Control Protocol for Power Supply

Power supply can be connected to PC by the DB9 plug on the rear panel via 3311 or 3312 adapter. The following instructions can help you to know how to control the power supply by PC.

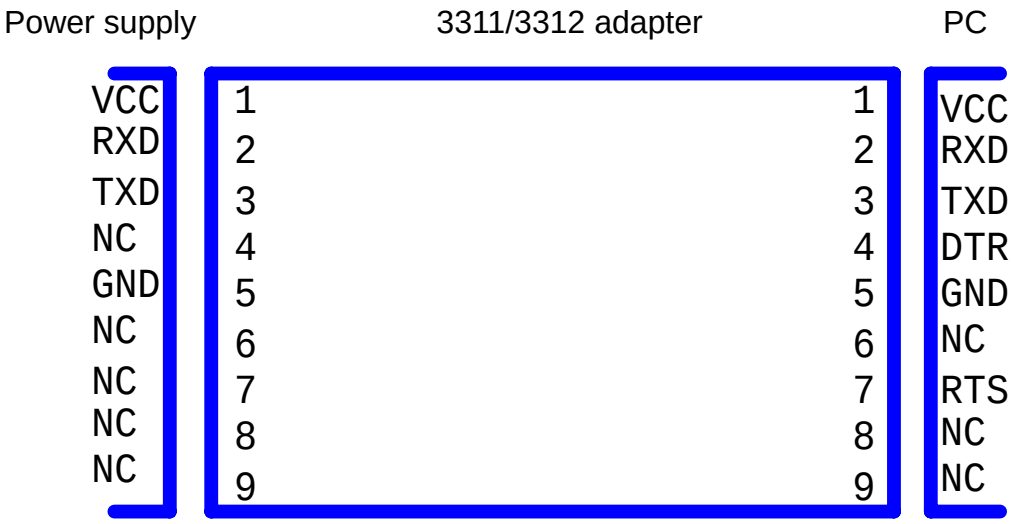
A. Default Serial Communications Port Settings

You can set the communication baudrate and the address of the power supply using the keyboard.

1) Address: (0-31) 00h-FEh
2) Baud rate: 9600 (4800, 9600, 19200, 38400)
3) Data bits: 8
4) Stop bits: 1
5) handshake: None

B. DB9 Serial interface

The output of DB9 interface in the rear back of the unit is TTL, and you have to use 3311 or 3312 adapter to connect it to the PC Com port.



C. Frame format (applies to both transmitted and received date)

The frame length is 26 bytes with the following format:

AAh	Address	Command	Relative information: Bit 4 - 25	Checksum

Description of frame bytes:

1) The first byte of the frame is always AAh
2) The second byte is the power supply address (00h to FEh as set using front panel menu)

3) The third byte is the instrument control Command
   These are the possible commands:
   a) 80h------Set max current, max power and set-value.
   b) 81h------Read current, voltage, power and power supply's state. The states include ON/OFF, over current and over power status of the power supply.
   c) 82h------ To control the ON/OFF state of the power supply
   d) 83h------Set the protection state of power supply
   e) 84h------Read the protection state of power supply
   f) 85h------ Demarcate the power command
   g) 86h------Return the actual output voltage to power supply
   h) 87h------Demarcate the current command
   i) 88h------Return the actual output voltage to power supply
   j) 89h------Set the demarcating information of power supply
   k) 8Ah------Read the demarcating information
   l) 8Bh------Set the serial number of power supply
   m) 8Ch-----Read the serial number, product model and software version of the power supply
   n) 12h-------Check

4) If you want to control the output of the power supply by PC, you have to set the power supply at PC control state, and the command is 82h. If you want to calibrate the output of the power supply and set the calibration information and serial number of the power supply, you have to set the protection status to OFF first.
5) Byte 26 is the checksum obtained by adding the values of the previous 25 bytes.

D. Command Descriptions

1) 80h, Set power supply operating parameters and maximum limits

Byte 1	Aah (frame start)
Byte 2	Addresses (00h - FEh)
Byte 3	80h (command)
Byte 4	Low byte of the max current
Byte 5	high byte of the max current
Byte 6	Low byte of the low character of the Max voltage
Byte 7	high byte of the low character of the Max voltage
Byte 8	Low byte of the high character of the Max voltage
Byte 9	high byte of the high character of the Max voltage
Byte 10	Low byte of the max power

Byte 11	high byte of the max power
Byte 12	Low byte of the low character of the voltage set
Byte 13	high byte of the low character of the voltage set
Byte 14	Low byte of the high character of the voltage set
Byte 15	high byte of the high character of the voltage set
Byte 16	New address of the power supply
Byte 17~25	System Reserved
Byte 26	Checksum

The set-values for current, power are all expressed by two bytes. The set voltage is expressed by four bytes. The low byte is sent first.

For example: The current set value 3589h is specified by the following sequence:

89h	35h

The voltage range of 0~36V is represented by an integer in the range of 0~36000mV
The current range of 0~3A is represented by an integer in the range of 0~3000mA
The powere range of 0~108W is represented by an integer in the range of 0~108W

2) 81h, Read the current, voltage, power value and the status of the power supply

Byte 1	AAh (frame start)
Byte 2	Address (00h~FEh)
Byte 3	81h (Command)
Byte 4	Low byte of the current
Byte 5	high byte of the current
Byte 6	Low byte of the low character of the voltage
Byte 7	high byte of the low character of the voltage
Byte 8	Low byte of the high character of the voltage
Byte 9	high byte of the high character of the voltage
Byte 10	Low byte of the power
Byte 11	high byte of the power
Byte 12	Low byte of the max current

Byte 13	high byte of the max current
Byte 14	Low byte of the low character of the Max voltage
Byte 15	high byte of the low character of the Max voltage
Byte 16	Low byte of the high character of the Max voltage
Byte 17	high byte of the high character of the Max voltage
Byte 18	Low byte of the max power
Byte 19	high byte of the max power
Byte 20	Low byte of the low character of the voltage set
Byte 21	high byte of the low character of the voltage set
Byte 22	Low byte of the high character of the voltage set
Byte 23	high byte of the high character of the voltage set
Byte 24	Output state of the power supply
Byte 25	System reserved
Byte 26	Checksum

The output state of the power supply is revealed by the individual bits of byte 24:

From high to low

b7	b6	b5	b4	b3	b2	b1	b0

b0：0=output OFF; 1=output ON

b1：0=current acceptable; 1=excessive current

b2：0=power acceptable; 1=excessive power

b3：0=local (front panel) control; 1=remote (PC) control

3) 82h, Control the ON/OFF status of the power supply

Byte 1	AAh (frame start)
Byte 2	Address (00h-FEh)
Byte 3	82h (Command)
Byte 4	The state of the power supply
Byte 5~25	System reserved
Byte 26	Checksum

The desired state of the power supply is specified by the individual bits of byte 4.

From high to low

b7	b6	b5	b4	b3	b2	b1	b0

b0： 0=output OFF; 1=output ON

b1： 0=go to local mode (front panel control); 1= go to remote control (PC in control)

Notes：Only under the situation of PC controlling, you can set the parameters of the power.

4) 83h, Set the power calibration protection state

Byte 1	AAh (frame start)
Byte 2	Power Address (00h~FEh)
Byte 3	83h (Command)
Byte 4	Power calibration protection state
Byte 5	Calibration password (0X28h)
Byte 6	Calibration password (0X01h)
Byte 7 to Byte 25	System reserved
Byte 26	Checksum

Calibration protection state is specified by one byte. The definition of each bit unit is as the following:

From the high to the low

b7	b6	b5	b4	b3	b2	b1	b0

b0：0=protection enable; 1=protection disable

5) 84h, Read the power calibration protection state

Byte 1	AAh (frame start)
Byte 2	Power Address (00h~FEh)
Byte 3	84h (Command)
Byte 4	Power calibration protection state
Byte 5 to Byte 25	System reserved
Byte 26	Checksum

Calibration protection state is specified by one byte. The definition of each bit unit is as the following:

From the high to the low

b7	b6	b5	b4	b3	b2	b1	b0

b0：0=protection enable; 1=protection disable

6) 85h, Calibrate the voltage of the power supply

Byte 1	AAh (frame start)
Byte 2	Power Address (00h~FEh)
Byte 3	85h (Command)
Byte 4	Voltage calibration point (1~4)
Byte 5 to Byte 25	System reserved
Byte 26	Checksum

7) 86h, Read the actual output voltage of the power supply

Byte 1	AAh (frame start)
Byte 2	Power Address (00h~FEh)
Byte 3	86h (Command)
Byte 4	Low byte of the low character of the actual voltage
Byte 5	high byte of the low character of the actual voltage
Byte 6	Low byte of the high character of the actual voltage
Byte 7	high byte of the high character of the actual voltage
Byte 8 to Byte 25	System reserved
Byte 26	Checksum

8) 87h, Calibrate the current of the power supply

Byte 1	AAh (frame start)
Byte 2	Power Address (00h~FEh)
Byte 3	87h (Command)
Byte 4	Current calibration point (1~2)
Byte 5 to Byte 25	System reserved
Byte 26	Checksum

9) 88h, Read the actual output current of the power supply

Byte 1	AAh (frame start)
Byte 2	Power Address (00h~FEh)
Byte 3	88h (Command)
Byte 4	Low byte of the actual current
Byte 5	high byte of the actual current
Byte 5 to Byte 25	System reserved
Byte 26	Checksum

10) 89h, Set the calibration information of the power supply

Byte 1	AAh (frame start)
Byte 2	Power Address (00h~FEh)
Byte 3	89h (Command)
Byte 4 to byte 23	Calibration information (ASCII Code)
Byte 24	System reserved
Byte 25	System reserved
Byte 26	Checksum

11) 8Ah, Read the calibration information of the power supply

Byte 1	AAh (frame start)
Byte 2	Power Address (00h~FEh)
Byte 3	8Ah (Command)
Byte 4 to Byte 23	Calibration Information (ASCII Code)
Byte 24	System reserved
Byte 25	System reserved
Byte 26	Checksum

12) 8Bh, Set the serial No of the power supply

Byte 1	AAh (frame start)
Byte 2	Power Address (00h~FEh)
Byte 3	8Bh (Command)
Byte 4 to Byte 23	Serial No. (ASCII Code)
Byte 24	System reserved
Byte 25	System reserved
Byte 26	Checksum

13) 8Ch, Read the serial No, product type and software version No of the power supply

Byte 1	AAh (frame start)
Byte 2	Power Address (00h~FEh)
Byte 3	8Ch (Command)
Byte 4 to Byte 9	Product serial No (ASCII Code)
Byte 10 to Byte 14	Product type (ASCII Code)
Byte 15	Low byte of the software version
Byte 16	high byte of the software version
Byte 16 to Byte 25	System reserved
Byte 26	Checksum

Press the button “1” on the keyboard when you are switching on the power supply, you’ll see the serial number, product type and firmware version of this unit will show on the LCD.

If the product serial No is 000045, the product type is 3645A and the software version No is V2.03, the return date is as the following:

AA	00	30	30	30	30	30	34	35	33	36	35	41	CB	00	XX	XX	XX	XX	XX	XX	XX	XX	XX

14) 12h. Return check information command

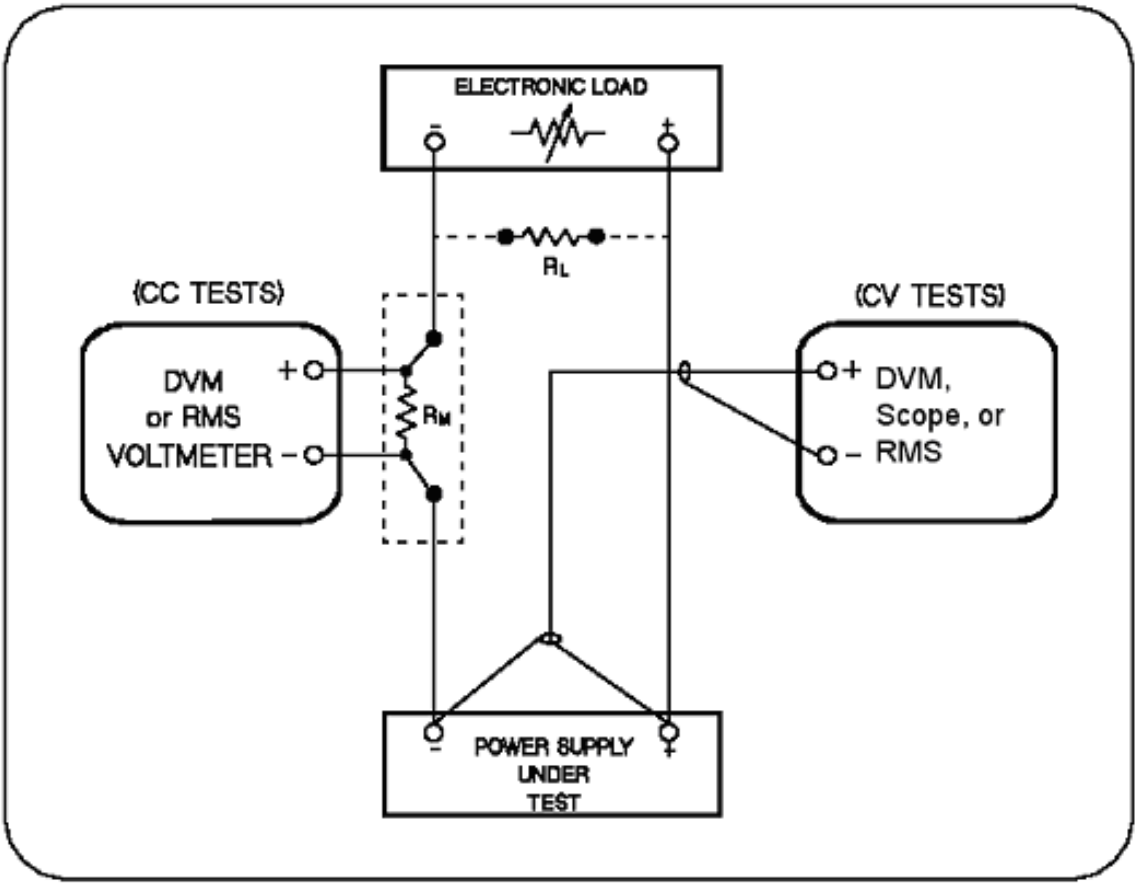
Byte 1	AAh (frame start)
Byte 2	Power Address (00h~FEh)
Byte 3	12h (Command)

Byte 4	80h indicates correct，90h indicates wrong
Byte 5 to byte 25	System reserved
Byte 26	Checksum

When the power receives a frame of set command, it will check this frame of command and return the relative checked result.
When the power receives a frame of reading command, it will check this frame of command. If it checks correctly, it will return the relative read data. And if it checks wrongly, it will return the check command (90h).

E. Power Calibration

1) Structure of the system



2) Procedure of calibration

a) Disable the power calibration protection.

AA	00	83	01	28	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	57

b) Set load to CC mode and Load OFF

c) Calibrate the first point of the voltage.

AA	00	85	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	30

d) Return the actual output voltage to the power supply until the output is stable.

AA	00	86	XX	XX	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	XX

e) Calibrate the second point of the voltage.

AA	00	85	02	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	31

f) Return the actual output voltage to the power supply until the output is stable.

AA	00	86	XX	XX	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	XX

g) Calibrate the third point of the voltage.

AA	00	85	03	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	32

h) Retun the actual output voltage to the power supply until the output is stable.

AA	00	86	XX	XX	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	XX

i) Calibrate the forth point of the voltage.

AA	00	85	04	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	33

j) Return the actual output voltage to the power supply when the output is stable.

AA	00	86	XX	XX	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	XX

k) Short-circuit the Eload.

l) Calibrate the first point of the current

AA	00	87	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	32

m) Return the actual output current to the power supply until the output is stable.

AA	00	88	XX	XX	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	XX

n) Calibrate the first point of the current

AA	00	87	02	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	33

o) Return the actual output current to the power supply until the output is stable.

AA	00	88	XX	XX	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	XX

p) Enable the power calibration protection.

AA	00	83	00	28	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	56

q. The calibration is finished.

Examples:

1. Set the parameters:

3000mA,36000mV,10800mW(108W) ,3000mV

AA 00 80 B8 0B A0 8C 00 00 30 2A B8 0B 00 00 00 00 00 00 00 00 00 00 00 00 36

2. Read the parameters:

AA 00 81 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 2B

3. Set control state:

A: PC control, output ON

AA 00 82 03 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 2F

B: PC control, output OFF

AA 00 82 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 2E

4.Self-control

AA 00 82 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 2C