

Triple Output Programmable DC Power Supply IT6300 Programming Guide



Model: IT6322A/IT6332A/IT6333A
IT6322B/IT6332B/IT6333B
IT6322C/IT6332C/IT6333C
Version: V3.4

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NOTE

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Quality Certification and Assurance

We certify that IT6300 series power supply meets all the published specifications at time of shipment from the factory.

Warranty

ITECH warrants that the product will be free from defects in material and workmanship under normal use for a period of one (1) year from the date of delivery (except those described in the Limitation of Warranty below).

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- The product returned to ITECH for warranty service must be shipped PREPAID. And ITECH will pay for return of the product to customer.
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This Warranty will be rendered invalid if the product is:

- Damaged resulting from customer-wired circuits or customer-supplied parts or accessories;
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- Damaged resulting from customer-wired circuits or use in an environment not designated by us;
- The product model or serial number is altered, deleted, removed or made illegible by customer;
- Damaged as a result of accidents, including but not limited to lightning, moisture, fire, improper use or negligence.

Safety Symbols

	Direct current		ON (power)
	Alternating current		OFF (power)
	Both direct and alternating current		Power-on state
	Chassis (earth ground) symbol.		Power-off state
	Earth (ground) terminal		Reference terminal
	Caution		Positive terminal
	Warning (refer to this manual for specific Warning or Caution information)		Negative terminal

	A chassis terminal	-	-
---	--------------------	---	---

Safety Precautions

The following safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or specific warnings elsewhere in this manual will constitute a default under safety standards of design, manufacture and intended use of the instrument. ITECH assumes no liability for the customer's failure to comply with these precautions.

WARNING

- Do not use the instrument if it is damaged. Before operation, check the casing to see whether it cracks. Do not operate the instrument in the presence of inflammable gasses, vapors or dusts.
- The power supply is provided with a three-core power line during delivery and should be connected to a three-core junction box. Before operation, be sure that the power supply is well grounded. Make sure to use the power cord supplied by ITECH.
- Check all marks on the instrument before connecting the instrument to power supply.
- Use electric wires of appropriate load. All loading wires should be capable of bearing maximum short-circuit of electronic load without overheating. If there are multiple loads, each pair of the load power cord must be carry out the full rated short-circuit output current of the power securely.
- 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.
- Do not install alternative parts on the instrument or perform any unauthorized modification.
- Do not use the instrument if the detachable cover is removed or loosen.
- To prevent the possibility of accidental injuries, be sure to use the power adapter supplied by the manufacturer only.
- 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.
- Never use the instrument with a life-support system or any other equipment subject to safety requirements.

CAUTION

- Failure to use the instrument as directed by the manufacturer may render its protective features void.
- Always clean the casing with a dry cloth. Do not clean the internals.
- Make sure the vent hole is always unblocked.

Environmental Conditions

The instrument is designed for indoor use and an area with low condensation. The table below shows the general environmental requirements for the instrument.




Environmental Conditions	Requirements
Operating temperature	0°C to 40°C
Operating humidity	20%-80% (non-condensation)
Storage temperature	-20°C to 70 °C
Altitude	Operating up to 2,000 meters
Pollution degree	Pollution degree 2
Installation category	II



Note

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

Regulatory Markings

	<p>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.</p>
	<p>The instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affix product label indicates that you must not discard the electrical/electronic product in domestic household waste.</p>
	<p>This symbol indicates the time period during which no hazardous or toxic substances are expected to leak or deteriorate during normal use. The expected useful 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.</p>

Waste Electrical and Electronic Equipment (WEEE) Directive



2002/96/EC Waste Electrical and Electronic Equipment (WEEE) Directive

This product complies with the WEEE Directive (2002/96/EC) marking requirement. This affix product label indicates that you must not discard the electrical/electronic product in domestic household waste.

Product Category

With reference to the equipment classifications described in the Annex 1 of the WEEE Directive, this instrument is classified as a “Monitoring and Control Instrument”.

To return this unwanted instrument, contact your nearest ITECH office.

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 ¹²³

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

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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.

A part of OUTPUT subsystem is listed below:

OUTPUT:

SYNC {OFF|0|ON|1}

SYNC:

MODE {NORMAL|CARRIER}

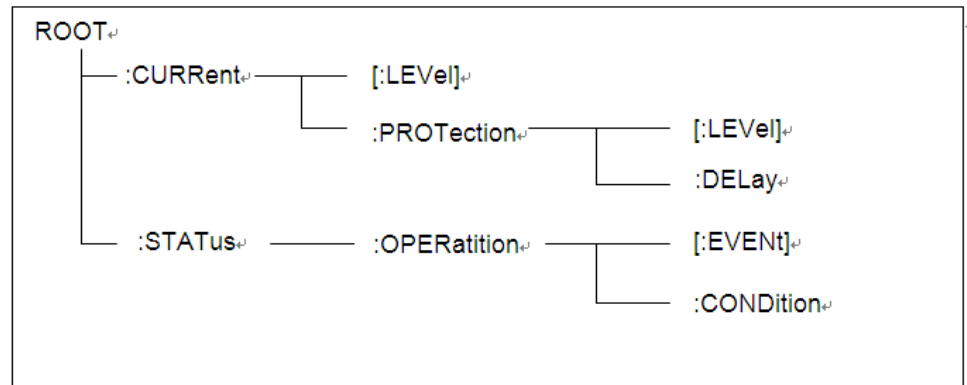
POLARITY {NORMAL|INVERTED}

OUTPUT is the root class keyword, SYNC is the second keyword, MODE and POLARITY are the third keyword. Colon(:) is used for separating the command keyword and the next level keyword.

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 overall electronic load functions, such as reset, status, and synchronization. All common commands 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 subsystem 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 specified 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 specified 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 lower, for 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 command subsystem tables in Section 5 provide the in the long-form version. 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 an 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..."
```


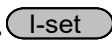
Single quotation marks may also be used to display the same message.

```
DISP:TEXT 'WAITING...'
```

1.6 Communication Interface

IT6322B/IT6332B/IT6333B Standard configuration have three communication interface: RS232, USB and GPIB. IT6322A/IT6332A/IT6333A Standard configuration have two communication interface: RS232 and USB. The IT6300C series power supply comes standard with three communication interfaces: LAN, USB (including TMC and VCP), GPIB. The user can choose any one to realize the communication with the computer. The following content can help you understanding how to through the computer control power supply output.



1.6.1 RS232 interface

The power rear panel has a DB9 needle mouth. Using both for the COM (DB9) cable connect computer. Press  (Shift) +  (Menu), setting menu of configuration the same as the computer configuration before Activation



connection. RS-232 interface can use all of the SCPI command to programming.





NOTE

In the procedure, the RS-232 must be set consistently with the front panel Config menu set. If you want to change, please press  (Shift)+  (Menu) and access to menu to change.

RS-232 data format

RS-232 data is a start bit and a stop bit 10 words. Start bit and the number of stop bits cannot be edit. However, press  (Shift)+  (Menu) and you can choose the following parity item. Parity options are stored in nonvolatile memory.

Baud rate

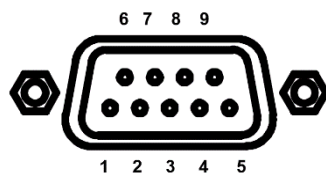
Press  (Shift)+  (Menu), under the Config menu, you can select a baud rate which is stored in nonvolatile memory:

4800/9600/19200/38400/57600/115200

RS-232 connection

RS-232 serial port can connect with controller serial port by using a piece of RS-232 cable with DB-9 interface (such as PC). The following table shows the plug of the pin.

If your computer connects with RS-232 interface with DB-25 plug, you need a cable and an adapter which one aspect of the matter is DB-25 plug the other end is DB-9 plug.



RS232 Pins of Plug

Base pin number	Description
1	No conjunction
2	TXD, data transmission
3	RXD, data receiving
4	No conjunction
5	GND, grounding
6	No conjunction
7	CTS, clear to send
8	RTS, request to send
9	No conjunction

RS-232 troubleshooting

If you are having trouble communicating over the RS-232 interface, check the following:

- The computer and the power supply must be configured for the same baud rate, parity, number of data bits, and flow control options. Note that the power supply is configured for 1 start bit and 1 stop bit (these values are fixed).
- The correct interface cables or adapters must be used, as described under RS-232 Connector. Note that even if the cable has the proper connectors for your system, the internal wiring may be incorrect.
- The interface cable must be connected to the correct serial port on your

computer (COM1, COM2, etc.).

Communication settings

Before communication, you should first make the following parameters of power supply and PC matches.

Baud Rate: 9600 (4800/9600/19200/38400/57600/115200). You can enter the system menu from the front panel, and then set the baud rate.

Data bits: 8

Stop bit: 1

Parity: (none, even, odd)

EVEN Eight data bits have even check

ODD Eight data bits have odd check

NONE Eight data bits have no check

The machine address: (0 ~ 31, the factory a value of 0)

Start Bit	8 Data Bits	Parity=None	Stop Bit
-----------	-------------	-------------	----------

1.6.2 USB interface

You can connect the power and computer by using a USB cable with an A type port and a B type port. All the power function can program through the USB.



Note

For the IT6300C series models, USBTMC and USBVCP options are supported, and USBVCP is a virtual serial port (fixed to 9600/8/N/1). Before starting communication with the PC, you need to install VCP related drivers. Please contact ITECH Technical Support for the driver.


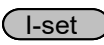

The power supply USB488 interface functions are described as follows:

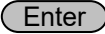
- Interface is 488.2 USB488 interface.
- Interface receive the request of REN_CONTROL, GO_TO_LOCAL, and LOCAL_LOCKOUT.
- Interface receive command information about MsgID = TRIGGER USBTMC and pass on TRIGGER order to function layer.

The power USB488 device function are described as follows:

- Equipment can read all the forced SCPI command.
- Equipment is SR1 enabled.
- Equipment is RL1 enabled.
- Equipment is DT1 enabled.

1.6.3 GPIB interface

First of all, you should make power supply GPIB port connecting to computer GPIB card through the IEEE488 bus. Make sure the connect is firmly and then set the address, power supply address range is: 1 to 30. You can Enter the system menu functions by pressing  (Shift)+  (Menu). You can find GPIB address settings through pressing  and Input address, then press

 to confirm. GPIB address is stored in nonvolatile line storage.

1.6.4 LAN interface

The LAN interface is assembled in the rear panel of the IT6300C series power supply. When connect PC, user can use one crossover cable to connect PC directly. Another way is using one direct-attached network cable to connected the router (in this case, the computer is also connected to the router).



Note

- When using one crossover cable to connect PC directly, the gateway address should be consistent with that of the PC, and the IP address should be at the same network segment with the PC's IP address.
- When the instrument and computer are connected to the router, an independent IP address must be assigned for the instrument.

The user can view the related information of LAN interface or configure the communication parameters in configuration menu (Config).

View LAN Interface Information

The operation steps to view the LAN interface information are as follows.

1. Press **[Shift]+[I-set]** (Menu) to enter into the menu setting interface.
2. Use left/right key or rotate the knob to select **Config > Communication** and press **[Enter]** to confirm.
3. Use left/right key or rotate the knob to select **LAN** and press **[Enter]** to confirm.

The first displayed menu item **Info** is to view the LAN interface information.

4. Press **[Enter]** to confirm.
5. Use the left/right key or rotate the knob to view the LAN interface information. For details, see the information in the Config menu table of the User Manual.
6. After the setting is completed, press **[Esc]** to exit.

Configure LAN Interface Information

The configurable parameters are described as follows.

The instrument address

IP: This value is the Internet Protocol (IP) address of the instrument. An IP address is required for all IP and TCP/IP communications with the instrument. An IP Address consists of 4 decimal numbers separated by periods. Each decimal number ranges from 0 through 255 with no leading zeros (for example, 169.254.2.20).

IP Mask: This value is used to enable the instrument to determine if a client IP address is on the same local subnet. The same numbering notation applies as for the IP Address. When a client IP address is on a different subnet, all packets must be sent to the Default Gateway.

Gate: This value is the IP Address of the default gateway that allows the instrument to communicate with systems that are not on the local subnet, as determined by the subnet mask setting. The same numbering notation applies as for the IP Address. A value of 0.0.0.0 indicates that no default gateway is defined.

DNS1: This field enters the primary address of the server. Contact your LAN

administrator for server details. The same numbering notation applies as for the IP Address. A value of 0.0.0.0 indicates that no default server is defined.

DNS is an internet service that translates domain names into IP addresses. It is also needed for the instrument to find and display its hostname assigned by the network. Normally, DHCP discovers the DNS address information; you only need to change this if DHCP is unused or not functional.

DNS2: This field enters the secondary address of the server. Contact your LAN administrator for server details. The same numbering notation applies as for the IP Address. A value of 0.0.0.0 indicates that no default server is defined.

Socket Port: This value indicates the port number corresponding to the Raw-socket service.

LAN Server

The configurable services include: mDNS, Ping, Telnet, Web, VXI and Raw Socket.

The operation steps to configure are as follows.

This configures the instrument address (IP Mode).

1. Press **[Shift]+[I-set]** (Menu) to enter into the menu setting interface.
2. Use left/right key or rotate the knob to select **Config > Communication** and press **[Enter]** to confirm.
3. Use left/right key or rotate the knob to select **LAN** and press **[Enter]** to confirm.
4. Use left/right key or rotate the knob to select **Config** and press **[Enter]** to confirm.
The first displayed menu item **IP Mode** is to configure the instrument address.
5. Press **[Enter]** to confirm.
 - Auto: automatically configure the addressing of the instrument;
 - Manual: manually configure the addressing of the instrument.
6. After the setting is completed, press **[Esc]** to exit.
7. Restart the instrument and the modified configuration item will take effect.

This selects the LAN services to enable or disable (Server Config).

1. Press **[Shift]+[I-set]** (Menu) to enter into the menu setting interface.
2. Use left/right key or rotate the knob to select **Config > Communication** and press **[Enter]** to confirm.
3. Use left/right key or rotate the knob to select **LAN** and press **[Enter]** to confirm.
4. Use left/right key or rotate the knob to select **Config** and press **[Enter]** to confirm.
5. Use left/right key or rotate the knob to select **Server Config** and press **[Enter]** to confirm.
6. Use left/right key or rotate the knob to select the desired service and press **[Enter]** to confirm.
7. Rotate the knob to adjust the value and press **[Enter]** to confirm.
 - On: indicates enable the service
 - Off: indicates disable the service
8. After the setting is completed, press **[Esc]** to exit.
9. Restart the instrument and the modified configuration item will take effect.

Reset the LAN to the Default Settings

The operation steps to reset the LAN to the default settings are as follows.

1. Press **[Shift]+[I-set]** (Menu) to enter into the menu setting interface.

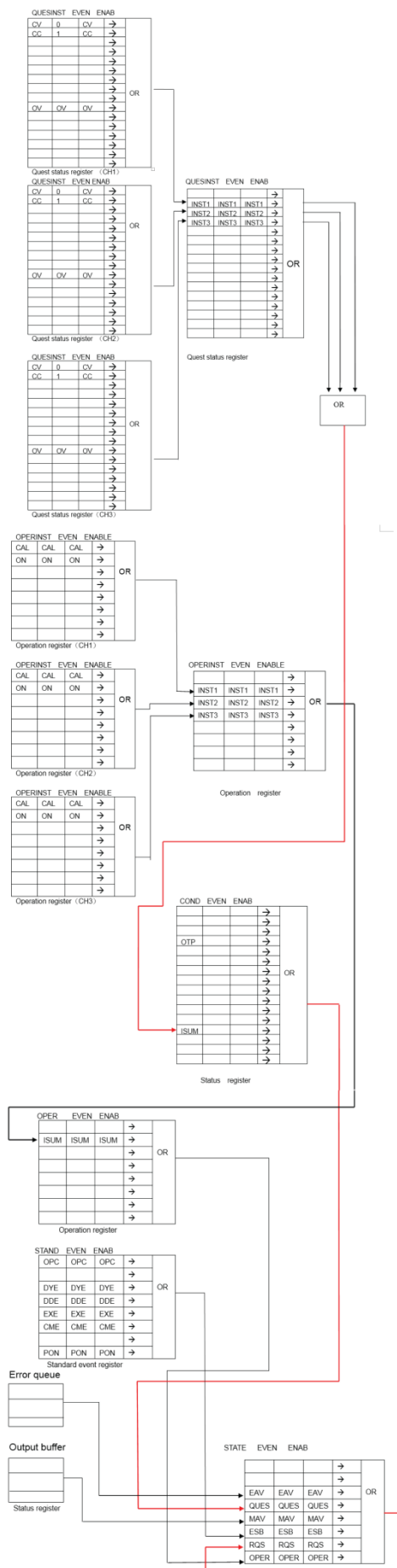
2. Use left/right key or rotate the knob to select **Config > Communication** and press **[Enter]** to confirm.
3. Use left/right key or rotate the knob to select **LAN** and press **[Enter]** to confirm.
4. Use left/right key or rotate the knob to select **Restore** and press **[Enter]** to confirm.
 - NO: indicates refuse to reset the LAN to the default settings.
 - YES: indicates reset the LAN to the default settings.
5. After the setting is completed, press **[Esc]** to exit.
6. Restart the instrument and the modified configuration item will take effect.

Chapter2 SCPI status register

You can get the current status of the power supply by reading the operation status registers. The power supply records the different status of the instrument through the four status register group, the four status register group are: status byte register, standard event register, query status register and operation status register. Status byte register records the information of the other status register

BIT	Signal	Meaning
0 1	CAL ON	Operation status register The power supply is calculating new calibration factor The power supply is waiting for trigger signal
0 1 9	CV CC OV	Query status register Constant voltage state Constant current state Over voltage
0 2 3 4 5 7	OPC QYE DDE EXE CME PON	Standard event register Operation completed. All the parallel operations are completed. Query error. Output buffer data lost. Instrument memory data loss or self test error Execute error. Command parameter over flow or the operation condition is not consistent Command error. There is syntax or semantic error in the command received. Power on bit, this bit is set to 1 after power on
2 3 4 5 6 7	EAV QUES MAV ESB RQS OPER	Status byte register Error buffer available This bit is set to 1 when any one status of enabled query status register changes. Output buffer available Bit ESB is set to 1 when the status of a enabled standard event status register changes If the status of enabled operation register changes, then this bit is set to 1.

The figure below defines the structure of the power status register.



Chapter3 System Commands

SYSTem:ERRor?

This command is used to read the error information.

Command syntax

SYST:ERR?

Arguments

None

Returns

<NR1>, <SRD>

SYSTem:VERSion?

This command is used to query the current SCPI version.

Command syntax

SYST:VERS?

Arguments

None

Returns

<NR2>

Example

1991.1

SYSTem:REMote

This command is used to switch to the remote control mode(PC control).

Command syntax

SYST:REM

Arguments

None

SYSTem:LOCal

This command is used to switch the instrument to local control mode (control from panel).

Command syntax

SYST:LOC

Arguments

None

SYSTem:RWLock[:STATe]

This command is transmit through RS232 interface, the same function as **SYSTem:REMOte**, but the difference is: this command can lock “LOCAL” button as well. When this command is executed, the “Local” button can’t switch to local control mode.

Command syntax

SYST:RWL

Arguments

None

SYSTem:COMMunicate:GPIB:RDEvice:ADDRess

This command is used to set the device address of the GPIB communication.

Command syntax

SYSTem:COMMunicate:GPIB:RDEvice:ADDRess {<NR1>}

Arguments

1~30

Query syntax

SYSTem:COMMunicate:GPIB:RDEvice:ADDRess?

Returns

<NR1>

SYSTem:COMMunicate:LAN:CURRent:ADDRess

This command is used to set IP address of power supply. (LAN related instructions only apply to IT6300C series instruments)

Command syntax

SYSTem:COMMunicate:LAN:CURRent:ADDRess <STR>

Arguments

<STR>

Unit

None

*RST

192.168.0.200

Example

SYST:COMM:LAN:CURR:ADDR "192.168.0.200"

Query syntax

SYSTem:COMMunicate:LAN:CURRent:ADDRess?

Returns

<STR>

SYSTem:COMMunicate:LAN:CURRent:DGATeway

This command is used to set gateway of power supply.

Command syntax

SYSTem:COMMunicate:LAN:CURRent:DGATeway

Arguments

<STR>

Unit

None

*RST Value

192.168.0.1

Example

SYST:COMM:LAN:CURR:DGAT "192.168.0.1"

Query syntax

SYSTem:COMMunicate:LAN:CURRent:DGATeway?

Returns

<STR>

SYSTem:COMMunicate:LAN:CURRent:SMASK

This command is used to set the subnet mask of power supply.

Command syntax

SYSTem:COMMunicate:LAN:CURRent:SMASK

Arguments

<STR>

Unit

None

***RST**

255.255.255.0

Example

SYST:COMM:LAN:CURR:SMAS "255.255.255.0"

Query syntax

SYSTem:COMMunicate:LAN:CURRent:SMASk?

Returns

<STR>

SYSTem:COMMunicate:LAN:DHCP[:STATe]

This command is used to set Dynamic IP address of power supply.

Command syntax

SYSTem:COMMunicate:LAN:DHCP[:STATe] <bool>

Arguments

0|1|OFF|ON

Reset Value

0

Example

SYST:COMM:LAN:DHCP 1

Query syntax

SYSTem:COMMunicate:LAN:DHCP[:STATe]?

Returns

0|1

SYSTem:COMMunicate:LAN:SOCKetport

This command is used to set socket port of communication.

Command syntax

SYSTem:COMMunicate:LAN:SOCKetport <NR1>

Arguments

<NR1>

Unit

None

*RST value

30000

Query syntax

SYSTem:COMMunicate:LAN:SOCKetport?

Returns

<NR1>

SYSTem:COMMunicate:LAN:MACaddress?

This command is used to return the MAC address of LAN communication.

Command syntax

SYSTem:COMMunicate:LAN:MACaddress?

Arguments

<STR>

ADDR

Address Matching Command

This command is used in **multi-device mode** via the **RS232 communication interface**.

When this command is sent, the power supply whose communication address matches the command's address will establish connection with the PC, allowing the PC to perform related operations on that specific power supply.

Command syntax

ADDR <NR1>

Arguments

0~30

SYSTem:BEEPer

This order is used to test the beeper, after execute this order, the power supply will issue a beep sound.

Command syntax

SYSTem:BEEPer

Arguments

None

STATus:QUEStionable[:EVENT]?

This command can be used to read the value in query event register. After executing this command, the query event register will be cleared.

Query syntax

STATus:QUEStionable[:EVENT]?

Arguments

None

Returns

<NR1>

Related Command

STATus:QUEStionable:ENABLE

STATus:QUEStionable:CONDition?

This command can be used to read the value of the query condition register. When the value of a bit in the query condition register changes, the corresponding bit in the query event register is set to 1.

Query syntax

STATus:QUEStionable: CONDition?

Arguments

None

Returns

<NR1>

STATus:QUEStionable:ENABLE

This command edits the enable register value of query event. setting parameter can determine which bit value of query event register is 1 and the bit will cause QUES of status byte register to be 1.

Command syntax

STATus:QUEStionable:ENABLE <NRf>

Arguments

0~255

Default set

Refer to *PSC command

Example

STATus:QUEStionable:ENABLE 128

Query syntax

STATus:QUESTionable:ENABLE?

Returns

<NR1>

Related Command

*PSC

STATus:PRESet

This command is used to clean status event.

Command syntax

STATus:PRESet

Arguments

None

STATus:QUESTionable:INSTrument[:EVENT]?

This command can query the parameter of event register in the channel. When the query value is returned, the register is reset.

Query syntax

STATus:QUESTionable:INSTrument[:EVENT]?

Arguments

None

Returns

<Nrf>

STATus:QUESTionable:INSTrument:ENABLE

This command can re-write the parameter of query enable register in the channel.

Command syntax

STATus:QUESTionable:INSTrument:ENABLE

Arguments

Register parameter

Query syntax

STATus:QUESTionable:INSTument:ENABLE?

STATus:QUEStionable:INSTrument:ISUMmary1[:EVENT]?

This command can query the event register in channel 1. When the query value is returned, the register is reset.

Query syntax

STATus:QUEStionable:INSTrument:ISUMmary1 [:EVENT]?

Arguments

None

STATus:QUEStionable:INSTrument:ISUMmary1:ENABLe

This command can re-write the parameter of query enable register in channel 1.

Command syntax

STATus:QUEStionable:INSTrument:ISUMmary1:ENABLe

Arguments

Register parameter

Query syntax

STATus:QUEStionable:INSTrument:ISUMmary1:ENABLe?

STATus:QUEStionable:INSTrument:ISUMmary1:CONDition?

This command can query the parameter of query status register in channel 1.

Query syntax

STATus:QUEStionable:INSTrument:ISUMmary1:CONDition?

Arguments

None

STATus:QUEStionable:INSTrument:ISUMmary2[:EVENT]?

This command can query the event register in channel 2. When the query value is returned, the register is reset.

Query syntax

STATus:QUEStionable:INSTrument:ISUMmary2[:EVENT]?

Arguments

None

STATus:QUEStionable:INSTrument:ISUMmary2:ENABLe

This command can re-write the parameter of query enable register in channel 2.

Command syntax

STATus:QUEStionable:INSTrument:ISUMmary2:ENABLe

Arguments

Register parameter

Query syntax

STATus:QUEStionable:INSTrument:ISUMmary2:ENABLe?

STATus:QUEStionable:INSTrument:ISUMmary2:CONDition?

This command can query the parameter of query status register in channel 2.

Query syntax

STATus:QUEStionable:INSTrument:ISUMmary2:CONDition?

Arguments

None

STATus:QUEStionable:INSTrument:ISUMmary3[:EVENTj]?

This command can query the event register in channel 3. When the query value is returned, the register is reset.

Query syntax

STATus:QUEStionable:INSTrument:ISUMmary3[:EVENTj]?

Arguments

None

STATus:QUEStionable:INSTrument:ISUMmary3:ENABLe

This command can re-write the parameter of query enable register in channel 3.

Command syntax

STATus:QUESTionable:INSTrument:ISUMmary3:ENABle

Arguments

Register parameter

Query syntax

STATus:QUESTionable:INSTrument:ISUMmary3:ENABle?

STATus:QUESTionable:INSTrument:ISUMmary3:CONDition?

This command can query the parameter of query status register in channel 3.

Query syntax

STATus:QUESTionable:INSTrument:ISUMmary3:CONDition?

Arguments

None

STATus:OPERation[:EVENT]?

This command can read the parameter from operation event register. After executing this order, operation event register is reset.

Query syntax

STATus: OPERation [:EVENT]?

Arguments

None

Returns

<NR1>

Related Command

STATus:OPERation:ENABle

Bit description of operation event register:

Bit	7	6	5	4	3	2	1	0
Name	no use	no use	no use	no use	no use	no use	ON	CAL
Value							2	1

STATus:OPERation:CONDition?

This command can be used to read the value of the operating condition register. When the value of a bit in the operating condition register changes, the corresponding bit in the operation event register is set to 1.

Query syntax

STATus: OPERation: CONDition?

Arguments

None

Returns

<NR1>

STATus:OPERation:ENABLE

This command can set the parameter of operation event enable register. Setting parameter can determine which bit value of operation event register is 1 and the bit will cause OPER of status byte register to be 1.

Command syntax

STATus: OPERation:ENABLE <NRf>

Arguments

0~255

Default set

Refer to *PSC command

Example

STATus: OPERation:ENABLE 128

Query syntax

STATus: OPERation:ENABLE?

Returns

<NR1>

STATus:OPERation:INSTrument[:EVENT]?

This command can query the parameter of operation event register in the channel. After executing this order, the register is reset.

Query syntax

STATus:OPERation:INSTrument[:EVENT]?

Arguments

None

STATus:OPERation:INSTrument:ENABLE

This command can re-write the parameter of operation enable register in the channel.

Command syntax

STATus:OPERation:INSTrument:ENABle

Arguments

Register parameter

Query syntax

STATus:OPERation:INSTrument:ENABle?

STATus:OPERation:INSTrument:ISUMmary1[:EVENT]?

This command can query the parameter of operation event register in channel 1. After executing this order, the register is reset.

Query syntax

STATus:OPERation:INSTrument:ISUMmary1[:EVENT]?

Arguments

None

STATus:OPERation:INSTrument:ISUMmary1:ENABle

This command can re-write the parameter of operation enable register in the channel 1.

Command syntax

STATus:OPERation:INSTrument:ISUMmary1:ENABle

Arguments

Register parameter

Query syntax

STATus:OPERation:INSTrument:ISUMmary1:ENABle?

STATus:OPERation:INSTrument:ISUMmary1:CONDition?

This command can query the parameter of operation event register in channel 1.

Query syntax

STATus:OPERation:INSTrument:ISUMmary1:CONDition?

Arguments

None

STATus:OPERation:INSTrument:ISUMmary2[:EVENT]?

This command can query the parameter of operation event register in channel 2. After executing this order, the register is reset.

Query syntax

STATus:OPERation:INSTrument:ISUMmary2[:EVENT]?

Arguments

None

STATus:OPERation:INSTrument:ISUMmary2:ENABLE

This command can re-write the parameter of operation enable register in the channel 2.

Command syntax

STATus:OPERation:INSTrument:ISUMmary2:ENABLE

Arguments

Register parameter

Query syntax

STATus:OPERation:INSTrument:ISUMmary2:ENABLE?

STATus:OPERation:INSTrument:ISUMmary2:CONDitio n?

This command can query the parameter of operation event register in channel 2.

Query syntax

STATus:OPERation:INSTrument:ISUMmary2:CONDitio
n?

Arguments

None

STATus:OPERation:INSTrument:ISUMmary3[:EVENT]?

This command can query the parameter of operation event register in channel 3. After executing this order, the register is reset.

Query syntax

STATus:OPERation:INSTrument:ISUMmary3[:EVENT]?

Arguments

None

STATus:OPERation:INSTrument:ISUMmary3:ENABLE

This command can re-write the parameter of operation enable register in the channel 3.

Command syntax

STATus:OPERation:INSTrument:ISUMmary3:ENABLE

Arguments

Register parameter

Query syntax

STATus:OPERation:INSTrument:ISUMmary3:ENABLE?

STATus:OPERation:INSTrument:ISUMmary3:CONDition?

This command can query the parameter of operation event register in channel 3.

Query syntax

STATus:OPERation:INSTrument:ISUMmary3:CONDition?

Arguments

None

Chapter4 Output Commands

OUTPut[:STATe][:ALL]

This command is used to control the output switch state.

Command syntax

```
OUTPut [:STATe] <bool>
```

Arguments

```
0|1|ON|OFF
```

*RST Value

```
OFF
```

Query syntax

```
OUTPut:STATe[:ALL]?
```

Returns

```
0|1
```

OUTPut:TIMer[:STATe]

This command is used to control the status of the power output timer.

Command syntax

```
OUTPut:TIMer[:STATe] <bool>
```

Arguments

```
0|1|ON|OFF
```

*RST Value

```
OFF
```

Query syntax

```
OUTPut:TIMer:STATe?
```

Returns

```
0|1
```

OUTPut:TIMer:DELay

This command is used to set the delay time of the timer.

Command syntax

```
OUTPut:TIMer:DELay <NR1>
```

Arguments

0.1-99999.9

Unit

S

Query syntax

OUTPut:TIMer:DELay?

OUTPut:TRACk[:STATe]

This command is used to set the following state of channel CH1+CH2.

Command syntax

OUTPut:TRACk[:STATe]

Arguments

0|1|ON|OFF

Query syntax

[SOURce:]OUTPut:TRACk[:STATe]?

Note: If channel 3 and channel 1 or channel 2 are in series or parallel or synchronized state. Then an error occurs after this command is executed.

OUTPut:SERies[:STATe]

This command can set the serial state of CH1+CH2.

Command syntax

OUTPut:SERies[:STATe]

Arguments

0|1|ON|OFF

Query syntax

OUTPut:SERies[:STATe]?

Note: If channel 3 and channel 1 or channel 2 are in series or parallel or synchronized state. Then an error occurs after this command is executed.

OUTPut:PARAllel [:STATe]

This command can set the parallel state of CH1+CH2.

Command syntax

OUTPut:PARAllel [:STATe]

Arguments

0|1|ON|OFF

Query syntax

OUTPut:PARAllel [:STATe]?

Note: If channel 3 and channel 1 or channel 2 are in series or parallel or synchronized state. Then an error occurs after this command is executed.

[SOURce:]CHANnel:OUTPut[:STATe]

This command is used to control the output state (ON/OFF) of the current channel. Before using this command, you must switch to the appropriate channel firstly.

Command syntax

[SOURce:]CHANnel:OUTPut[:STATe] <bool>

Arguments

0|1|ON|OFF

*RST Value

OFF

Query syntax

[SOURce:]CHANnel:OUTPut[:STATe]?

Returns

0|1

[SOURce:]CHANnel?

This command is used to query the current channel. This command only works when the command option in Config menu is selected as EXT1.

Arguments

None

Returns

CH1|CH2|CH3

[SOURce:]CURRent[:LEVeI][:IMMediate][:AMPLitude]

This command is used to set the current value of current channel.

Command syntax

[SOURce:]CURRent[:LEVeI] <NRf>

Arguments

num|MIN|MAX|DEF

Setting range: 0~rated value

Unit

A mA

***RST Value**

MAX

Example

CURR 3A, CURR 30mA, CURR MAX, CURR MIN

Query syntax

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

Arguments

[MIN|MAX]

Example

CURR?, CURR? MAX, CURR?MIN

Returns

<NR2>

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

This command is used to increase a current step for current channel.

Command syntax

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

Arguments

None

Related Command

[SOURce:]CURRent[:LEVel][:IMMediate]:STEP[:INCRement]

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

This command is used to decrease a current step for current channel.

Command syntax

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

Arguments

None

Related Command

[SOURce:]CURRent[:LEVel][:IMMediate]:STEP[:INCRement]

[SOURce:]CURRent[:LEVel][:IMMediate]:STEP[:INCRement]

This command is used to set the current step.

Command syntax

[SOURce:]CURRent[:LEVel][:IMMediate]:STEP[:INCRement]

Arguments

Current value

Unit

A|mA

Query syntax

[SOURce:]CURRent[:LEVel][:IMMediate]:STEP[:INCRement]?

[SOURce:]CURRent[:LEVel]:TRIGgered[:IMMediate][:INCRement]

This command is used to set the trigger current. Only applicable to IT6300A/B series models.

When the instrument receives a trigger signal (*TRG command or USB or GPIB hardware level trigger signal), the instrument automatically sets the current to the current value set in this Trigger command.

Command syntax

[SOURce:]CURRent[:LEVel]:TRIGgered[:IMMediate][:INCRement]

Arguments

Current value|Min|Max|Def|Up|Down

Unit

A|mA

Query syntax

[SOURce:]CURRent[:LEVel]:TRIGgered[:IMMediate][:INCRement]?

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

This command is used to set output Voltage value.

Command syntax

[SOURce:]VOLTage[:LEVel] <NRf>

Arguments

num|MIN|MAX|DEF
Setting range: 0~rated value

Unit

V mV kV

*RST Value

MIN

Query syntax

[SOURce:]VOLTage[:LEVel]?

Arguments

[MIN|MAX]

Returns

<NR2>

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

This command is used to increase a voltage step for voltage channel.

Command syntax

[SOURce:] VOLTage[:LEVel]:UP[:IMMediate][:AMPLitude]
Arguments None

Related Command

[SOURce:]VOLTage[:LEVel][:IMMediate]:STEP[:INCRement]

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

This command is used to decrease a voltage step for voltage channel.

Command syntax

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

Arguments

None

Related Command

[SOURce:]VOLTage[:LEVel][:IMMediate]:STEP[:INCRement]

[SOURce:]VOLTage[:LEVel][:IMMediate]:STEP[:INCRement]

This command is used to set the voltage step.

Command syntax

```
[SOURce:] VOLTage[:LEVel][:IMMediate]:STEP[:INCRement]
```

Arguments

Voltage value

Unit

kV|V|mV

Query syntax

```
[SOURce:] VOLTage[:LEVel][:IMMediate]:STEP[:INCRement]?
```

[SOURce:]VOLTage[:LEVel]:TRIGgered[:IMMediate][:INCRement]

This command is used to set the trigger voltage. Only applicable to IT6300A/B series models.

When the instrument receives a trigger signal (*TRG command or USB or GPIB hardware level trigger signal), the instrument automatically sets the voltage to the voltage value set in this Trigger command.

Command syntax

```
[SOURce:] VOLTage[:LEVel]:TRIGgered[:IMMediate][:INCRement]
```

Arguments

Voltage value|Min|Max|Def|Up|Down

Unit

kV|V|mV

Query syntax

```
[SOURce:] VOLTage[:LEVel]:TRIGgered[:IMMediate][:INCRement]?
```

[SOURce:]VOLTage:PROTection:STATe

This command is used to set the overvoltage protection status of the power supply.

Command syntax

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

Arguments

0 | 1 | ON | OFF

Unit

None

***RST Value**

OFF

Example

VOLT:PROT:STAT 1, VOLT:PROT:STAT ON

Query syntax

[SOURce:] VOLTage:PROTection:STATe?

Arguments

None

Example

VOLT:PROT:STAT?

Returns

<0|1>

[SOURce:]VOLTage:PROTection[:LEVel]

This command is used to set the protection voltage upper limit of the power supply.

Command syntax

[SOURce:] VOLTage:PROTection[:LEVel] <NRf>

Arguments

MIN TO MAX|MIN|MAX

Unit

V | mV

***RST Value**

MAX

Example

VOLT:PROT 30V VOLT:PROT MAX

Query syntax

[SOURce:] VOLTage:PROTection[:LEVel]?

Arguments

[MIN|MAX]

Example

VOLT:PROT? VOLT:PROT? MAX

Returns

<NR2>

[SOURce:]VOLTage:PROTection:TRIPed?

This command is used to query the OVP trigger status.

Command syntax

[SOURce:]VOLTage:PROTection:TRIPed?

Arguments

None

[SOURce:]VOLTage:PROTection:CLEar

This command is used to clear the protection status.

Command syntax

[SOURce:]VOLTage:PROTection:CLEar

Arguments

None

[SOURce:]VOLTage:LIMIT[:LEVel]

This command is used to set the upper limited voltage.

Command syntax

[SOURce:]VOLTage:LIMIT[:LEVel]

Arguments

num|Min|Max|def

Unit

kV|V|mV

Query syntax

[SOURce:]VOLTage:LIMIT[:LEVel]?

Chapter5 Display Commands

DISPlay[:WINDow][:STATe]

This command is used to switch the status of the display.

Command syntax

DISPlay[:WINDow][:STATe]

Arguments

ON/OFF

Query syntax

DISPlay[:WINDow][:STATe]?

DISPlay[:WINDow]:TEXT[:DATA]

This command is used to display the specified characters.

Command syntax

DISPlay[:WINDow]:TEXT[:DATA]

Arguments

String, double quotes

Query syntax

DISPlay[:WINDow]:TEXT[:DATA]?

DISPlay[:WINDow]:TEXT:CLEAr

This command is used to clear the characters on the display and return to the normal display state.

Command syntax

DISPlay[:WINDow]:TEXT:CLEAr

Arguments

None

Chapter6 Trigger Command

TRIGger[:IMMediate]

This order is used to generate a trigger signal when trigger source is in BUS mode. The function of this order is similar to *TRG.

Command syntax

*TRIGger[:IMMediate]

Arguments

None

TRIGger:DELAy

This command is used to set the trigger delay time. When the instrument receives the trigger signal, it will delay the set time and then start execution.

Command syntax

TRIGger:DELAy {<NR1>}

Unit

S

Query syntax

TRIGger:DELAy?

Chapter7 Channel Combination Commands

INSTrument[:SElect]

This command is used to switch the channel.

Command syntax

```
INSTrument[:SElect] {<NR1>}
```

Arguments

```
CH1|CH2|CH3
```

Query syntax

```
INSTrument[:SElect]?
```

Note: When the channel is switched by executing the command, the channel indicator displayed on the VFD does not change.

INSTrument:NSElect

This command is used to switch the channel. The function is the same as INSTrument[:SElect], but the parameters are different.

Command syntax

```
INSTrument:NSElect {<NR1>}
```

Arguments

```
1-3
```

Query syntax

```
INSTrument:NSElect?
```

INSTrument:COMbine:SERies

This command is used to set the specified channels to serial state. Each channel is separated by a comma.

Command syntax

```
INSTrument:COMbine:SERies {<NR2>}
```

Parameter 1

```
CH1|CH2|CH3
```

Parameter 2

```
CH1|CH2|CH3
```

Optional Parameter 3

```
CH1|CH2|CH3
```

Example

```
INST:COM:SER CH1, CH2
```

Note: In this example, channel 1 and channel 2 are connected in series.

INSTrument:COMbine:SERies none

This command is used to disable the channels serial state.

Command syntax

```
INSTrument:COMbine:SERies none
```

Arguments

None

INSTrument:COMbine:PARAllel

This command is used to set the specified channels in parallel state.

Command syntax

```
INSTrument:COMbine:PARAllel {<NR2>}
```

Parameter 1

```
CH1|CH2|CH3
```

Parameter 2

```
CH1|CH2|CH3
```

Optional Parameter 3

```
CH1|CH2|CH3
```

Example

```
INST:COM:PARA CH1,CH2
```

INSTrument:COMbine:PARAllel none

This command is used to disable the channels parallel state.

Command syntax

```
INSTrument:COMbine:PARAllel none
```

Arguments

None

INSTrument:COMbine:TRAck

This command is used to set the specified channels in synchronized state.

Command syntax

```
INSTrument:COMbine:TRAck {<NR2>}
```

Parameter 1

CH1|CH2|CH3

Parameter 2

CH1|CH2|CH3

Optional Parameter 3

CH1|CH2|CH3

Example

INST:COM:TRA CH1,CH2,CH3

INSTrument:COMbine:TRACk none

This command is used to disable the channels synchronization state.

Command syntax

INSTrument:COMbine:TRACk none

Arguments

None

Note: Series, parallel, and synchronous cannot be directly switched to each other. You need to remove the current association before configuring.

INSTrument:COUPl[e]:TRIGger]

This command is prepared for the trigger command ***TRG** to specify which channels are affected by ***TRG**. When this command does not specify a channel, the ***TRG** command only affects the current channel. Each channel is separated by a comma.

Arguments

CH1|CH2|CH3

Query syntax

INSTrument:COUPl[e]:TRIGger]?

Example

INSTrument:COUPl[e]:TRIGger] CH1, CH2

Chapter8 Measurement Commands

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

FETCh[:VOLTage][:DC]?

These two commands are used to read the output voltage of power supply.

Command syntax

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

FETCh[:VOLTage][:DC]?

Arguments

None

Returns

<NR2>

Unit

V

Example

MEAS:VOLT?

MEASure[:SCALar]:CURRent[:DC]?

FETCh:CURRent[:DC]?

These two commands are used to read the output current of power supply.

Command syntax

MEASure[:SCALar]:CURRent[:DC]?

FETCh:CURRent[:DC]?

Arguments

None

Returns

<NR2>

Unit

A

Example

```
MEAS:CURRE?
```

MEASure[:SCALar]:POWER[:DC]?

This command is used to read the output power of power supply.

Command syntax

```
MEASure[:SCALar]:POWER?
```

Arguments

None

Returns

<NR2>

Unit

W

Example

```
MEAS:POW?
```

MEASure[:SCALar]:CURRent:ALL[:DC]?

This command is used to return the current value of three channels at the same time (compatible with the previous 6322).

Command syntax

```
MEASure[:SCALar]:CURRent:ALL[:DC]?
```

Arguments

None

MEASure[:SCALar][:VOLTage]:ALL[:DC]?

This command is used to return the voltage value of three channels at the same time (compatible with the previous 6322).

Command syntax

```
MEASure[:SCALar][:VOLTage]:ALL[:DC]?
```

Arguments

None

Chapter9 Apply Commands

[SOURce:]APPLy

This command is used to switch channels and set voltage and current values at the same time.

Parameter 1

CH1|CH2|CH3

Optional Parameter 2

Voltage|Max|Min|Def|Up|Down

Optional Parameter 3

Current|Max|Min|Def|Up|Down

Query syntax

[SOURce:]APPLy?

Example

APPL CH1,MAX,MIN

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

This command sets the output voltage of three channels at the same time without switching channels.

Parameter 1

Voltage of channel 1

Optional Parameter 2

Voltage of channel 2

Optional Parameter 3

Voltage of channel 3

Unit

V

Example

APP:VOLT 3,3,1

Query syntax

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

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

This command sets the output current of three channels at the same time without switching channels.

Parameter 1

Current of channel 1

Optional Parameter 2

Current of channel 2

Optional Parameter 3

Current of channel 3

Unit

A

Example

APP:CURR 1,1,0.6

Query syntax

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

Chapter10 IEEE-488 Commands

*CLS

This command clears the following registers:

- Standard event register
- Query event register
- Operation event register
- Status byte register

Command syntax

*CLS

Arguments

None

*ESE

This command can set the parameter of standard event enable register. Setting parameter can determine which bit of standard event register is 1 and the byte will enable ESB of status byte register is 1.

Command syntax

*ESE <NRf>

Arguments

0~255

Default set

Refer to *PSC command

Example

*ESE 128

Query syntax

*ESE?

Returns

<NR1>

*ESR?

This command can read the value of standard event status register. After executing this command, standard event status register is reset. Bit definition of standard event status register is as the same as the standard event status enable register.

Query syntax`*ESR?`**Arguments**

None

Returns`<NR1>`**Related Command**`*CLS *ESE *ESE? *OPC`***IDN?**

This command can read information about power supply. The returns parameter contains 4 segments divided by comma.

Query syntax`*IDN?`**Arguments**

None

Returns

ITECH co.ltd Made
IT6322A Product Mode
XXXXXX Product Serial
VXX. XX Software Version

Example`ITECH co.Ltd, IT6322A, 0000000004, V1.01-V1.02`***OPC**

When all commands before this command are executed, bit OPC in standard event register will be set to 1.

Command syntax`*OPC`**Arguments**

None

Query syntax`*OPC?`

Returns

<NR1>

*PSC

This order control if power supply send a query or not when it is reset.

1 OR ON: When power supply is reset, status byte register operation event enable register, query event enable register and standard event status register are all reset.

0 OR OFF: The data of status byte register, operation event enable register, quest event enable register and standard event status enable register is stored in nonvolatile register, and is recalled when power supply is reset.

Command syntax

*PSC <bool>

Arguments

0|1|ON|OFF

Query syntax

*PSC?

Returns

0|1

Related Command

*ESE *SRE STAT:OPER:ENAB STAT:QUES:ENAB

*RST

This command reset the power supply to default settings.

CAL:SEC:STAT 1

OUTP OFF

CURR MAX

VOLT:LIMIT MAX

INST:COM:OFF

Command syntax

*RST>

Arguments

None

*SRE

This command can set the parameter of state byte enable register.setting parameter can determine which byte value of state byte register is 1 and the

byte will set RQS of state byte register to 1. Bit definition of state byte enable register is as the same as the state byte register.

Command syntax

*SRE <NRf>

Arguments

0~255

Default set

Refer to *PSC command

Example

*SRE 128

Query syntax

*SRE?

Returns

<NR1>

Related Command

*ESE *ESR? *PSC

*STB?

This command can read the data from status byte register. After execute this command, the value of bit6 in status byte register will be clean.

Query syntax

*STB?

Arguments

None

Returns

<NR1>

Related Command

*CLS *ESE *ESR

*TRG

When the trigger mode of the power supply is BUS order trigger mode, the order will Generates a trigger signal. The function is the same as **TRIGger[:IMMediate]**.

Command syntax

*TRG

Arguments

None

Related Command

TRIG

***SAV**

This command can save the current setups of power supply to specified memory. These setups contains current setups, voltage setups, max voltage set and min voltage set

Command syntax

*SAV<NRf>

Arguments

1-27

Example

*SAV 3

Related Command

*RCL

***RCL**

This command can recall the setups you saved before from the specified memory.

Command syntax

*RCL<NRf>

Arguments

1-27

Example

*RCL 3

Related Command

*SAV

***TST?**

This command is used to query the self-test by the instrument. 0 indicates that self-test succeeds; other Arguments indicate self-test fails. In addition, in case of failure, an error information will be generated to describe failure reason.

Query syntax

*TST?

Arguments

None

Returns

<NR1> 0 indicates that self-test succeeds; and other values indicate self-test fails.

***WAI**

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

Arguments

None

Related Command

*OPC

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