF | ON

RST Value

OFF

Example

OUTP:DFI 1 OUTP:DFI ON

Query syntax

OUTPut:DFI[:STATe]?

Returns

0 | 1

Related Command

OUTP:DFI:SOUR

OUTPut:DFI:SOURce

This command selects the source for discrete fault indicator (DFI) events. The choices are:

QUEStionable selects the Questionable event summary bit (bit 3 of the Status Byte Register)

OPERation selects the Operation Event summary bit (bit 7 of the Status Byte

Register)

ESB selects the Standard Event summary bit (bit 5 of the Status Byte Register)

RQS selects the Request Service bit (bit 6 of the Status Byte Register)

OFF selects no DFI source

Command syntax

OUTP:DFI:SOUR <source>

Arguments

QUES | OPER | ESB | RQS | OFF

RST Value

OFF

Example

OUTP:DFI:SOUR OPER

Query syntax

OUTPut:DFI:SOUR?

Returns

<CRD>

Related Command

OUTP:DFI

OUTPut:PROTection:CLEar

This command clears the latch that disables the output when an overvoltage, overcurrent, overtemperature, or remote inhibit status condition is detected. All conditions that generate the fault must be removed before the latch can be cleared. The output is then restored to the state it was in before the fault condition occurred.

Command syntax

OUTPut:PROTection:CLEar

Arguments

None

Example

OUTP:PROT:CLE

Related Command

OUTP:PROT:DEL *RCL *SAV

OUTPut[n]:PROTection:DELay

This command sets OCP protection delay, which prevents the subsystem status bit from being recompiled and causing mis-operation due to transient-varied CC status.

Command syntax

OUTPut[n]:PROTection:DELay <NRf+>

Arguments

0 to 60

Unit

seconds

RST Value

0.08 (Normal)

Example

OUTP:PROT:DEL 75E-1

Query syntax

OUTPut[n]:PROTection:DELay?

Returns

<NR3>

Related Command

OUTP:PROT:CLE CURR *RCL *SAV

OUTPut:RI:MODE

This command selects the mode of operation of the Remote Inhibit protection. The RI mode is stored in non-volatile memory. The following modes can be selected:

Latch: Latch mode. After the detection of level change (from high to low) at the

external On/Off control terminals, the power supply output will be switched off. To release the latch state, send the command (OUTPut: PROTection: CLEar) or select “Menu > System > Sys Conf” on the interface to enter the System Menu interface. Select the System Protection Clear by the Up/Down key. Press the right **[Enter]** soft key to release the latch mode.

Live: Live mode. The output state of power supply changes with the level of external On/Off control terminal. When the On/Off control terminal input is high-level, the power supply output is on; and when the external On/Off control terminal input is low-level, the power supply output is off.

Command syntax

OUTPut:RI:MODE <mode>

Arguments

LATCh | LIVE

Example

OUTP:RI:MODE LIVE

Query syntax

OUTPut:RI:MODE?

Returns

<CRD>

Related Command

OUTP:PROT:CLE

OUTPut[n]:SPEed

This command sets the speed of source output. If n is omitted, default to Channel 1. The source output speed can be set as NORMal, FAST and TIME.

Command syntax

OUTPut[n]:SPEed <NRf+>

Arguments

NORMal|FAST|TIME

Example

OUTP:SPE NORMal

OUTP2:SPE FAST

Query syntax

OUTPut[n]:SPEed?

Returns

<CRD> NORMal|FAST|TIME

OUTPut[n]:SPEed:TIME

This command sets the specific time of source output speed.

Command syntax

OUTPut[n]:SPEed:TIME <NRf>

Arguments

0.001-86400.00

Unit

s

Query syntax

OUTPut[n]:SPEed:TIME?

OUTPut[n]:VOLTage[:DC]:RANGe

This command sets the source output range. If n is omitted, default to Channel 1. The source output range can be set as LOW and HIGH. LOW means low range, where, voltage range: -9.05 to 9.05V, current range: -5.05 to 5.05A; HIGH means high range, where, voltage range: -15.1 to 15.1V, current range: -3.05 to 3.05A.

Command syntax

OUTPut[n]:VOLTage[:DC]:RANGe<NRf+>

Arguments

LOW|HIGH

Example

OUTP:VOLT:RANG LOW

OUTP2: VOLT:RANG HIGH

Query syntax

OUTPut[n]:VOLTage[:DC]:RANGe?

Returns

<CRD> LOW|HIGH

OUTPut[n]:DELay

This command sets the delay time of source output. If n is omitted, default to Channel 1. The delay time of source output ranges from 0 to 999.999s.

Command syntax

OUTPut[n]:DELay< NRf >

Arguments

0-999.999

Unit

S(second)

Example

OUTP:DEL 0.5
OUTP2:DEL 0.1

Query syntax

OUTPut[n]:DELay?

Returns

< NRf >

OUTPut:PONSetup[n][:STATe] OFF|ON|LAST

Set the power-on output state.

Command syntax

OUTPut:PONSetup[n][:STATe] OFF|ON|LAST

Arguments

OFF|ON|LAST

Example

OUTP:PONS OFF

Query syntax

OUTPut:PONSetup[n][:STATe]?

Returns

OFF|ON|LAST

SYSTem:POSetup[n] RST|SAV0|LAST

Set the power-on parameter state.

Command syntax

SYSTem:POSetup[n] RST|SAV0|LAST

Arguments

RST|SAV0|LAST

Example

SYST:POS RST

Query syntax

SYSTem:POSetup[n]?

Returns

RST|SAV0|LAST

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

This command sets the current value. If n is omitted, default to Channel 1. The current value setting must meet current upper limit and voltage limit.

Command syntax

[SOURce:]CURRent[n][:LEVel][:IMMediate][:AMPLitude] <NRf >

Arguments

0-5.05

Unit

A(Amps)

Example

CURR 1,CURR2 7

Query syntax

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

Returns

< NR3 >

[SOURce:]CURRent[n]:PROTection:STATe

This command sets the source OCP state of all channels. If source current is in CC state and OCP is on, the output will be switched off and the Questionable Condition state register OC bit will be set as 1. This CC value is set by [SOURce:]CURRent command. The OCP state can be cleared by OUTPut:PROTection:CLEar. Parameters include 1, 0, ON and OFF. When current exceeds the OCP value, the power supply will be switched off.

Command syntax

[SOURce:]CURRent[n]:PROTection:STATe <bool>

Arguments

0|1|ON|OFF

Example

CURR:PROT:STAT 1
CURR2:PROT:STAT OFF

Query syntax

[SOURce:]CURRent[n]:PROTection:STATe?

Returns

0|1

Related Command

OUTP:PROT:CLE *RST

[SOURce:]CURRent[n]:TRIGgered

This command sets a preset current value for source. This preset value will be promptly transferred to output if a trigger is generated. To generate trigger, the trigger subsystem must be initialized (in trigger subsystem, INITiate command is used for initialize trigger).

Command syntax

[SOURce:]CURRent[n][:LEVel]:TRIGgered[:AMPLitude] <NRf+>

Arguments

<NRf+>

Unit

A (amperes)

RST Value

10% of MAX

Example

CURR:TRIG 1CURRENT:LEVEL:TRIGGERED 1

Query syntax

[SOURce:]CURRent[n][:LEVel]:TRIGgered[:AMPLitude]?

Returns

<NR3>

[SOURce:]DIGital:DATA

This command sets the system IO output and controls two system IO output voltages: High 5V and Low 0V.

DIGital: H H (H 为 HIGH L 为 LOW)

H L

L H

L L

Command syntax

[SOURce:]DIGital:DATA<NR1>

Arguments

0/1/2/3

Example

DIGital:DATA 2

Query syntax

[SOURce:]DIGital:DATA?

Returns

< NR1 >

[SOURce:]DIGital:FUNCtion

This command configures two control ports and saves them in NVM.

RIDFi configured as discrete error interruption.

DIGio configured as digital output port. (Refer to DIG:DATA)

Command syntax

[SOURce:]DIGital:FUNCtion <CRD>

Arguments

RIDFi | DIGio

Example

DIG:FUNC DIG

Query syntax

[SOURce:]DIGital:FUNC?

Returns

<CRD>

[SOURce:]CURRent[n]:LIMit:STATe

This command sets the source OCP state. If n is omitted, default to Channel 1. Parameters include 1, 0, ON and OFF, Parameters include 0|1|ON|OFF.

Command syntax

[SOURce:]CURRent[n]:LIMit:STATe <bool>

Arguments

0|1|ON|OFF

Example

CURR:LIM:STAT 1

CURR2:LIM:STAT OFF

Query syntax

[SOURce:]CURRent[n]:LIMit:STATe?

Returns

0|1

[SOURce:]CURRent[n]:LIMit

This command sets the upper limit of source current. If n is omitted, default to Channel 1. The upper limit can be set as 0-6A.

Command syntax

CURRent[n]:LIMit < NRf >

Arguments

0-6.0

Unit

A(Amps)

Example

CURR: LIM 1.688
CURR2: LIM 5.28

Query syntax

CURRent[n]:LIMit?

Returns

< NR3 >

[SOURce:]RESistance[n][:LEVel][:IMMediate][:AMPLitude]

This command sets the source internal resistance. If n is omitted, default to Channel 1.

Command syntax

[SOURce:]RESistance[n][:LEVel][:IMMediate][:AMPLitude] <NRf >

Arguments

0-1

Unit

Ω (Ohms)

Example

RES 1, RES2 0.2

Query syntax

[SOURce:]RESistance[n][:LEVel][:IMMediate][:AMPLitude]?

Returns

< NR3>

[SOURce:]RESistance:TRIGger

This command sets the source internal resistance output value in case of trigger.

Command syntax

[SOURce:]RESistance[:LEVel]:TRIGgered[:AMPLitude] <NRf+>

RST Value

0

Example

RES:TRIG 1

Query syntax

[SOURce:]RESistance[:LEVel]:TRIGgered[:AMPLitude]?

Returns

<NR3>

Related Command

RES

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

This command sets the voltage value. If n is omitted, default to Channel 1. The voltage value setting must meet voltage upper limit and voltage limit.

Command syntax

[SOURce:]VOLTage[n][:LEVel][:IMMediate][:AMPLitude] <NRf >

Arguments

0-15.1

Unit

V(Volts)

Example

VOLT 1; VOLT2 7

Query syntax

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

Returns

< NRf >

[SOURce:]VOLTage[n]:PROTection

This command sets the source OVP value. This value can be set through the front panel or the remote interface. OVP is supported by hardware circuit. In case of over voltage, the OVP will response promptly, which provides extremely good protection for external test device. If n is omitted, default to Channel 1. Upper limit can be set as 0-15.05V.

Command syntax

VOLTage[n]:PROTection < NRf >

Arguments

0-15

Unit

V(Volts)

Example

VOLT:PROT 1.688
VOLT2:PROT 16

Query syntax

VOLTage[n]:PROTection?

Returns

< NRf >

[SOURce:]VOLTage[n]:PROTection:STATe

This command sets the source OVP state. If n is omitted, default to Channel 1. Parameters include 1, 0, ON and OFF. When current exceeds the OVP value,

the power supply will be switched off.

Command syntax

[SOURce:]VOLTage[n]:PROTection:STATe <bool>

Arguments

0|1|ON|OFF

RST Value

OFF

Example

VOLT:PROT:STAT 1
VOLT2:PROT:STAT OFF

Query syntax

[SOURce:]VOLTage[n]:PROTection:STATe?

Returns

0|1

[SOURce:]VOLTage[n]:TRIGger

This command sets a preset voltage value for source. This preset value will be promptly transferred to output if a trigger is generated. To generate trigger, the trigger subsystem must be initialized (in trigger subsystem, INITiate command is used for initialize trigger).

Command syntax

[SOURce:]VOLTage[n][:LEVel]:TRIGgered[:AMPLitude]

Arguments

<NRf+>

Unit

V (volts)

RST Value

0

Example

VOLT:TRIG 15 VOLTAGE:LEVEL:TRIGGERED 15

Query syntax

[SOURce:]VOLTage[n][:LEVel]:TRIGgered[:AMPLitude]?

Returns

<NR3>

Related Command

VOLT VOLT:PROT

[SOURce:]VOLTage[n]:LIMit:STATe

This command sets the source OVP state. If n is omitted, default to Channel 1. Parameters include 1, 0, ON and OFF, Parameters include 0|1|ON|OFF.

Command syntax

[SOURce:]VOLTage[n]:LIMit:STATe <bool>

Arguments

0|1|ON|OFF

Example

VOLT:LIM:STAT 1
VOLT2:LIM:STAT OFF

Query syntax

[SOURce:]VOLTage[n]:LIMit:STATe?

Returns

0|1

[SOURce:]VOLTage[n]:LIMit

This command sets the upper limit of source voltage. If n is omitted, default to Channel 1. The upper limit can be set as 0-15.1V.

Command syntax

VOLTage[n]:LIMit < NRf >

Arguments

0-15.1

Unit

V(Volts)

Example

VOLT: LIM 1.688
VOLT2: LIM 5.28

Query syntax

VOLTage[n]:LIMit?

Returns

< NRf >

[SOURce:]VOLTage[n]:MAXSet?

This command queries the settable maximum value of current voltage.

Command syntax

[SOURce:]VOLTage[n]:MAXSet?

Arguments

NONE

Returns

<NR3>

[SOURce:]VOLTage[n]:MINSet?

This command queries the settable minimum value of current voltage.

Command syntax

[SOURce:]VOLTage[n]:MINSet?

Arguments

NONE

Returns

<NR3>

[SOURce:]CURRent[n]:MAXSet?

This command queries the settable maximum value of current.

Command syntax

[SOURce:]CURRent[n]:MAXSet?

Arguments

NONE

Returns

<NR3>

[SOURce:]CURRent[n]:MINSet?

This command queries the settable minimum value of current.

Command syntax

[SOURce:]CURRent[n]:MINSet?

Arguments

NONE

Returns

<NR3>

[SOURce:]POLarity:PROTection:REVerse:INHibit:CHANge

This command sets the source polarity change protection state.

Command syntax

[SOURce:]POLarity:PROTection:REVerse:INHibit:CHANge <bool>

Arguments

0|1|ON|OFF

Example

POL:PROT:REV:INH:CHAN ON

Query syntax

[SOURce:]POLarity:PROTection:REVerse:INHibit:CHANge?

Returns

0|1

[SOURce:]POLarity:PROTection:REVerse:STATe

This command sets the source polarity reverse protection state.

Command syntax

[SOURce:]POLarity:PROTection:REVerse:STATe <bool>

Arguments

0|1|ON|OFF

Example

POL:PROT:REV:STAT ON

Query syntax

[SOURce:]POLarity:PROTection:REVerse:STATe?

Returns

0|1

OUTPut:RI:STATe

This command sets the source external On/Off control state.

Command syntax

OUTPut:RI:STATe <bool>

Arguments

0|1|ON|OFF

Example

OUTPut:RI:STATe ON

Query syntax

OUTPut:RI:STATe?

Returns

0|1

Chapter9 Trigger commands

Trigger commands consist of trigger and initiate commands. They are used to generate output transients and measurement triggers.

Initiate initialize the trigger system.

Trigger control the remote triggering of the dc source. Trigger commands (and Initiate commands) are referenced either by name or by number. The correspondence between names and numbers is:

Sequence Number	Sequence Name	Description
1 (the default)	TRANsient	Output transient trigger sequence
2	ACQuire	Measurement acquire trigger sequence

INITiate:SEQuence

INITiate:NAME

INITiate commands control the enabling of both output and measurement triggers. When a trigger is enabled, an event on a selected trigger source causes the specified triggering action to occur. If the trigger subsystem is not enabled, all triggers are ignored.

Command syntax

INITiate[:IMMediate]:SEQuence [1 | 2]
INITiate[:IMMediate]:NAME<name>

Arguments

TRANsient | ACQuire (for INIT:NAME)

Example

INIT:SEQ2
INIT:NAME TRAN

Related Command

ABOR INIT:CONT TRIG TRIG:SEQ:DEF *TRG

INITiate[n]:CONTinuous:SEQuence1

INITiate[n]:CONTinuous:NAME TRANsient

1 or **ON** continuously initiates the output trigger system.

0 or **OFF** turns off continuous triggering. In this state, the output trigger system must be initiated for each trigger using INITiate:SEQuence[n].

Command syntax

INITiate[n]:CONTinuous:SEQuence1 <bool>

INITiate[n]:CONTinuous:NAME TRANsient <bool>

Arguments

0 | 1 | OFF | ON

Example

INIT:CONT:SEQ1 ON

INIT:CONT:NAME TRAN 1

Related Command

ABOR INIT TRIG TRIG:SEQ:DEF *TRG

TRIGger

This command generates a BUS trigger for the output transient trigger system. If the transient trigger system is enabled, the trigger will then:

1. Initiate a pending level change as specified by CURRent:TRIGger or VOLTage:TRIGger.
2. Clear the WTG bit in the Status Operation Condition register after both transient and acquire trigger sequences have completed. (WTG is the logical-or of both transient and acquire sequences.)
3. If INITiate:CONTinuous ON has been programmed, the trigger subsystem is immediately re-enabled for subsequent triggers. As soon as it is cleared, the WTG bit is again set to 1.

Command syntax

TRIGger[:SEQuence1][:IMMediate]

TRIGger[:IMMediate]

Arguments

None

Example

TRIG
TRIG:IMM

Related Command

ABOR CURR:TRIG INIT *TRG VOLT:TRIG

TRIGger[n]:SOURce

This command selects the trigger source for the output transient trigger system. Since BUS is the only trigger source for transient triggers, this command does not need to be used. It is included for completeness only.

Command syntax

TRIGger[n]:SOURce <source>
TRIGger[n]:SOURce <source>

Arguments

BUS

Example

TRIG:SOUR BUS

Query syntax

TRIGger[n]:SOURce?

Returns

< CRD >

TRIGger[n]:SEQuence2

TRIGger[n]:ACQuire

These commands generate a BUS trigger for the measurement trigger system. When the measurement trigger system is enabled, the measurement trigger causes the dc source to measure either the voltage or current on the main output or the DVM inputs and store the results in a buffer. The SENSe:FUNCtion command selects the signal that will be measured.

Command syntax

TRIGger[n]:SEQuence2

TRIGger[n]:ACQuire

Arguments

None

Example

TRIG:SEQ2
TRIG:ACQ

Related Command

TRIG:SOUR TRIG:SEQ2:DEF TRIG:SEQ2:COUN

TRIGger[n]:SEQuence2:LEVel:CURRent

TRIGger[n]:ACQuire:LEVel:CURRent

This command sets the trigger level for internally triggered current measurements. A positive current trigger occurs when the current level changes from a value less than the lower hysteresis band limit to a value greater than the upper hysteresis band limit. Similarly, a negative current trigger occurs when the current level changes from a value greater than the upper hysteresis band limit to a value less than the lower hysteresis band limit.

Command syntax

TRIGger[n]:SEQuence2:LEVel:CURRent <NRf+>
TRIGger[n]:ACQuire:LEVel:CURRent <NRf+>

Arguments

0 to MAX (see table 8-3)

Unit

A (amperes)

RSTValue:

0

Example

TRIG:SEQ2:LEV:CURR 5
TRIG:ACQ:LEV:CURR 2

Query syntax

TRIGger[n]:SEQuence2:LEVel:CURRent?
TRIGger[n]:ACQuire:LEVel:CURRent?

Returns

<NR3>

Related Command

TRIG:SEQ2:LEV:VOLT
TRIG:SEQ2:HYST:CURR

TRIGger[n]:SEQuence2:LEVel:DVM

TRIGger[n]:ACQuire:LEVel:DVM

This command sets the trigger level for DVM measurements. A positive trigger occurs when the input signal changes from a value less than the lower hysteresis band limit to a value greater than the upper hysteresis band limit. Similarly, a negative trigger occurs when the input signal changes from a value greater than the upper hysteresis band limit to a value less than the lower hysteresis band limit.

Command syntax

TRIGger[n]:SEQuence2:LEVel:DVM <NRf+>
TRIGger[n]:ACQuire:LEVel:DVM <NRf+>

Arguments

0 to MAX (see table A-3)

Unit

V (volts)

RSTValue:

0

Example

TRIG:SEQ2:LEV:DVM 5

Query syntax

TRIGger[n]:SEQuence2:LEVel:DVM?

TRIGger[n]:ACQuire:LEVel:DVM?

Returns

<NR3>

Related Command

TRIG:SEQ2:HYST:DVM

TRIGger[n]:SEQuence2:LEVel:VOLTage

TRIGger[n]:ACQuire:LEVel:VOLTage

This command sets the trigger level for internally triggered voltage measurements. A positive voltage trigger occurs when the voltage level changes from a value less than the lower hysteresis band limit to a value greater than the upper hysteresis band limit. Similarly, a negative voltage trigger occurs when the voltage level changes from a value greater than the upper hysteresis band limit to a value less than the lower hysteresis band limit.

Command syntax

TRIGger[n]:SEQuence2:LEVel:VOLTage <NRf+>
TRIGger[n]:ACQuire:LEVel:VOLTage <NRf+>

Arguments

0 to MAX (see table 8-3)

Unit

V (volts)

RSTValue:

0

Example

TRIG:SEQ2:LEV:VOLT 5
TRIG:ACQ:LEV:VOLT 4

Query syntax

TRIGger[n]:SEQuence2:LEVel:VOLTage?
TRIGger[n]:ACQuire:LEVel:VOLTage?

Returns

<NR3>

Related Command

TRIG:SEQ2:LEV:CURR

TRIGger[n]:SEQuence2:SLOPe:CURRent

TRIGger[n]:ACQuire:SLOPe:CURRent

This command sets the slope of an internally triggered current measurement.

POSitive triggering occurs on the rising edge.

NEGative triggering occurs on the falling edge.

EITHer triggering occurs on either edge.

Command syntax

TRIGger[n]:SEQuence2:SLOPe:CURRent<slope>

TRIGger[n]:ACQuire:SLOPe:CURRent<slope>

Arguments

EITHer | POSitive | NEGative

RSTValue:

POSitive

Example

TRIG:SEQ2:SLOP:CURR POS

Query syntax

TRIGger[n]:SEQuence2:SLOPe:CURRent?

TRIGger[n]:ACQuire:SLOPe:CURRent?

Returns

<CRD>

Related Command

TRIG:SEQ2:SLOP:VOLT

TRIGger[n]:SEQuence2:SLOPe:DVM

TRIGger[n]:ACQuire:SLOPe:DVM

This command sets the slope of the DVM input signal.

POSitive measurement triggering occurs on the rising edge.

NEGative measurement triggering occurs on the falling edge.

EITHer measurement triggering occurs on either edge.

Command syntax

TRIGger[n]:SEQuence2:SLOPe:DVM <slope>

TRIGger[n]:ACQuire:SLOPe:DVM <slope>

Arguments

EITHer | POSitive | NEGative

RSTValue:

POSitive

Example

TRIG:SEQ2:SLOP:DVM POS

Query syntax

TRIGger[n]:SEQuence2:SLOPe:DVM?

TRIGger[n]:ACQuire:SLOPe:DVM?

Returns

<CRD>

Related Command

TRIG:SEQ2:LEV:DVM

TRIGger[n]:SEQuence2:SLOPe:VOLTage

TRIGger[n]:ACQuire:SLOPe:VOLTage

This command sets the slope of an internally triggered voltage measurement.

POSitive triggering occurs on the rising edge.

NEGative triggering occurs on the falling edge.

EITHer triggering occurs on either edge.

Command syntax

TRIGger[n]:SEQuence2:SLOPe:VOLTage <slope>
TRIGger[n]:ACQuire:SLOPe:VOLTage <slope>

Arguments

EITHer | POSitive | NEGative

RSTValue:

POSitive

Example

TRIG:SEQ2:SLOP:VOLT POS

Query syntax

TRIGger[n]:SEQuence2:SLOPe:VOLTage?
TRIGger[n]:ACQuire:SLOPe:VOLTage?

Returns

<CRD>

Related Command

TRIG:SEQ2:SLOP:CURR

TRIGger[n]:SEQuence2:SOURce

TRIGger[n]:ACQuire:SOURce

These commands select the trigger source for measurement triggers as follows:

BUS GPIB device, *TRG, or <GET> (Group Execute Trigger)

INTernal trigger is generated internally when the measured waveform crosses the trigger level with the selected slope.

EXTernal Selects the external trigger input

Command syntax

TRIGger[n]:SEQuence2:SOURce <source>
TRIGger[n]:ACQuire:SOURce <source>

Arguments

BUS | INTernal|EXTernal

RSTValue:

INTernal

Example

TRIG:ACQ:SOUR BUS

Query syntax

TRIGger[n]:SEQuence2:SOURce?
TRIGger[n]:ACQuire:SOURce?

Returns

<CRD>

TRIGger[n]:SEQuence2:MODE

TRIGger[n]:ACQuire:MODE

This command sets the internal voltage trigger mode. If n is omitted, default to Channel 1. Parameters include AUTo|NORMal|SINGel, i.e., automatic, normal and single modes.

Command syntax

TRIGger[n]:SEQuence2:MODE

Arguments

AUTo|NORMal|SINGel

Example

TRIG:SEQ2:MODE AUTo

Query syntax

TRIGger[n]:SEQuence2:MODE?

Returns

< CRD > AUTo|NORMal|SINGel

Chapter10 Trace Commands

TRACe Subsystem

Data trace subcommand system, which sets the data cache size, storage mode, storage variable type, data cache filter, data sampling rate, sampling depth, etc.

TRACe[n]:CLEar

This command sets data cache clearing. If n is omitted, default to Channel 1.

Command syntax

TRACe[n]:CLEar

Arguments

None

Example

TRACe:CLEar

TRACe[n]:DATA?

This command queries all data in the data cache. Data type is set by TRACe[n]:STATistics. If n is omitted, default to Channel 1.

Command syntax

TRACe[n]:DATA?

Arguments

None

Example

TRACe2:DATA?

Returns

<NRf >

TRACe[n]:POINts:ACTual?

This command queries the count of effective data in data cache. If n is omitted, default to Channel 1.

Command syntax

TRACe[n]:POINts:ACTual?

Arguments

None

Example

TRACe:POINts:ACTual?

Returns

<NR1>

TRACe[n]:POINt

This command sets the data cache depth. If n is omitted, default to Channel 1.

Command syntax

TRACe[n]:POINt <NR1>

Arguments

<NR1>[MIN,MAX]

Example

TRACe:POINts 600

Query syntax

TRACe[n]:POINt?

Returns

<NR1>

TRACe:FEED

This command is used to select the reading source saved in the cache. If VOLTage is selected, the voltage reading is saved in cache; if CURRent is selected, the current reading is saved in cache. If VOLTage and CURRent are simultaneously selected, both voltage and current are saved in cache when saving is executed.

Command syntax

TRACe:FEED <CRD>

Arguments

VOLTage|CURRent|TWO

Example

TRAC:FEED VOLT

Query syntax

TRACe:FEED?

Returns

<CRD>

TRACe[n]:FEED:CONTrol

This command sets the storage mode of data cache, Including Always (FIFO, first in and first out of data in the buffer area), Next (Repetition, enable write protection till the buffer area is full) and Never (OFF, disable write protection for the buffer area). If n is omitted, default to Channel 1.

Command syntax

TRACe[n]:FEED:CONTrol <CRD>

Arguments

ALWays|NEXT|NEVer

Example

TRACe:FEED:CONTrol ALWays

Query syntax

TRACe[n]:FEED:CONTrol?

Returns

< CRD > ALWays|NEXT|NEVer

TRACe[n]:STATistics

This command sets the variable type of data cache. If n is omitted, default to Channel 1. Parameters include mean/peak/max/min, i.e., mean value, peak-peak value, maximum value and minimum value.

Command syntax

TRACe[n]:STATistics <CRD>

Arguments

MEAN|PEAK|MAX|MIN

Example

TRACe2: STATistics MEAN

Query syntax

TRACe[n]:STATistics?

Returns

< CRD > MEAN|PEAK|MAX|MIN

TRACe[n]:CLEar

This command sets that data cache will be automatically cleared if data are full. If n is omitted, default to Channel 1. Parameters include ON, OFF, 1 and 0.

Command syntax

TRACe[n]:CLEar <bool>

Arguments

0|1|ON|OFF

Example

TRACe2:CLEar ON

Query syntax

TRACe[n]:CLEar?

Returns

< NR1> 0 1

TRACe[n]:SAVE

This command sets that data cache are imported to USB device. If n is omitted, default to Channel 1.

Command syntax

TRACe[n]:SAVE

Arguments

None

Example

TRACe:SAVE

Chapter11 Scope commands

SCOPe:VOLTage:RANGe

This command sets the voltage range of oscilloscope function.

Command syntax

SCOPe:VOLTage:RANGe < NRf >

Arguments

0.1/0.2/0.5/1/2/5/10

Unit

V

Example

SCOP:VOLT:RANG 1

Query syntax

SCOPe:VOLTage:RANGe?

Returns

<NRf>

SCOPe:CURRent:RANGe

This command sets the current range of oscilloscope function.

Command syntax

SCOPe:CURRent:RANGe < NR1 >

Arguments

0.005/0.01/0.02/0.05/0.1/0.2/0.5/1/2

Unit

A

Example

SCOP:CURR:RANG 1

Query syntax

SCOPe:CURRent:RANGe?

Returns

<NRF>

SCOPe:TIME:BASE

This command sets the oscilloscope time base.

Command syntax

SCOPe:TIME:BASE < NR1 >

Arguments

1/2/5/10/20/50/100/200/500

Unit

ms

Example

SCOPe:TIME:BASE 1

Query syntax

SCOPe:TIME:BASE?

Returns

<NRF>

SCOPe:RUNStop <bool>

This command sets to start(OFF) or stop(ON) the oscilloscope function.

Command syntax

SCOPe:RUNStop <bool>

Arguments

ON/OFF/0/1

Example

SCOP:RUNS 1

Query syntax

SCOPe:RUNStop?

Returns

0/1

SCOPe:AUTO

This command sets the oscilloscope function under automatic adaption mode.

Command syntax

SCOPe:AUTO

Arguments

NONE

SCOPe[n]:SHOW

This command sets the parameter display ON/OFF of oscilloscope function. The parameter 3Bit indicates DAU.

If parameter is 7, 111 is displayed, indicating that all is ON; if parameter is 6, 110 is displayed, indicating that voltage display is off and current and digital voltmeter display is ON.

Command syntax

SCOPe[n]:SHOW

Arguments

0-7

Example

SCOP:SHOW 7

Query syntax

SCOPe[n]:SHOW?

Returns

0-7

SCOPe[n]:VOLTage:BASE

This command sets the voltage base address of oscilloscope function.

Command syntax

SCOPe[n]:VOLTage:BASE < NRF >

Arguments

-15 to 15

Example

SCOP:VOLT:BASE 0

Query syntax

SCOPe[n]:VOLTage:BASE?

Returns

<NRF>

SCOPe[n]:CURRent:BASE

This command sets the current base address of oscilloscope function.

Command syntax

SCOPe[n]:CURRent:BASE < NRF >

Arguments

-5 to 5

Example

SCOP:CURR:BASE 0

Query syntax

SCOPe[n]:CURR:BASE?

Returns

<NRF>

SCOPe[n]:DVM:BASE

This command sets the digital voltmeter base address of oscilloscope function.

Command syntax

SCOPe[n]:DVM:BASE < NRF >

Arguments

-20-20

Example

SCOP:DVM:BASE 0

Query syntax

SCOPe[n]:DVM: BASE?

Returns

<NRF>

SCOPe[n]:VOLTage:TRIGer

This command sets the voltage trigger level of oscilloscope function.

Command syntax

SCOPe[n]:VOLTage:TRIGer < NRF >

Arguments

-15.1-15.1

RST Value

0

Example

SCOP:VOLT:TRIG 5

Query syntax

SCOPe[n]:VOLTage:TRIGer?

Returns

<NRF>

SCOPe[n]:CURRent:TRIGer

This command sets the current trigger level of oscilloscope function.

Command syntax

SCOPe[n]:CURRent:TRIGer < NRF >

Arguments

-5.05-5.05

RST Value

0

Example

SCOP:CURR:TRIG 5

Query syntax

SCOPe[n]:CURR:TRIGer?

Returns

<NRF>

SCOPe[n]:DVM:TRIGer

This command sets the digital voltmeter trigger level of oscilloscope function.

Command syntax

SCOPe[n]:DVM:TRIGer < NRF >

Arguments

-30-30

RST Value

0

Example

SCOP:DVM:TRIG 5

Query syntax

SCOPe[n]:DVM:TRIGer?

Returns

<NRF>

SCOPe[n]:TRIGer:SOURce

This command sets the trigger source type of oscilloscope function.

Command syntax

SCOPe[n]:TRIGer:SOURce

Arguments

VOLTage|CURRent|DVM

RST Value

VOLTage

Example

SCOPe:TRIGer:SOURce VOLTage

Query syntax

SCOPe[n]:TRIGer:SOURce?

Returns

VOLTage|CURRent|DVM

SCOPe[n]:TRIGer:MODE

This command sets the trigger mode of oscilloscope function.

Command syntax

SCOPe[n]:TRIGer:MODE

Arguments

AUTO|NORM|SINGle

RST Value

AUTO

Example

SCOPe:TRIGer:MODE SINGle

Query syntax

SCOPe[n]:TRIGer:MODE?

Returns

AUTO|NORM|SINGle

SCOPe[n]:TRIGer:SLOPe

This command sets the trigger edge of oscilloscope function.

Command syntax

SCOPe[n]:TRIGer:SLOPe

Arguments

UP|DOWN|UPDown

RST Value

UP

Example

SCOPe:TRIGer:SLOPe UP

Query syntax

SCOPe[n]:TRIGer:SLOPe?

Returns

UP|DOWN|UPDown

SCOPe:TRIGer:DELay

This command sets the trigger delay time of oscilloscope function.

Command syntax

SCOPe:TRIGer:DELay < NRF >

Arguments

-2000-2000

Unit

ms

Example

SCOPe:TRIGer:DELay 5

Query syntax

SCOPe:TRIGer:DELay?

Returns

<NRF>

SCOPe[n]:DATA?

This command sets to obtain the current wave of oscilloscope. Reply 900 float data at one time. The middle shall be separated by a comma.

Command syntax

SCOPe[n]:DATA?

Arguments

NONE

Returns

<NRF>

Chapter12 Battery commands

BATTery[n]:GROup <NRf>

This command sets the BATTERY group.

Command syntax

BATTery[n]:GROup < NRf >

Arguments

0-19

Example

BATTery:GROup 1
BATTery2:GROup 3

Query syntax

BATTery[n]:GROup?

Returns

<NR1>

BATTery[n]:POINt <NRf>

This command sets the current group point of the BATTERY.

Command syntax

BATTery[n]:POINt < NRf >

Arguments

0-19

RST Value

0

Example

BATTery:POINt 1
BATTery2:POINt 3

Query syntax

BATTery[n]:POINt?

Returns

<NR1>

BATTery[n]:TOTal <NRf>

This command sets the total point of the current group of BATTERY.

Command syntax

BATTery[n]:TOTal <NRf>

Arguments

0-19

Example

BATTery:TOTal 1
BATTery2:TOTal 3

Query syntax

BATTery[n]:TOTal?

Returns

<NR1>

BATTery[n]:PARamneter <NRf><NRf><NRf>

This command sets the 3 parameters of the current point of the current group, i.e., capacity, voltage and internal resistance.

Command syntax

BATTery[n]:PARameter< NRf >

Arguments

Capacity,Volt,Res

Example

BATTery:PARameter 100,5,0.01

Query syntax

BATTery[n]:PARameter?

Returns

<NRf>,<NRf>,<NRf>

BATTery[n]:VOLTage:SHUT <NRf>

This command sets the voltage shut-off value of BATTERY.

Command syntax

BATTery[n]:VOLTage:SHUT< NRf >

Arguments

0-15.1

RST Value

0

Example

BATTery:VOLTage:SHUT 10.0

Query syntax

BATTery[n]:VOLTage:SHUT?

Returns

<NRF>

BATTery[n]:VOLTage:SHUT:STATe <BOOL>

This command sets the voltage shut-off status of BATTERY.

Command syntax

BATTery[n]:VOLTage:SHUT:STATe <BOOL>

Arguments

0/1/ON/OFF

RST Value

0

Example

BATTery:VOLTage:SHUT:STATe ON

Query syntax

BATTery[n]:VOLTage:SHUT:STATe?

Returns

0/1

BATTery[n]:CAPacity:SHUT <NRf>

This command sets the capacity shut-off value of BATTERY.

Command syntax

BATTery[n]:CAPacity:SHUT< NRf >

Arguments

0-9999.99

Unit

mAH

Example

BATTery: CAPacity:SHUT 10.0

Query syntax

BATTery[n]:CAPacity:SHUT?

Returns

<NRF>

BATTery[n]:CAPacity:SHUT:STATe <BOOL>

This command sets the capacity shut-off status of BATTERY.

Command syntax

BATTery[n]:CAPacity:SHUT:STATe <BOOL>

Arguments

0/1/ON/OFF

RST Value

0

Example

BATTery:CAPacity:SHUT:STATe ON

Query syntax

BATTery[n]:CAPacity:SHUT:STATe?

Returns

0/1

BATTery[n]:CURRent:SHUT <NRf>

This command sets the current shut-off value of BATTERY.

Command syntax

BATTery[n]:CURRent:SHUT< NRf >

Arguments

0-5.05

Unit

A

Example

BATTery: CURRent:SHUT 10.0

Query syntax

BATTery[n]:CURRent:SHUT?

Returns

<NRF>

BATTery[n]:CURRent:SHUT:STATe <BOOL>

This command sets the current shut-off status of BATTERY.

Command syntax

BATTery[n]:CURRent:SHUT:STATe < BOOL>

Arguments

0/1/ON/OFF

RST Value

0

Example

BATTery:CURRent:SHUT:STATe ON

Query syntax

BATTery[n]:CURRent:SHUT:STATe?

Returns

0/1

BATTery[n]:TIME:SHUT <NRf>

This command sets the operation time shut-off value of BATTERY.

Command syntax

BATTery[n]:TIME:SHUT< NRf >

Arguments

0-999999

Unit

s

Example

BATTery:TIME:SHUT 9999

Query syntax

BATTery[n]:TIME:SHUT?

Returns

<NR1>

BATTery[n]:TIME:SHUT:STATe <BOOL>

This command sets the time shut-off status of BATTERY.

Command syntax

BATTery[n]:TIME:SHUT:STATe <BOOL>

Arguments

0/1/ON/OFF

RST Value

0

Example

BATTery:TIME:SHUT:STATe ON

Query syntax

BATTery[n]:TIME:SHUT:STATe?

Returns

0/1

BATTery[n]:STARt

This command sets to start operation of BATTERY.

Command syntax

BATTery[n]:STARt

Arguments

NONE

Example

BATT:STAR
BATT2:STAR

BATTery[n]:STOP

This command sets to stop operation of BATTERY.

Command syntax

BATTery[n]:STOP

Arguments

NONE

Example

BATT:STOP
BATT2:STOP

BATTery[n]:CAPacity:CLEar

This command sets to clear the current capacity of the BATTERY.

Command syntax

BATTery[n]:CAPacity:CLEar

Arguments

NONE

Example

BATT:CAP:CLE

BATTery[n]:SAVE

This command sets to save the current group of the BATTERY to FLASH.

Command syntax

BATTery[n]:SAVE

Arguments

NONE

Unit

BATT:SAVE
BATT2:SAVE

BATTery[n]:CLEar

This command sets to clear the BATTERY group value as 0, and save to FLASH.

Command syntax

BATTery[n]:CLEar

Arguments

NONE

Example

BATT:CLEar
BATT2:CLEar

BATTery[n]:RECall:SELect <NR1>

This command sets the group of BATTERY to be recalled and load it.

Command syntax

BATTery[n]:RECall:SELect <NR1>

Arguments

0-19

Example

BATT:REC:SEL 1
BATT2:REC:SEL 12

BATTery[n]:MODE

This command sets the operation mode of BATTERY.

Command syntax

BATTery[n]:MODE

Arguments

CHARge,DISCharge,SIMulator

Example

BATT:MODE CHARge
BATT2:MODE SIM

Query syntax

BATTery[n]:MODE?

Returns

CHARge,DISCharge,SIMulator

BATTery[n]:VOLTage <NRf>

This command sets the charge or discharge voltage value of the BATTERY.

Command syntax

BATTery[n]:VOLTage < NRf >

Arguments

-15.1-15.1

Unit

V

Example

BATTery:VOLTage 10

Query syntax

BATTery[n]:VOLTage?

Returns

<NRF>

BATTery[n]:CURRent <NRf>

This command sets the charge or discharge current value of BATTERY.

Command syntax

BATTery[n]:CURRent< NRf >

Arguments

0-5.05

Unit

A

Example

BATTery:CURRent 10

Query syntax

BATTery[n]:CURRent?

Returns

<NRF>

Chapter13 List commands

LIST[n]:GROup <NRf>

This command sets the LIST group.

Command syntax

LIST[n]:GROup < NRf >

Arguments

0-19

RST Value

0

Example

LIST:GROup 1
LIST2:GROup 3

Query syntax

LIST[n]:GROup?

Returns

<NR1>

LIST[n]:PERiod <NRf>

This command sets the count of repeated periods of the current group.

Command syntax

LIST[n]:PERiod < NRf >

Arguments

0-65535

RST Value

0

Example

LIST:PERiod 1

LIST2:PERiod 3

Query syntax

LIST[n]:PERiod?

Returns

<NR1>

LIST[n]:TOTal <NRf>

This command sets the total point of the current group.

Command syntax

LIST[n]:TOTal < NRf >

Arguments

0-30

RST Value

0

Example

LIST:TOTal 1
LIST2:TOTal 3

Query syntax

LIST[n]:TOTal?

Returns

<NR1>

LIST[n]:POINt <NRf>

This command sets the current point of current group.

Command syntax

LIST[n]:POINt< NRf >

Arguments

0-29

RST Value

0

Example

LIST:POINt 1
LIST2:POINt 3

Query syntax

LIST[n]:POINt?

Returns

<NR1>

LIST[n]:PARamneter <NRf>,<NRf>,<NRf>,<NRf>

This command sets 4 parameters of the current point of the current group, i.e., voltage, current, internal resistance and duration.

Command syntax

LIST[n]:PARameter < NRf >

Arguments

VOLT,CURR,RES,DWELL

Example

LIST:PARameter 15.0,3.0,0,0.1

Query syntax

LIST[n]:PARameter?

Returns

<NRf>,<NRf>,<NRf>,<NRf>

LIST[n]:GROup:SELect <NRf>

This command sets which group is in enabled status.

Command syntax

LIST[n]:GROup:SELect < NRf >

Arguments

0-19

Example

LIST:GROup: SELect 5 (Select to enable the fifth group)

LIST[n]:GROup:CLEar:SELect

This command sets to clear the enable status of all groups.

Command syntax

LIST[n]:GROup:CLEar:SELect

Arguments

NONE

Example

LIST[n]:GROup:CLEar:SELect

LIST[n] <BOOL>

This command sets to switch on the LIST function of which channel.

Command syntax

LIST[n] <bool>

Arguments

ON/OFF/0/1

Example

LIST ON

Query syntax

LIST[n]?

Returns

0,1,ON,OFF

LIST[n]:RUN:STATe?

This command queries the LIST operation state.

Command syntax

LIST[n]:RUN:STATe?

Arguments

NONE

Returns

0,1

LIST:TRIGer

This command sets the setting of LIST trigger and has no channel difference.

Command syntax

LIST:TRIGer

Arguments

NONE

LIST[n]:STEP?

This command queries the step and group in which LIST operates.

Command syntax

LIST[n]:STEP?

Arguments

NONE

Returns

<NR1>,<NR1> (First parameter is the group number, and the second parameter is step number)

LIST[n]:SAVE

This command saves the setting of current LIST group.

Command syntax

LIST[n]:SAVE

Arguments

NONE

LIST[n]:TRIGer:ENABle

This command sets to enable the LIST channel trigger.

Command syntax

LIST[n]:TRIGer:ENABle

Arguments

NONE

Example

LIST:TRIGer:ENABle

LIST[n]:TRIGer:DISable

This command sets to disable the LIST channel trigger.

Command syntax

LIST[n]:TRIGer:DISable

Arguments

NONE

Example

LIST:TRIGer:DISable

LIST:TERMinate <CPD>

This command sets the end state of the list program.

Command syntax

LIST:TERMinate <CPD>

Arguments

LAST|NORMal|OFF

Example

LIST:TERMinate LAST

Query syntax

LIST:TERMinate?

Returns

LAST|NORMal|OFF

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