

# Digital Control Power Supply IT6720 Series

## Frame Format Programming Guide



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Model: IT6720/IT6721  
Version: V2.0

## Notices

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### Manual Part Number

IT6720-400000

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## Safety Notices

### CAUTION

A CAUTION sign denotes a hazard. It calls attention to an operating procedure or practice that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

### WARNING

A WARNING sign denotes a hazard. It calls attention to an operating procedure or practice that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.



### NOTE

A NOTE sign denotes important hint. It calls attention to tips or supplementary information that is essential for users to refer to.

## Quality Certification and Assurance

We certify that series IT6720 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).

For warranty service or repair, the product must be returned to a service center designated by ITECH.















- The product returned to ITECH for warranty service must be shipped PREPAID. And ITECH will pay for return of the product to customer.
- If the product is returned to ITECH for warranty service from overseas, all the freights, duties and other taxes shall be on the account of customer.


## 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;
- Modified or repaired by customer without authorization;
- 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;
- Damaged as a result of accidents, including but not limited to lightning, moisture, fire, improper use or negligence.

## Safety Symbols

	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	-	-
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## 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 instrument 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 current of power supply without overheating. If there are multiple electronic loads, each pair of the power cord must be capable of bearing the full-loaded rated short-circuit output current
- 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 before operation.

## 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 affixed 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 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.</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 I 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 <sup>123</sup>

#### 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 Operation

## 1.1 Communication Cable

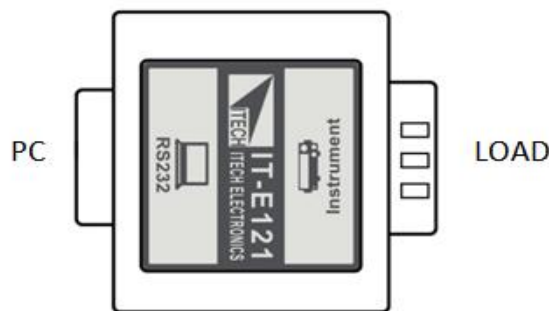
The DB9 interface connector on the rear panel of the power supply can be transferred to RS-232 interface, the following information will tell you how to use the computer to control the output of the power supply.

The optional communication modules are: IT-E121/IT-E122/IT-E123.

### IT-E121 Communication Module

The DB9 interface connector on the rear panel of the IT6720/IT6721 power supply is TTL voltage level; you can use the communication module IT-E121 and a standard RS232 extension cable to connect the DB9 interface connector of the power supply and the RS-232 interface connector of computer for the communication.

IT-E121 communication cable

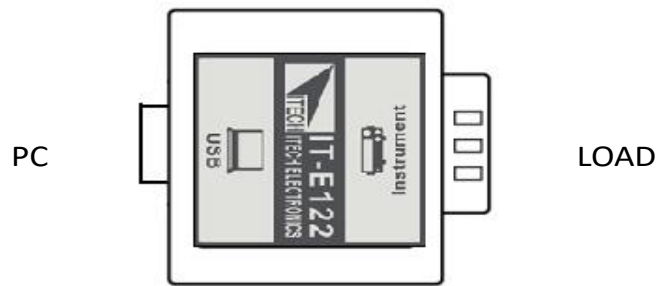


### IT-E122 Communication Module

The DB9 interface on the rear panel of the IT6720/IT6721 power supply outputs TTL levels; IT-E122 end of the USB interface (B-type male interface), you can use the IT-E122 communication module and a standard USB extension cable (one end of the B-type female interface, one end of the A-type) to connect the power supply's DB9 interface and the computer's USB interface for communication.

Note: After connecting the power supply and PC through IT-E122, only Win7 computer system needs to install IT-E122driver (you can search and install it in ITECH official website-Resource Center-Software Driver), and after installing it, USB-to-Serial COM Port will appear in PC's Device Manager.

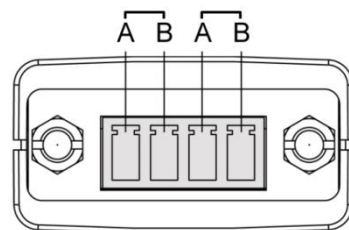
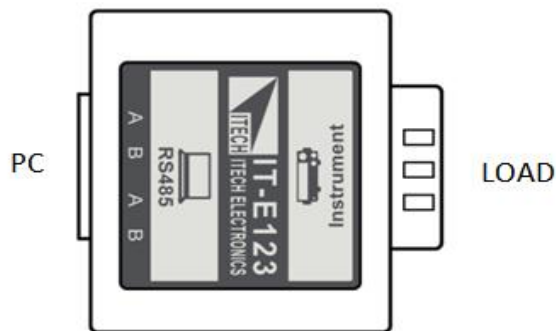
## IT-E122 communication cable



## IT-E123 Communication Module

The interface on both side port of IT-E123 are DB9 interface and RS485 interface, you can use the communication module IT-E123 and an a standard RS485-RS232 conversion cable to connect the DB9 interface connector of the DC power and the RS-232 interface connector of computer for the communication.

## IT-E123 communication cable



RS485 pins

**CAUTION**

The DB9 interface connector on the rear panel of power supply can't be connected to PC by using standard RS-232, USB or GPIB cable. You must use the communication module IT-E121, IT-E122 or IT-E123 to connect.

## 1.2 Communication Between Power Supply and PC

Before using the remote operation mode, please make sure that the baud rate and communication address in power supply are the same as in the computer

software, otherwise, the communication will fail.

- Baud rate: 4800
- Data bit: 8 bit
- Stop bit: 1
- Parity: none
- Address

Start Bit	8 Data Bits	Parity=None	Stop Bit
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## Chapter2 Frame format

Frame length is 26 bytes, the format is as follows:

Start	Address	Command	4-25 bytes are information content	Check sum
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Description:

- Start bit is AAH, occupies a byte.
- Address range is 00H-1EH, occupies a byte.  
FFH is the broadcast address.
- Command occupies a byte.
  - 20H----Setting the remote control mode
  - 21H----Setting the output ON/OFF state
  - 22H----Setting the maximum output voltage
  - 23H----Setting the output voltage
  - 24H----Setting the output current
  - 25H----Setting the communication address
  - 26H----Reading the present current/voltage, maximum voltage, setup voltage/current and operation states of the power supply.
  - 31H----Reading product's model, series number and version information.
  - 12H---- The return information of command operation in power supply.



### Note

You must change the power supply to remote control mode firstly, then you can control the power supply output by computer. The command for remote control is 20H.

26th byte is check sum, the sum of the former 25 bytes.

## Chapter3 Communication protocol

### 3.1 Setting the Remote Control Mode (20H)

1 <sup>st</sup> byte	Start bit (AAH)
2 <sup>nd</sup> byte	Address (00H-1EH)
3 <sup>rd</sup> byte	Command (20H)
4 <sup>th</sup> byte	Operation mode (lowest binary digit 0 for panel operation mode, lowest binary digit 1 for remote operation mode)
5 <sup>th</sup> to 25 <sup>th</sup> byte	System reserve
26 <sup>th</sup> byte	Check sum



#### Note

You cannot control the power supply from the front panel when the power supply is in calibration mode.

### 3.2 Setting the Output State ON/OFF (21H)

1 <sup>st</sup> byte	Start bit (AAH)
2 <sup>nd</sup> byte	Address (00H-1EH)
3 <sup>rd</sup> byte	Command (21H)
4 <sup>th</sup> byte	Power output status (the lowest binary bit of 0 indicates output OFF, the lowest binary bit of 1 indicates output ON)
5 <sup>th</sup> to 25 <sup>th</sup> byte	System reserve
26 <sup>th</sup> byte	Check sum

### 3.3 Setting the Maximum Output Voltage (22H)

1 <sup>st</sup> byte	Start bit (AAH)
2 <sup>nd</sup> byte	Address (00H-1EH)
3 <sup>rd</sup> byte	Command (22H)
4 <sup>th</sup> byte	The lowest byte of voltage upper limit
5 <sup>th</sup> byte	The lower byte of voltage upper limit
6 <sup>th</sup> byte	The higher byte of voltage upper limit
7 <sup>th</sup> byte	The highest byte of voltage upper limit
8 <sup>th</sup> to 25 <sup>th</sup> byte	System reserve
26 <sup>th</sup> byte	Check sum



#### Note

The upper voltage limit is expressed in four-byte hexadecimal code, with the low byte first and the high byte second. If the upper limit of voltage is set to 16.000V, due to the need to use the plastic value to indicate that it is accurate to three decimal places, the set value is agreed to be 1,000 times the actual value, i.e., 16,000; and then 16,000 is converted to hexadecimal, and its hexadecimal code is 00003E80H, then the fourth byte in the command frame is 80H, the fifth byte is 3EH, the sixth byte is 00H, and the seventh byte is 00H.

### 3.4 Setting the Output Voltage (23H)

1 <sup>st</sup> byte	Start bit ( AAH)
2 <sup>nd</sup> byte	Address (00H-1EH)
3 <sup>rd</sup> byte	Command (23H)
4 <sup>th</sup> byte	The byte 0 of output voltage value
5 <sup>th</sup> byte	The byte 1 of output voltage value
6 <sup>th</sup> byte	The higher byte of output voltage value
7 <sup>th</sup> byte	The highest byte of output voltage value
8 <sup>th</sup> to 25 <sup>th</sup> byte	System reserve
26 <sup>th</sup> byte	Check sum



#### Note

The set voltage value parameter format is the same as the upper voltage limit parameter format.

### 3.5 Setting the Output Current (24H)

1 <sup>st</sup> byte	Start bit ( AAH)
2 <sup>nd</sup> byte	Address (00H-1EH)
3 <sup>rd</sup> byte	Command (24H)
4 <sup>th</sup> byte	To set the low byte of current value
5 <sup>th</sup> byte	To set the high byte of current value
6 <sup>th</sup> to 25 <sup>th</sup> byte	System reserve
26 <sup>th</sup> byte	Check sum



#### Note

The set current value is expressed in two-byte hexadecimal, with the low byte first and the high byte second. For example, if the setting current is 1.000A, since it is necessary to use the plastic value to express the accuracy to three decimal places, the setting value is agreed to be 1000 times of the actual value, i.e. 1000; and then 1000 is converted to hexadecimal, and its hexadecimal code is 03E8H, the fourth byte in the command frame is E8H, and the fifth byte is 03H.

### 3.6 Setting the Communication Address (25H)

1 <sup>st</sup> byte	Start bit (AAH)
2 <sup>nd</sup> byte	The current address of power supply (00H-1EH)
3 <sup>rd</sup> byte	Command (25H)
4 <sup>th</sup> byte	The new address
5 <sup>th</sup> to 25 <sup>th</sup> byte	System reserve
26 <sup>th</sup> byte	Check sum

### 3.7 Reading the Present Current/Voltage, Maximum Voltage, Setup Voltage/Current and the States of Power Supply (26H)

1 <sup>st</sup> byte	Start bit (AAH)
2 <sup>nd</sup> byte	Address (00H-1EH)
3 <sup>rd</sup> byte	Command (26H)



### 3.9 The Return Information of Command Operation in Power Supply (12H)

1 <sup>st</sup> byte	Start bit (AAH)
2 <sup>nd</sup> byte	Address (00H-1EH)
3 <sup>rd</sup> byte	Command (12H)
4 <sup>th</sup> byte	Command checkout result
5 <sup>th</sup> to 25 <sup>th</sup> byte	System reserve
26 <sup>th</sup> byte	Check sum



#### Note

When the power supply receives a frame command, it will check the frame command.

- If the check sum is correct, then it will return the corresponding reading parameters.
- If the check sum is incorrect, then it will return to 90H.
- If there is any error on setting parameter or over parameter, then it will return to A0H.
- If the command wasn't executed, then it will return to B0H.
- If the command is not effective, then it will return to C0H.
- Or otherwise, it will return to 80H.

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