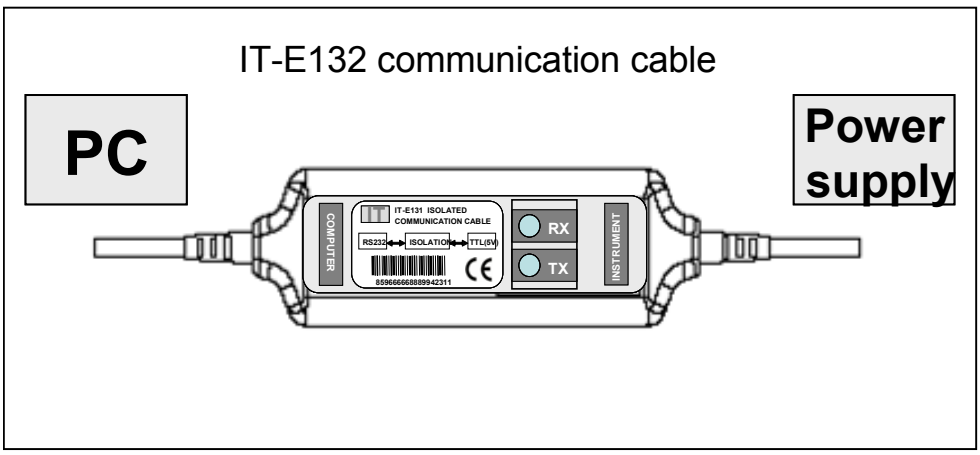
Chapter 4 Remote Operation Mode

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.

4.1 IT-E132 Communication cable

The DB9 interface connector on the rear panel of power supply is TTL voltage level; you can use the communication cable (IT-E132) to connect the DB9 interface connector of the power supply and an USB port of a computer for the communication.



Note: **It will not work if you connect the DB9 interface connector of the power supply to the RS232 interface connector of computer directly by a standard RS232 cable. Please use IT-E132 to connect them.**

4.2 Communication setting

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, you can change the baud rate and communication address from the front

panel or from computer.

1. Address: the range is from 0 to 254，default setting is 0
2. Baud rate: 4800,9600,19200 and 38400 are selectable, default setting is 4800
3. Data bit：8 bit
4. Stop bit：1
5. Parity：None

4.3 Frame format

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

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

Description:

1. Start bit is AAH, occupies a byte.
2. Address range is 0 to FE，occupies a byte.
3. Command occupies a byte.
   a. 20H----Setting the remote control mode
   b. 21H----Setting the output ON/OFF state
   c. 22H----Setting the maximum output voltage
   d. 23H----Setting the output voltage
   e. 24H----Setting the output current
   f. 25H----Setting the communication address
   g. 26H----Reading the present current/voltage, maximum voltage, setup voltage/current and operation states of the power supply.
   h. 27H----Enter the calibration mode
   i. 28H----Reading the calibration mode state
   j. 29H----Calibrate voltage value.
   k. 2AH----Sending the actual output voltage to calibration program.
   l. 2BH----Calibrate current value.
   m. 2CH----Sending the actual output current to calibration program.
   n. 2DH----Save the calibration data to EEPROM.
   o. 2EH----Setting calibration information.
   p. 2FH----Reading calibration information.
   q. 31H----Reading product's model, series number and version information.
   r. 32H----Restoring the factory default calibration data.
   s. 37H----Enable the local key.
   t. 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。**

If you want to calibrate the power supply, set the calibration information or want to set the product serial number, you must set the calibration protection mode to OFF state firstly, the command for calibration protection is 27H.

When the power supply is in calibration mode, it is not allowed to change the output

4. 4th to 25th bytes are information content
5. 26th byte is check sum, the sum of the former 25 bytes.

4.4 Communication protocol

1. Setting the remote control mode (20H)

1st byte	Start bit(AAH)
2nd byte	Address(0~0XFE)
3rd byte	Command （20H）
4th byte	Operation mode(0 represent front panel operation mode, 1 represent remote operation mode)
5th to 25th byte	System reserve
26th byte	Check sum

Note: You can not control the power supply from the front panel when the power supply is in calibration mode.

2. Setting the output state ON/OFF (21H)

1st byte	Start bit (AAH)
2nd byte	Address(0~0XFE)
3rd byte	Command (21H)
4th byte	Output state(0 is OFF，1 is ON)
5th to 25th byte	System reserve
26th byte	Check sum

3. Setting the maximum output voltage (22H)

1st byte	Start bit (AAH)
2nd byte	Address(0~0XFE)
3rd byte	Command (21H)
4th byte	The lowest byte of voltage upper limit
5th byte	The lower byte of voltage upper limit
6th byte	The higher byte of voltage upper limit
7th byte	The highest byte of voltage upper limit
8th to 25th byte	System reserve
26th byte	Check sum

Note: We use 4 bytes of Hex number to represent a maximum voltage value. For example the maximum voltage is 16.000V, the hex code of 16.000 is 0X00003EB0，so the 4th byte is 0XB0, 5th bye is 0X3E, 6th byte is 0X00，7th byte is 0X00.

4. Setting the output voltage (23H)

1st byte	Start bit (AAH)
2nd byte	Address(0~0XFE)

3rd byte	Command（23H）
4th byte	The byte 0 of output voltage value
5th byte	The byte 1 of output voltage value
6th byte	The higher byte of output voltage value
7th byte	The highest byte of output voltage value
8th to 25th byte	System reserve
26th byte	Check sum

Note: We use 4 bytes of Hex number to represent an output voltage value. For example the output voltage value is 16.000V and the hex code of 16.000 is 0X00003EB0，so the 4th byte is 0XB0, 5th byte is 0X3E, 6th byte is 0X00，7th byte is 0X00.

5. Setting the output current (24H)

1st byte	Start bit (AAH)
2nd byte	Address (0~0XFE)
3rd byte	Command（24H）
4th byte	To set the low byte of current value
5th byte	To set the high byte of current value
6th to 25th byte	System reserve
26th byte	Check sum

Note: We use 2 bytes of Hex number to represent an output current value. For example the output current value is 1.000A, the hex code of 1.000 is 0X03E8，so the 4th byte is 0XE8, 5th bye is 0XE3.

6. Setting the communication address (25H)

1st byte	Start bit (AAH)
2nd byte	The current address of power supply(0~0XFE)
3rd byte	Command(25H)
4th byte	The new address
5th to 25th byte	System reserve
26th byte	Check sum

7. Reading the present current/voltage, maximum voltage, setup voltage/current and the states of power supply. (26H)

1st byte	Start bit (AAH)
2nd byte	Address(0~0XFE)
3rd byte	Command（26H）
4th byte	Byte 0 of present output current value
5th byte	Byte 1 of present output current value
6th byte	Byte 0 of present output voltage value
7th byte	Byte 1 of present output voltage

8th byte	Byte 2 of present output voltage
9th byte	Byte 3 of present output voltage
10th byte	Power supply's state
11th byte	To set the low byte of current value
12th byte	To set the high byte of current value
13th byte	Byte 0 of the maximum voltage value
14th byte	Byte 1 of the maximum voltage value
15th byte	Byte 2 of the maximum voltage value
16th byte	Byte 3 of the maximum voltage value
17th byte	Byte 0 of output voltage value
18th byte	Byte 1 of output voltage value
19th byte	Byte 2 of output voltage value
20th byte	Byte 3 of output voltage value
21st to 25th byte	System reserve
26th byte	Check sum

Note:

1. We use 4 bytes to represent the maximum voltage value as follows:

Byte 3	Byte 2	Byte1	Byte 0

2. We use 1 byte to represent power supply's state. Each bit is defined as follows:

From higher bit to lower bit

7	6	5	4	3	2	1	0

0 bit：The output state, 0 is OFF, 1 is ON.

1 bit：Over heat protection, 0 is normal, 1 is abnormal.

2、3 bit: The output mode, 1 is CV mode, 2 is CC mode,3 is Unreg mode.

4、5、6 bit：The fan speed, 0 is stop, 5 is the maximum fan speed.

7 bit：Operation state, 0 is front panel operation mode, 1 is remote control mode.

3. The frame format is the same as above

2nd byte	Address(0~0XFE)
3rd byte	Command(27H)
4th byte	Calibration protection state
5th byte	Calibration password(0X28H)
6th byte	Calibration password(0X01H)
7th to 25th byte	System reserve
26th byte	Check sum

Note:

We use a byte to represent calibration protection state，each bit is defined as follows:

from higher bit to lower bit

7	6	5	4	3	2	1	0

0 bit：Protection state, 0 is to disable protection, 1 is to enable the protection.

9. Reading the calibration state (28H)

1st byte	Start bit(AAH)
2nd byte	Address(0~0XFE)
3rd byte	Command(28H)
4th byte	Calibration protection state
5th byte	System reserve
26th byte	Check sum

10. Calibrating the voltage value (29H)

1st byte	Start bit(AAH)
2nd byte	Address(0~0XFE)
3rd byte	Command(29H)
4th byte	Calibrated voltage points(point 1-3)
5th to 25th byte	System reserve
26th byte	Check sum

Note: To calibrate the 3 points of voltage sequentially.

11. Sending the present output voltage to calibration program (2AH)

1st byte	Start bit (AAH)
2nd byte	Address(0~0XFE)
3rd byte	Command(2AH)
4th byte	The byte 0 of present voltage value
5th byte	The byte 1 of present voltage value
6th byte	The byte 2 of present voltage value
7th byte	The byte 3 of present voltage value
8th to 25th byte	System reserve
26th byte	Check sum

12. Calibrate the current value (2BH)

1st byte	Start bit(AAH)
2nd byte	Address(0-0XFE)
3rd byte	Command(2BH)
4th byte	Calibrated current points(point 1-2)
5th to 25th byte	System reserve
26th byte	Check sum

Note: To calibrate the 2 points of the current value sequentially.

13. Sending the actual output current to calibration program (2CH)

1st byte	Start bit (AAH)

2nd byte	Address(0~0XFE)
3rd byte	Command(2CH)
4th byte	The lower byte of the present current value
5th byte	The higher byte of the present current value
6th to 25th byte	System reserve
26th byte	Check sum

14. Save the calibration data to EEPROM（2DH）

1st byte	Start bit(AAH)
2nd byte	Address (0~0XFE)
3rd byte	Command(2DH)
4th to 25th byte	System reserve
26th byte	Check sum

15. Setting calibration information (2EH)

1st byte	Start bit (AAH)
2nd byte	Address (0~0XFE)
3rd byte	Command(2EH)
4th to 23rd byte	Calibration information(ASIC code)
24th byte	System reserve
25th byte	System reserve
26th byte	Check sum

16. Reading calibration information (2FH)

1st byte	Start bit (AAH)
2nd byte	Address (0~0XFE)
3rd byte	Command（2FH）
4th to 23rd byte	Calibration information(ASCII code)
24th byte	System reserve
25th byte	System reserve
26th byte	Check sum

17. Reading product's model, series number and version information (31H)

1st byte	Start bit (AAH)
2nd byte	Address (0~0XFE)
3rd byte	Command（31H）
4th to 8th byte	Product model(ASIC code)
9th byte	Lower byte of the software version
10th byte	Higher byte of the software version
11th to 20th byte	Serial number(ASCII code)
21st to 25th byte	System reserve
26th byte	Check sum

Note: For example, the serial number is 000045，the product model is IT 6811，and software version is V2.03, then the returned data is as follows:

AA	00	31	36	38	31	31	00	03	02	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	ZZ	XX	XX	XX	XX	XX	57

18. Restore the factory default calibration data (32H)

1st byte	Start bit (AAH)
2nd byte	Address(0~0XFE)
3rd byte	Command(32H)
4th to 25th byte	System reserve
26th byte	Check sum

19. Enable the local key (37H)

1st byte	Start bit (AAH)
2nd byte	Address (0-0XFE)
3rd byte	Command (37H)
4th byte	Enable/disable local key (0 is disable, 1is enable)
5th to 25th byte	System reserve
26th byte	Check sum code

Note: The local keys on the front panel are not allowed to use when the power supply is in remote mode. If the local key was enabled, user can press the numeric key 7 to change the remote mode to front panel operation mode and all local keys will work.

20. The return information of command operation in power supply (12H)

1st byte	Start bit (AAH)
2nd byte	Address (0~0XFE)
3rd byte	Command(12H)
4th byte	Command checkout result
5th to 25th byte	System reserve
26th 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 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 isn't effective, then it will return to C0H. Or otherwise, it will return to 80H.