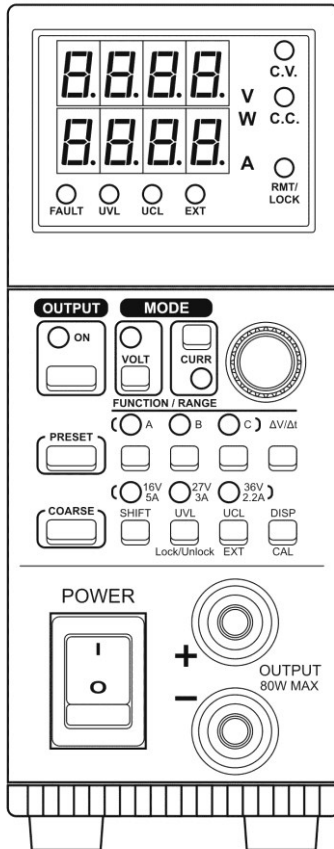


# SSP-8080

## REMOTE PROGRAMMABLE POWER SUPPLY WITH ETHERNET NETWORK CONNECTIVITY DC WAVE FORM GENERATOR 3 SELECTABLE VOLTAGE & CURRENT RANGES

### USER MANUAL



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## **1. INTRODUCTION**

This is a power supply for the R&D, burn-in-test, laboratory work with repetitive cyclic operation at different voltage, current and cycle time.

It can be programmed, controlled by a stand alone PC or via the Ethernet remotely controlled, monitored and data logged.

The DC ramp and wave form generator can either be panel set or by the supplied software with preview of final waveform.

When use as a bench top power supply, the tuning of voltage and current is ever so precise in step 1V or 0.1V and 0.1A or 0.01A.

Furthermore it can also be fully remotely controlled without the PC as well.

## **2. PRECAUTIONS**

Keep this manual in a safe place for quick reference at all times.

This manual contains important safety and operation instructions for correct use of the power supply. Read through the manual and pay special attention to the markings and labels of this unit and equipment to be connected.

Pay special attention to these two types of notices used in this manual

***WARNING : Failure to observe this warning may cause injury to persons and damage to power supply or connected equipment.***

***CAUTION : Failure to observe this warning may result in damage to equipment and Improper functioning of the power supply.***

### **WARNING :**

1. Do not use this power supply near water.
2. Do not operate or touch this power supply with wet hands.
3. Do not open the casing of the power supply when it is connected to ac mains.
4. Refer all servicing to qualified service personnel only.
5. Before replacing the AC fuse find out and clear up the cause first.
6. Replace the AC fuse with the same type and rating as the original fuse.

### **CAUTION :**

1. Use a grounded 3 pin AC source .
2. This unit is for indoor use only .
3. Do not operate or place this unit in a humid, dusty, in direct sunlight location or near any heat source.
4. Before plugging into local AC mains, check with the rating label at the back of the unit.
5. Do not block any ventilation openings of the unit.
6. This unit must be used within the specified rating, regular excessive continuous over loading may cause damage to the power supply.
7. The gauge size of input power cable must be at least 0.75mmsq and the total length of power cable must not exceed 3m.
8. Input Fuse Recommended: **T2AL250V (Time-Lag from 2A)**

### **Operation environmental condition :**

10-80% R.H.

Altitude up to 2000m

Installation category : CAT 2

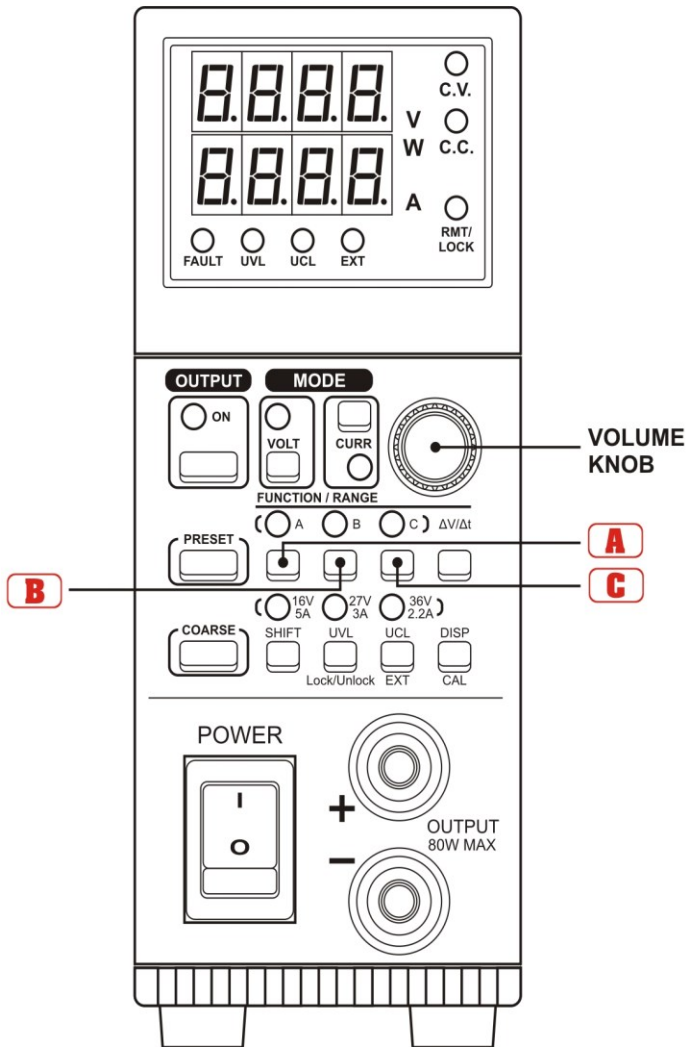
Pollution degree : 2

Mains supply voltage fluctuation up to  $\pm 10\%$  of the specified operating voltage.

### 3. SPECIFICATIONS

Input AC voltage range		100-240V AC
No load input current (230V)		$\leq 130\text{mA}$
Full load input current (230V)		$\leq 0.5\text{A}$
Input AC Frequency		47 ~ 63Hz
Efficiency(Output 16V/5A With Optimal Load)		80%
Power Factor		$\geq 0.9$
Constant Voltage Characteristics		
Load Regulation(0 ~ 100% )		$\leq 20\text{mV}$
Line Regulation ( $\pm 10\%$ )		$\leq 4\text{mV}$
Ripple & Noise (P-P)		$\leq 30\text{mV}$
Output Voltage Range per Selection	0~16V / 5A Selection I	0 ~ 16.4V
	0~27V / 3A Selection II	0 ~ 27.6V
	0~36V / 2.2A Selection III	0 ~ 36.8V
Constant Current Characteristics		
Load Regulation(0 ~ 100% )		$\leq 10\text{mA}$
Line Regulation( $\pm 10\%$ )		$\leq 10\text{mA}$
Output Current Range per Selection	0~16V / 5A Selection I	0 ~ 5.1A
	0~27V / 3A Selection II	0 ~ 3.1A
	0~36V / 2.2A Selection III	0 ~ 2.3A
Meter Accuracy		
Voltmeter Accuracy	Output $V \leq 5\text{V}$	$\pm 0.5\% + 5\text{counts}$
	Output $V > 5\text{V}$	$\pm 0.5\% + 3\text{counts}$
Ammeter Accuracy	Output $I \leq 2\text{A}$	$\pm 0.5\% + 5\text{counts}$
	Output $I > 2\text{A}$	$\pm 0.5\% + 3\text{counts}$
Protection		Tracking Over Voltage Protection, Current Limiting Protection ( Short Circuit , Overload), Over Temperature Protection
CE Approvals		LVD: EN 61010 EMC: EN 55011, 61000
Size (W * H * D)		53*136*330 mm
Weight		Approx. 2.1 kg
User Adjustable UVL(Up Voltage Limit) , UCL(Up Current Limit)		Yes
Remote Sensing		Yes.
Remote Analog Control Interface		Yes
Number of Quick Preset Recalls of frequent use V& I setting		3
Ramp Function Generators(RFG)		Yes
Wave Form Generation Function		Yes
Standard Communication Port		USB 2.0
Optional interface accessory		Ethernet control board (IPORT-1) factory pre-installed or user installable.
Provided Software		Application Software , USB Driver , Command Sets , Labview driver for Ethernet Interface

## 4. INDICATORS AND CONTROLS



## 4.1 Front Panel Push Buttons and Volume Knob

**ON** output on-off

**VOLT** output voltage set

**CURR** output current limiting set

### Volume Knob to adjust output voltage, current and other preset values

**PRESET** Press to review voltage and current setting when output is off.

Used with **A/B/C** buttons and Volume Knob to set Func A/B/C duration time in waveform generation.

**A/B/C** These 3 buttons have the following 3 functions.  
Push buttons for selecting voltage and current operation range, lower LED lit up.  
Push buttons for Recalls of frequently used V and I setting, upper LED lit up .  
Push buttons for Voltage Generators in Ramp and waveform, upper LED lit up.

**$\Delta V/\Delta t$**  Push button to get the voltage generators pairs such as **A/B**, **B/A**, **B/C**, **C/B**, **A/C** & **C/A** and set the transit time for the pairs by adjusting the VOLUME KNOB.

**COARSE** Set Volume Knob into coarse and fast tuning mode

**SHIFT** Mode button used together with other dual function button such as Lock/Unlock, EXT, CAL.

**UVL / LOCK UNLOCK** Dual function button for Upper Voltage Limit & Lock and unlock of front panel buttons

**UCL / EXT** Dual function button for Upper Current Limit and Remote control function set

**DISP / CAL** Dual function button for voltage & current meter display set and default settings of factory presets.

**POWER** Power Supply on / off switch

**OUTPUT** DC output terminal

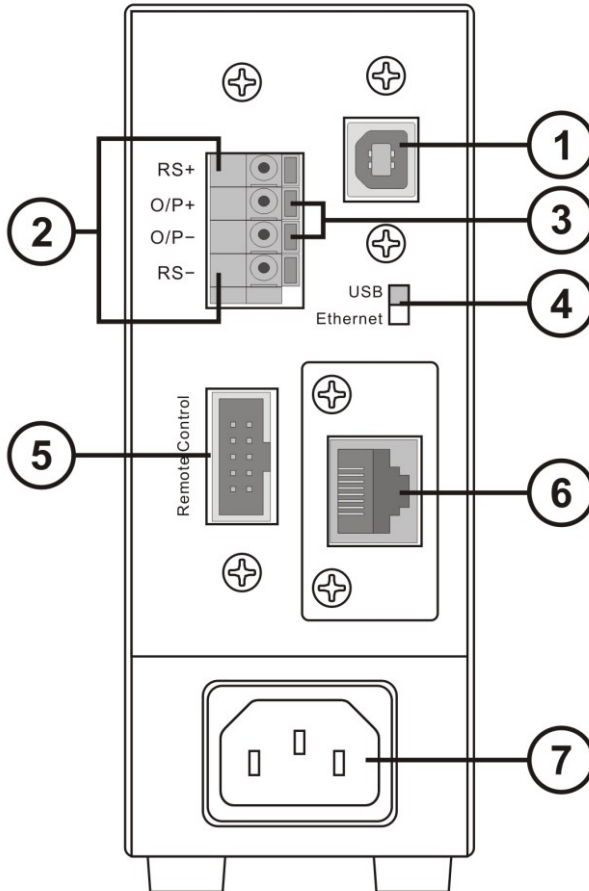
## 4.2 LED Indicators

<b>Fault</b>	Over temperature protection or tracking OVP is triggered.
<b>UVL</b>	Upper voltage limit protection at the output is triggered
<b>UCL</b>	Upper current limit protection at the output is triggered
<b>EXT</b>	Power supply is under remote program control
<b>W</b>	Ampere meter becomes a Watt meter (Cal button)
<b>A</b>	Ampere meter
<b>CC</b>	Constant current mode
<b>CV</b>	Constant voltage mode
<b>RMT / LOCK</b>	Panel control buttons lock up or PS in remote program mode
<b>16V / 5A</b>	power supply V I range is selected at 16V , 5A
<b>27V / 3A</b>	power supply V I range is selected at 27V , 3A
<b>36V / 2.2A</b>	power supply V I range is selected at 36V , 2.2A






### 4.3 Back Panel

- ① USB communication port
- ② Remote sensing terminals
- ③ DC output terminal which has same power rating as the front output
- ④ Selector Switch for USB and ETHERNET.
- ⑤ Terminal for remote control of VI range, output on-off, V & I volume. (See section 7)
- ⑥ RJ45 communication port for Ethernet .
- ⑦ AC INPUT SOCKET



## **5. OPERATION PROCEDURES**

### **5.1 Selecting the V I Range**

First press and hold SHIFT button, then press the desired // button.  
Note the respective lower VI range LED lights up to confirm the selected range.

Changing the V I Range will change all the Recalls settings, output v to zero and the setting value of output I to the maximum value of the range.

### **5.2 Adjusting Output Voltage and Current**

1. Push down the VOLT or CURR button.
2. Check its LED indicator before adjusting Volume Knob.




For fast tune, press and hold the COARSE button and turn the VOLUME Knob. Voltage increases by 1.0V step and Current by 0.1A step in coarse tune.




For fine tune, press and hold the PRESET button and turn the VOLUME Knob. Voltage increases by 0.1V step and Current by 0.01A step in fine tune .

#### ***Note :***

The power supply retains the final output values of the voltage, current and VI range setting even after it is switched off.

### **5.3 Setting the 3 Voltage & Current Recalls**

3 frequently used output voltage and current limit values can be quickly accessed at one touch of the buttons //.

Press to select any one of // button and note its LED indicator A, B, C. Adjust the output V and I to the desired values using steps in procedures 5.2. Repeat for remaining the two Recalls .

#### ***Note:***

All three recalls must be in the same V I Range (16V,5A ; 27V,3A ; 36V,2.2A)  
Changing the V I Range will erase all Recalls settings & output voltage to zero and the setting value of output I to the maximum value of the range.

### **5.4 $\Delta V/\Delta t$ Function**




There are 3 settable DC voltage generators , namely A, B, and C .

$\Delta V$  a-b means from voltage level A to voltage level B.

$\Delta t$  a-b means time in seconds from voltage level A to level B, this transit time is adjustable from 0 to 20 seconds.

### 5.4.1. Presetting the DC generator voltage level

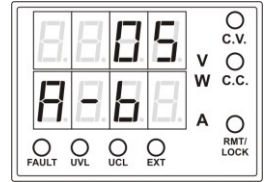
There are 3 generator voltage levels that can be preset, namely A / B and C

First press to select  and note its LED, then adjust voltage as given in procedure 5.2.

### 5.4.2. Presetting the $\Delta t$

There are 6 sets of available  $\Delta t$  short presses on the  $\Delta V / \Delta t$  button will show the cyclic sequence of

AB  $\rightarrow$  BA  $\rightarrow$  BC  $\rightarrow$  CB  $\rightarrow$  AC  $\rightarrow$  CA  $\rightarrow$  AB.



We use the AB as an example



Click the  $\Delta V / \Delta t$  button until “A-b” appears on the lower LED display then hold the button, at the same time, turn the volume knob to set to desired transit time  $\Delta t$  say 5sec.


### 5.4.3. Generating the Ramp Up or Down DC output

Ramp up generator example

Set A = 5V B = 10V ,  $\Delta t$  a-b = 5 seconds

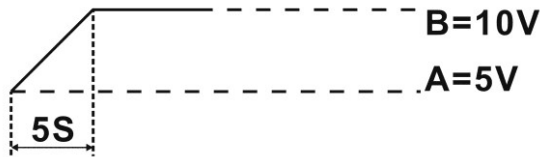
terminal  
output LED indicator. Now connect a suitable load to the output and turn on the output by pushing the OUTPUT ON button and note the

Push Button  note the output voltage of 5V and then push Button  note output voltage rises to 10V in 5seconds showing a ramp up voltage, the output will stay at 10V level.

Now pushing the Button  now will generate a ramp down voltage from 10V to 5V in 5 seconds and stays at the 5V level.




**Note:**

The final output voltage level will be at the last voltage level generator.

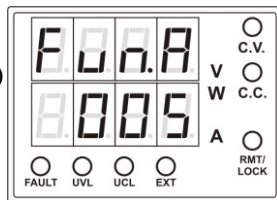


## 5.5 Func A/B/C and Wave Form Generator

The Func A/B/C sets how long (0 to 600sec) the voltage generator stays on at the specified output voltage level before going to other voltage level.

To set the Func A/B/C , press and hold both the PRESET button and the button  and at the same time turn the Vol. Knob to set the duration time period (0 to 600 seconds)for the chosen voltage level.

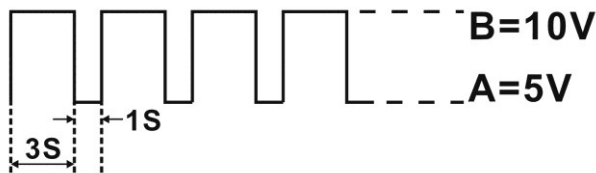
To generate waveform,  
 the Func A/B/C is used in conjunction with  $\Delta V/\Delta t$   
 (the time from one voltage level to another voltage level)  
 By using the above functions simultaneously,  
 3 reversible pair (AB & BA, BC & CB, AC & CA )  
 can be used to generate waveform .



**Example 1 :** Pulse waveform with 3sec at 10V and 1sec at 5V .  
 set A = 5V , set B = 10V  
 set Func. A = 1 seconds **by press & hold the PRESET button and button** **and at the same time, turn the volume knob.**  
 Func B = 3 seconds using the same procedure as above  
 Set  $\Delta t$  a-b = 0 , Set  $\Delta t$  b-a = 0

### Generating Wave Form

To generate the waveform push buttons and at the same time .  
 The waveform will repeat cyclically until either or button is pressed again .



**Example 2 :** Triangular wave form  
 Set A = 5V , B = 10 V  
 Set  $\Delta t$  a-b = 3 seconds , Set  $\Delta t$  b-a = 3 seconds  
 Set Func. A = 3 seconds , Set Func. B = 3 seconds



**Note :**

The waveform generation can be operated via our remote programming software with preview of the waveform and data logging of the output in graphical presentation as well. See section 10.

This is a rather tricky operation, check the 2 LED carefully to see if both are lit up and one is flashing.

The flashing will jump from one to the other, A to B, then B to A .

If the above does not happen, push both buttons and simultaneously again

until the above happens.

The waveform will repeat cyclically until either or button is pressed again .

## **6. UVL , UCL , DISP/CAL FUNCTIONS**

### **6.1 Adjusting the UVL (Upper Voltage Limit) and UCL (Upper Current Limit)**

When the voltage or current at the output terminal exceeds the set limiting values, the output will be cut off. These additional protection features are necessary for a power supply with such a wide ranges of voltage and current.

Press and hold the UVL button, tune the VOLUME knob, the upper LED indicator shows the UVL voltage values.

Press and hold the UCL button, tune the VOLUME knob, the lower LED shows the UCL current values.

### **6.2 The DISP button --- changing the current display to watt display**

Short press at the DISP button will change the lower LED display from Amp (red) reading to Watt (green) reading.

### **6.3 The CAL button**

The calibration function is initiated when the CAL button is pressed simultaneously with the SHIFT button. Do not perform this function unless calibration is required.

## **7. REMOTE CONTROL FUNCTIONS**

The remote control terminal at the back of the power supply can be used to control the Output on-off, voltage and current volume, and selection of VI range.

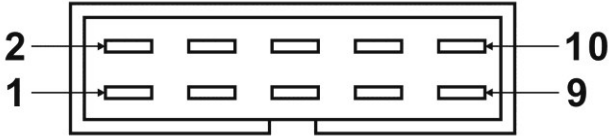
### **7.1 Activate the Remote Control Mode**

Press and hold the SHIFT button and at the same time press the EXT button. The green LED of EXT and the PMT/LOCK will light up indicating power supply is in Remote Control Mode. All the control buttons, and volume knob become inactive and locked except the SHIFT and EXT buttons.

### **7.2 Exit from the Remote Control Mode**

Keep SHIFT button pressed down, first press the Local/Lock button to release the Lock on the control buttons and volume knob. Press the SHIFT button + EXT button to exit from the Remote Control Mode. The green LED of the SHIFT and EXT will be off to confirm complete exit from the Remote Control Mode.

### 7.3 Remote Control Terminal Allocations

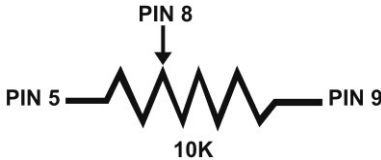


Position of 10 insert slots	Control Signal Scheme	Control Signal Applications
1	OUT_EN	Output On-Off Signal ON: no connection , isolated OFF: pin 4 connected to ground
2	SELECT 0	Selection of VI Ranges 16V/5A: PIN2,PIN3 and PIN 4 TO ground 27V/3A:PIN2 no connection, PIN3 to Pin 2 open Pin 3 to ground 36V/2.2A: Pin3 open
3	SELECT 1	
4	DGND	Control Signal Ground
5	2.5V reference voltage	To resistor in remote control circuit
6	2.5V reference voltage	To resistor in remote control circuit
7	CC CNT	remote control for constant current
8	CV CNT	remote control for constant voltage
9	AGND	simulated ground signal
10		

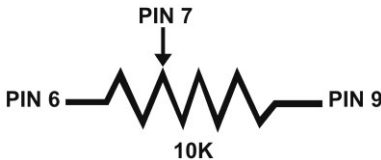
### 7.4 Remote control methods and connections

Remote control for CC (constant current) current and CV (constant voltage) voltage adjustment can be performed by using the *internal* voltage source and external variable resistor.

a. Output voltage control CV

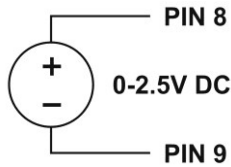


b. Output current limiting control CC

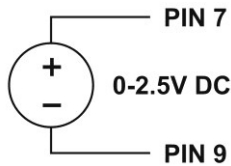


Remote control for CC (constant current) current and CV (constant voltage) voltage adjustment can be performed by using an variable *external* of DC voltage source of 0 to 2.5 V.

a. Output voltage control CV



b. Output current limiting control CC



**Remarks:**

PIN 5, PIN 6, PIN 7, PIN 8, PIN 9 are analog signal interface for remote control.

## 8. Remote Sensing Operation

When the output current is large or long cable to load, there is a voltage drop across the connecting cable such that the voltage at load point is less than at the output terminal of the power supply.

By making an extra connection from the remote sensing terminal **SENSOR** to the load point (Attention: do not reverse polarity) will make up for the load line voltage drop and make the voltage at the load point and output terminal the same. (Make sure to disconnect the wiring to remote sensing first before disconnecting the main output connection)

## 9. Over Temperature and Tracking Over Voltage Protections

When either the temperature inside the power supply exceeds a preset value or the output voltage is higher than adjusted values, the protection circuitry will be triggered and the output will be cut off. A Buzzer alarm and the FAULT led will be on at the same time.

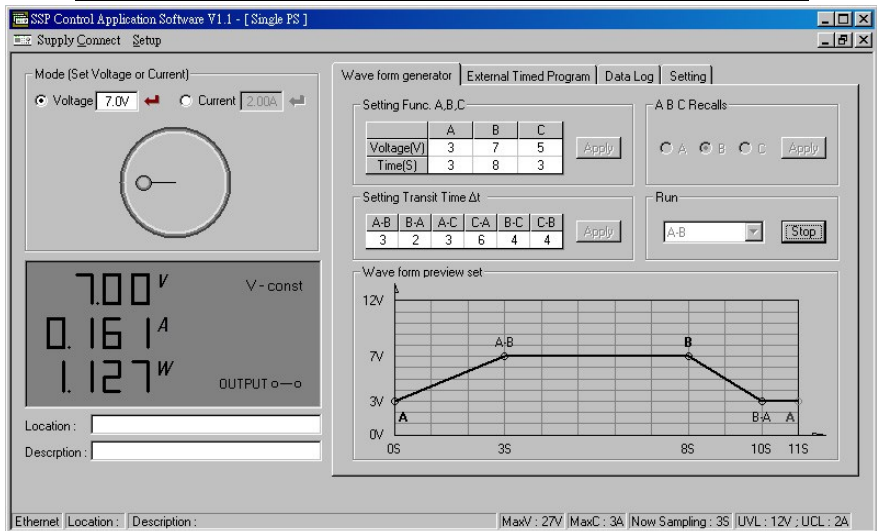
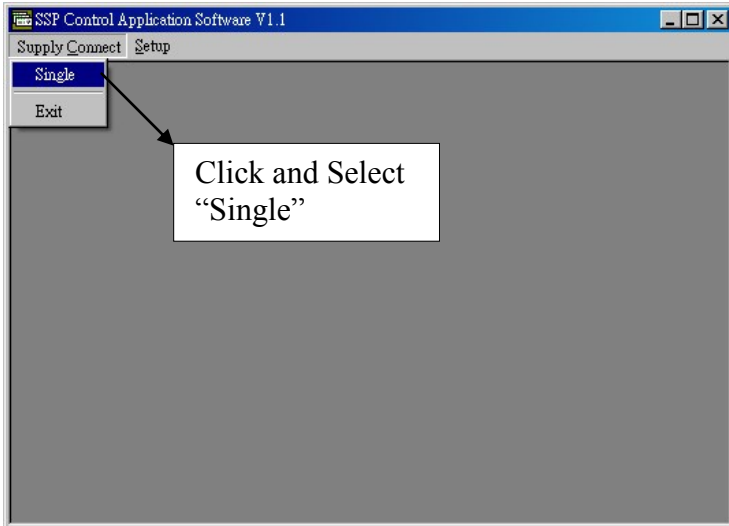
The set points of Tracking Over Voltage;

For adjusted output voltage  $V_a$  of less or equal to 10V, tracking OVP is set at  $V_a + 1$  V.

For adjusted output voltage  $V_b$  of more than 10V, tracking OVP is set at  $V_b \times 1.1$  V.

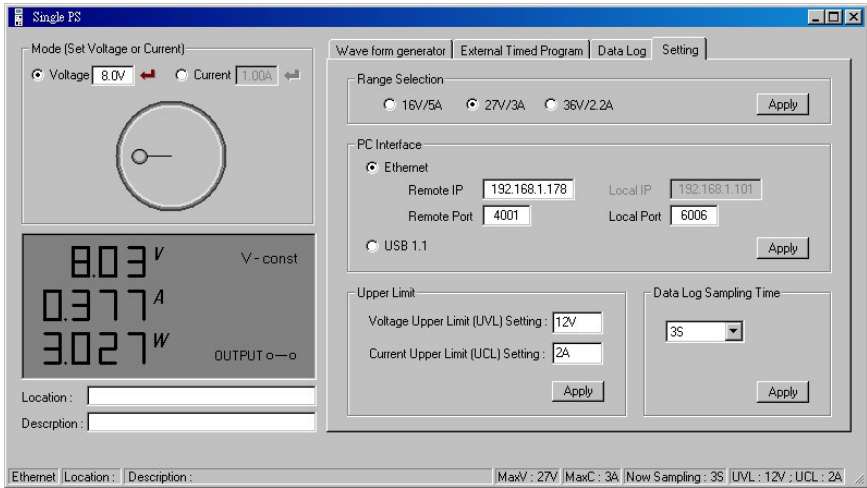
## 10. PC Interface and Remote Programming Software

1. Install the software by first insert the CD into CD Rom of your PC.
2. Locate and click the Setup file.
3. After completion of the installation of software then connect the SSP-8080 to the PC either via the USB Port or the RJ45 Port (with optional Ethernet card) checking the correct position of the USB / Ethernet Selector Switch.
4. Connect the output terminal of the SSP-8080 to a suitable load.
5. Start the application software of SSP-8080 on your PC, the following window dialog will appear.



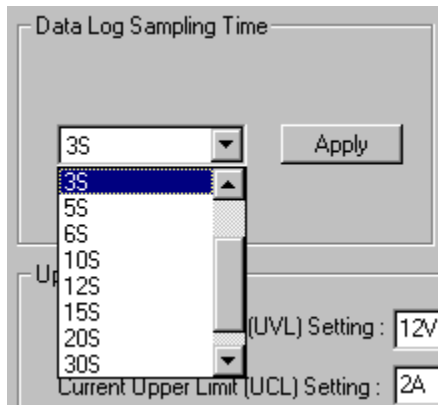


6. Press “Setting” tab.



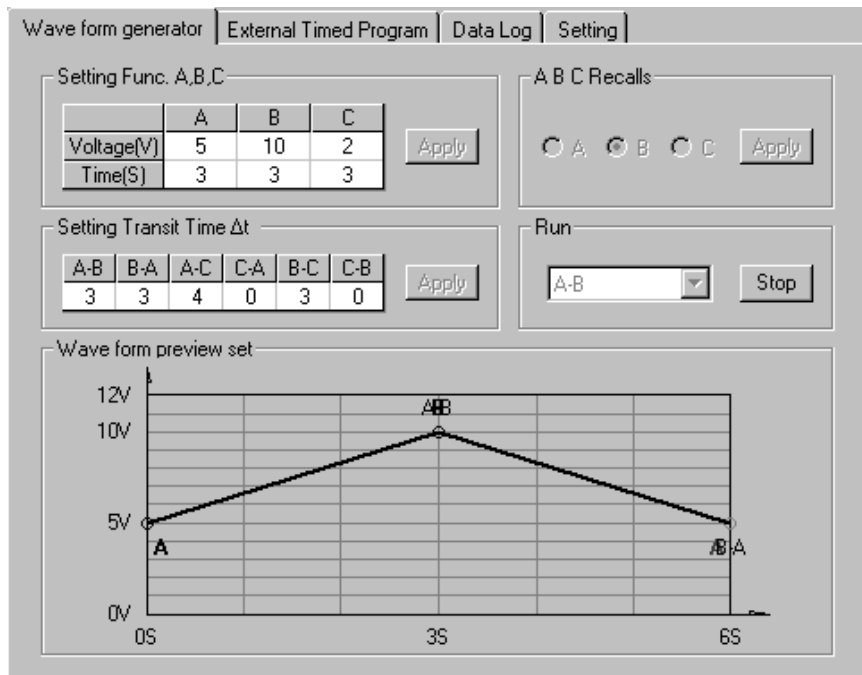
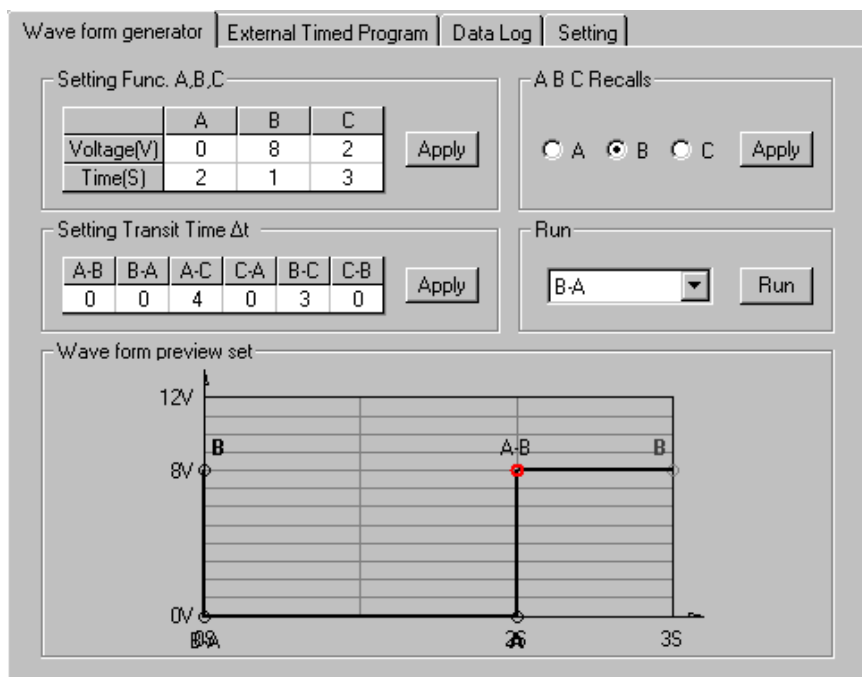
7. V I Range Selection to choose.

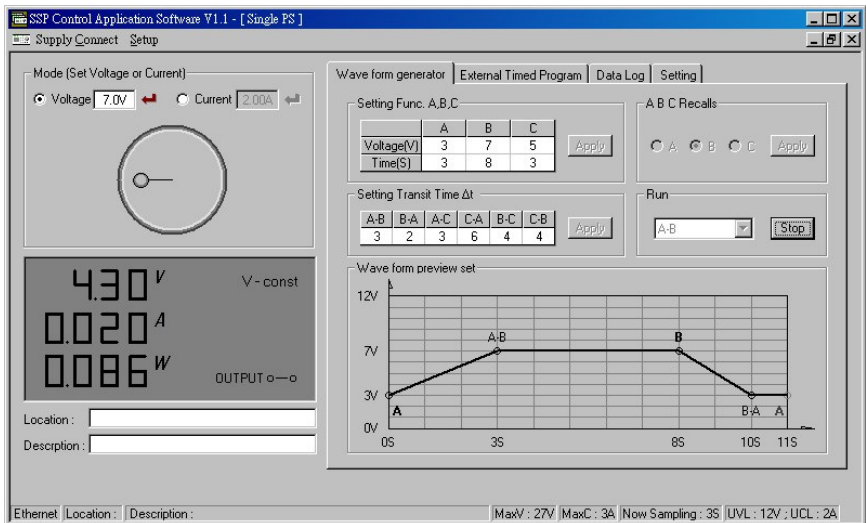
Data log Sampling Time at the drop down slot.



PC interface for either USB or Ethernet as set at the SSP-8080.  
Enter the IP address if using the Ethernet connection.

## Example of preview wave form

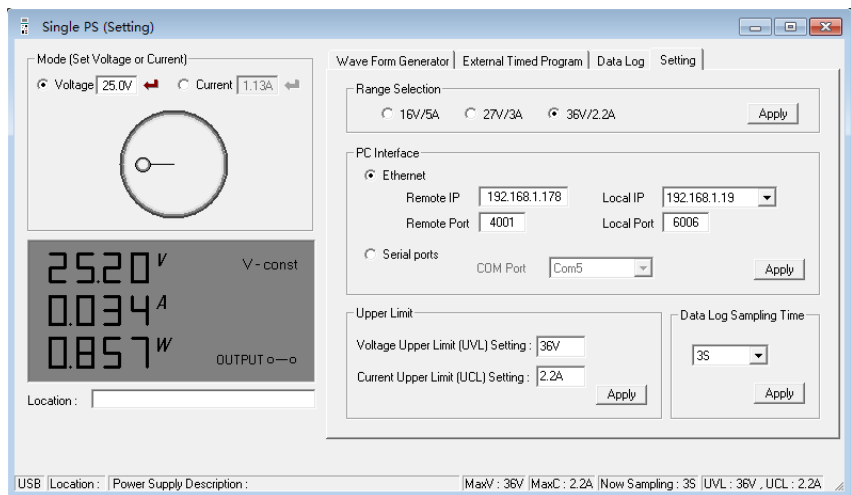




## 10.1 External Timed Program

The unit can be externally programmed via a PC to run 20 steps each with a preset voltage, current limiting value and a preset time period of 1 second to 99 minutes. The timed program can be set to run from one cycle to infinite cycles.

### External Timed Program Window



**Clear Table** Delete all data in the Display Table and ready for new data entry.

**Run (Stop)** To run and stop the Timed Program

**Running Cycle:**



**Enter the number** of desired running cycles here.

The range of the number is 0-999.

However the maximum cycles can be set to infinite when “0” cycle is entered.

External Timed Program allows user set the output either ON or OFF by selecting the boxes in the last column.

Output ON/OFF:

1. Output ON Ticked: Output is **ON** for that step
2. Output ON Un-ticked: Output is **OFF** for that step.

Operation Procedure

1. Clear old data in the table, click [**Clear Table**].
2. Enter data in the table using the 'Up Down Left Right' keys of your PC keyboard for new locations.
3. Data exceed the rated voltage and current will not be accepted.
4. Voltages exceed set UVL (Upper Voltage Limit) will not be accepted.
5. If retrieved or entered data exceed preset Upper or Lower Limit setting of voltage / current / time periods, the data will becomes red in colour and cannot be accepted .
6. When the running time period of any of the step is set at zero minute and zero second, this step becomes the terminating step and the cycle will end at that step.  
In the above example there are 4 steps each with 2 sec period, if step 3 is set to zero minute & second, the program only cycles around step1 and 2 and will not go to step 4.
7. Enter the number of desired running cycles.
8. click [**Run**] to run the External Time Program.  
External Timed Program allows user set the output either ON or OFF by selecting the boxes in the last column.

# 11. MORE OPERATION EXAMPLES

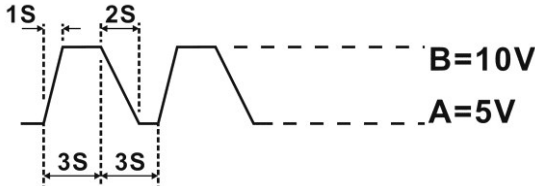
## 11.1 Examples of Func A/B/C and Wave Form Generator

### Example 3 Irregular waveform

Set  $A = 5V$ ,  $B = 10V$

Set  $\Delta t$  a-b = 1 second, Set  $\Delta t$  b-a = 2 seconds

Set Func. A = 3 seconds, Set Func.B = 3 seconds

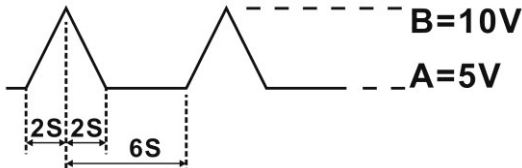


### Example 4 Irregular waveform

Set  $A = 5V$ ,  $B = 10V$

Set  $\Delta t$  a-b = 2 second, Set  $\Delta t$  b-a = 2 seconds

Set Func. A = 2 seconds, Set Func.B = 6 seconds

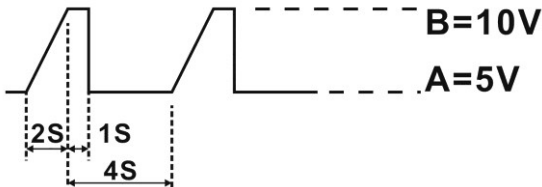


### Example 5 Irregular waveform

Set  $A = 5V$ ,  $B = 10V$

Set  $\Delta t$  a-b = 2 second, Set  $\Delta t$  b-a = 0 seconds

Set Func. A = 4 seconds, Set Func.B = 3 seconds

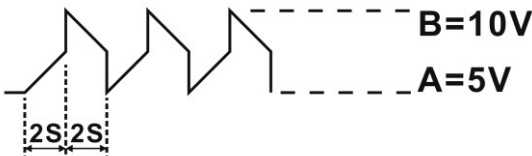


### Example 6 Irregular waveform

Set  $A = 5V$ ,  $B = 10V$

Set  $\Delta t$  a-b = 4 second, Set  $\Delta t$  b-a = 4 seconds

Set Func. A = 2 seconds, Set Func. B = 2 seconds



## 11.2 In – Case Recalibration

This in-case recalibration is to reduce:

1. the difference between set value and the actual output value from the output terminal. (see section 11.2.2)

**Note: You only do section 11.2.2 when the difference is greater than 0.1V for voltage and 0.01A for current**

2. the difference between set value and the LED Display value. (see section 7.3)

**Note: You only do section 11.3.3 when the difference is greater than 0.1V for voltage and 0.01A for current**

The calibration is divided to three sect (CALb0, CALb1, CALb2) or eliminating the nonlinear error for both voltage and current.

The three calibration sects are partitioned according responding voltage and current value as follow.

Voltage :

CALb0 0=< Voltage<=16.4V

CALb1 16.4<Voltage<=27.6V

CALb2 27.6V< Voltage

Current :

CALb0 0=<Current<=0.3A

CALb1 0.3A<Current<=4.8A

CALb2 4.8A<Current

### 11.2.1 Recalibrating the Set Value and the Actual Output Value

#### 11.2.1.1 Calibrating Voltage

1. Connect a voltmeter to the output terminals (see fig.1).
2. Set the voltage and current value as follow:

Calibration Sect	CALB0	CALB1	CALB2
Set Voltage Value	1.0V	20.0V	35.0V
Set Current Value	1A		

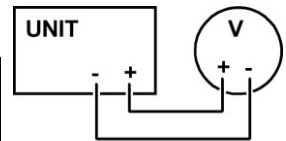


fig. 1

3. Compare the voltmeter reading with the set voltage value.
4. Calculate: Difference=Set Value – Voltmeter reading.
5. Use the calculated difference to find the corresponding offset value on the look up table for voltage calibration in appendix A.
6. Press the “SHIFT” +“CAL” key simultaneously, this will enter the calibration mode and the display will show “CALb 0”.
7. Using the knob to select corresponding calibration sect (0-2) according the setting voltage value and then press the “CAL” key.

8. Using the knob to select “CAL D-A” and then press the “CAL” key to confirm.
9. Using the knob to select “d-AE” for voltage actual output calibration, and then press the “CAL” key.
10. The display will show “AdxE OFSt” (x:0-2) ,press the “CAL” key to confirm.
11. Input the offset value you find on the look up table by turning the knob and press “CAL” key to confirm.(The increase or decrease value for every step is 10 when press the “COARSE” key simultaneously while turning the knob.)

### 11.2.1.2 Calibrating Current

1. Prepare an ammeter and make sure it can measure up to 5.5A.
2. Connect the ammeter to the unit (see fig. 2).

Set the voltage and current value as follow:

Calibration Sect	CALB0	CALB1	CALB2
Set Current Value	0.2A	2.0A	5.0A
Set Voltage Value	15V		

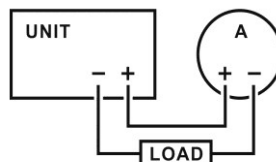


Fig. 2

3. Compare the ammeter reading with the set current value.
4. Calculate: Difference=Set Value – ammeter reading.
5. Use the calculated difference to find the corresponding offset value on the look up table for current calibration in appendix B.
6. Press the “SHIFT” +“CAL” key simultaneously, this will enter the calibration mode and the display will show “CALb 0”.
7. Using the knob to select corresponding calibration sect (0-2) according the setting current value and then press the “CAL” key.
8. Using the knob to select “CAL D-A” and then press the “CAL” key to confirm.
9. Using the knob to select “d-AC” for current actual output calibration, and then press the “CAL” key.
10. The display will show “AdxC OFSt” (x:0-2) ,press the “CAL” key to confirm.
11. Input the offset value you find on the look up table by turning the knob and press “CAL” key to confirm.(The increase or decrease value for every step is 10 when press the “COARSE” key simultaneously while turning the knob)

## 11.2.2 Recalibrating the Actual Display and the LED Display Value

### 11.2.2.1 Calibrating Voltage

1. Connect the voltmeter to output terminals (see fig.1).

Set voltage and current value as follow:

Calibration Sect	CALB0	CALB1	CALB2
Set Voltage Value	1.0V	20.0V	35.0V
Set Current Value	1A		

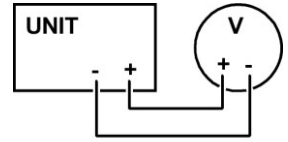


fig. 1

2. Compare the voltmeter reading with the LED voltage display value.
3. Calculate: Difference= Voltmeter reading - LED Voltage Display.
4. Use the calculated difference to find the corresponding offset value on the look up table for voltage calibration in appendix A.
5. Press the “SHIFT” +“CAL” key simultaneously, this will enter the calibration mode and the display will show “CALb 0”.
6. Using the knob to select corresponding calibration sect (0-2) according the setting voltage value and then press the “CAL” key.
7. Using the knob to select “CAL A-D” and then press the “CAL” key to confirm.
8. Using the knob to select “A-dE” for voltage LED display value calibration, and then press the “CAL” key.
9. The display will show “AdxE OFSt” (x:0-2) ,press the “CAL” key to confirm.
10. Input the offset value you find on the look up table by turning the knob and press “CAL” key to confirm.(The increase or decrease value for every step is 10 when press the “COARSE” key simultaneously while turning the knob.)

### 11.2.2.2 Calibrating Current

1. Prepare an ammeter and make sure it can measure up to 5.5A.
2. Connect the ammeter to the unit (see fig. 2).

Set the voltage and current value as follow:

Calibration Sect	CALB0	CALB1	CALB2
Set Current Value	0.2A	2.0A	5.0A
Set Voltage Value	15V		

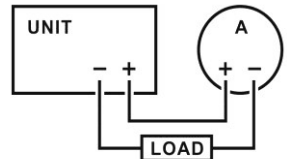


Fig. 2

3. Compare the ammeter reading with the LED current display value.
4. Calculate: Difference = Voltmeter reading - LED Current Display.
5. Use the calculated difference to find the corresponding offset value on the look up table for voltage calibration in appendix B.



6. Press the “SHIFT” +“CAL” key simultaneously, this will enter the calibration mode and the display will show “CALb 0”.
7. Using the knob to select corresponding calibration sect (0-2) according the current display value and then press the “CAL” key.
8. Using the knob to select “CAL A-D” and then press the “CAL” key to confirm.
9. Using the knob to select “A-d C” for current display value calibration, and then press the “CAL” key.
10. The display will show “AdxC OFSt” (x:0-2) ,press the “CAL” key to confirm.
11. Input the offset value you find on the look up table by turning the knob and press “CAL” key to confirm.(The increase or decrease value for every step is 10 when press the “COARSE” key simultaneously while turning the knob.)

## 12. Software Configuration and Network Setting

### 12.1 PC and Ethernet module connection test

The PC must be equipped with an Ethernet card and connected to the same network of the Power Supply.

The Power Supply must also be equipped with an Ethernet card module as well.

The Ethernet card module of the Power Supply has factory presets of:

IP address: 192.168.0.178 and Subnet Mask 255.255.255.0

The Power Supply has to be switched on to connect with the PC properly.

**In order to be on the same local network, the PC and the power supply have to be assigned IP address as: 192.168.xx.yy and 192.168.xx.zz, where yy does not equal zz. (1 < yy,zz < 255, exclusive)**

Please go to the relevant section of your Window Operating System for procedure in configuration and matching of the IP address.

- 12.2 Configure your PC’s IP address to 192.168.0.27 to match the client IP address of the Ethernet card module so that the PC and the Ethernet card are on the same network

## 12.2.1 Windows98/Me Network Setting

For Windows 98/Me, user should click from the taskbar “Start”, then “Settings” and “Control Panel”, then double click “Network” Icon. See the following figure.

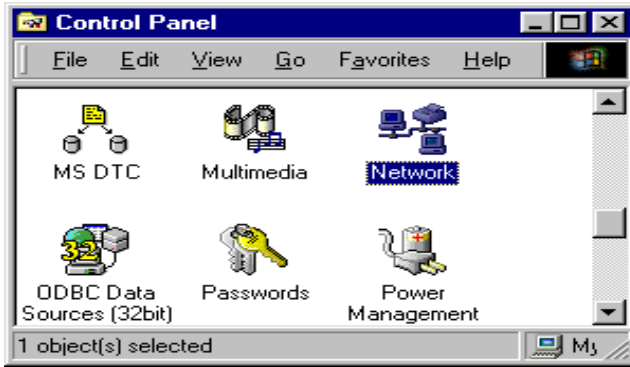


Figure 12.1 : Control Panel

From the “Configuration” tab, please select “TCP/IP” and click “Properties”, which pops up another window.

From the menu, choose “Specify an IP address” and insert IP address as 192.168.0.27 (factory setting of the Ethernet card module) and subnet mask as 255.255.255.0 Click “OK” afterwards, and then restart your computer to update the setup.

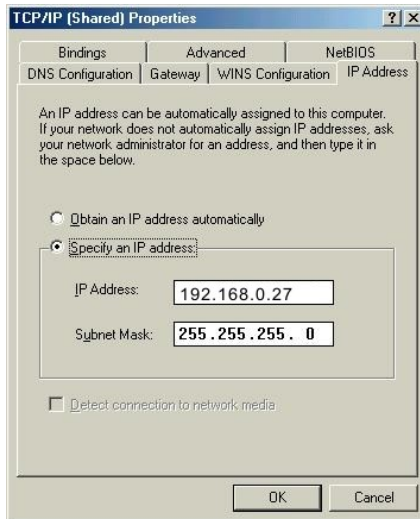


Figure 12.2 TCP/IP Properties : IP address panel

## 12.2.2 Windows2000/XP Network Setting

The user should click “Control Panel” from the “Start Menu”, then open “Network and Internet Connections”, then from LAN Connections click “Properties”, see Figure 12.3

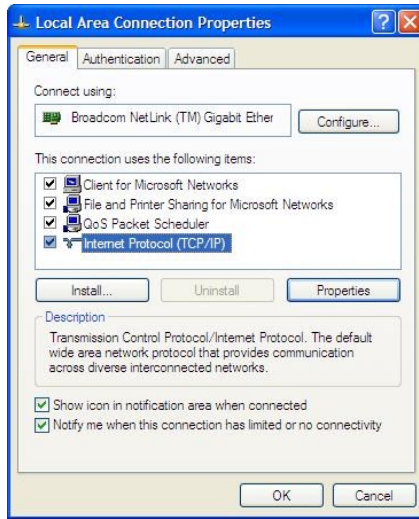


Figure 12.3: Local Area Connection Properties

then click “Properties” from Internet Protocol (TCP/IP) to pop up the following window,

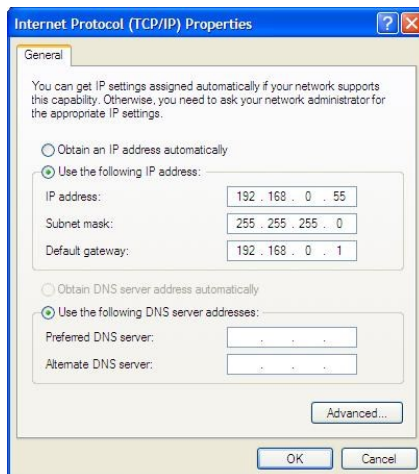
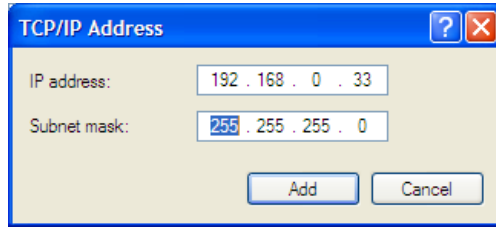


Figure 12.4 : TCP/IP Setting

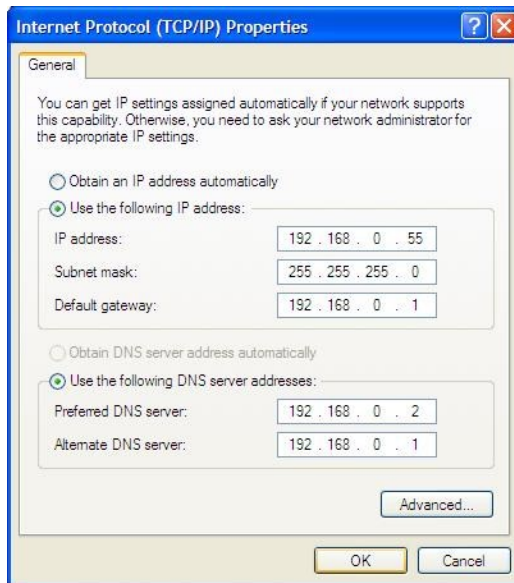
and on the IP settings tab, type in the IP address of 192.168.0.xx, ( $1 < xx < 255$ , not inclusive), then click Add... as the figure shown below.



**Figure 12.5 : Adding an IP address**

## 12.3 Configure PC's IP address

To configure TCP/IP, click Start, click Control Panel, click Network Connections, right click the LAN network connection and click Properties. On the General tab (for the local area connection), or the Networking tab (for all other connections), click Internet Protocol (TCP/IP), and click Properties. Then configure your IP address as 192.168.0.xx, and click OK. Now the PC and the Ethernet card module are on the same network.



**Figure 12.6 : TCP/IP Properties window**

## 12.3.1 Power Supply's Ethernet Card Internet Set Up

The Ethernet card has default IP 192.168.0.178 and default **Target IP** 192.168.0.55 for your connected PC.

### The default factory settings for reference

The image shows two screenshots of the configuration interface for the Power Supply's Ethernet Card. The left screenshot shows the 'General' and 'Network Settings' tabs, and the right screenshot shows the 'COM1 Settings' tab.

General	
Module	IPort-1
Firmware Version	V1.08
Name	IPort

Password Operation	
Password	
Modify Password	No
New Password	
Confirm New Password	

IP Information	
IP	192.168.0.178
Mask	255.255.255.0
Gateway	192.168.0.1
MAC	00:14:97:06:B8:40
IP Type	Static

Network Settings	
DNS Server	192.168.0.1
Web Port	80
Command Port	3003
IP Filter 1	<input type="checkbox"/>
IP Filter 2	<input type="checkbox"/>
IP Filter 3	<input type="checkbox"/>
IP Filter 4	<input type="checkbox"/>
IP Filter 5	<input type="checkbox"/>
IP Filter 6	<input type="checkbox"/>
IP Filter 7	<input type="checkbox"/>
IP Filter 8	<input type="checkbox"/>

COM1 Settings	
Set the other COMs same with this.	
Work Type	UDP
Work Port	4001
Timeout to Disconnect	0
TCP Alive Check Time(s)	20
The First Byte of a Fram	<input type="checkbox"/>
The Last Byte of a Fram	<input type="checkbox"/>
Baudrate	9600
Data Bits	8
Stop Bits	1
Parity	None
Frame Length	500
Frame Interval(ms)	50
Clear COM Buffer	Never
TCP Turbo	Disable
TCP Disconnect	Keep Connection
TCP Connection Passw	None
TCP Connection Info	None
TCP Connection Condit	None
TCP Connection Count	1
Function IO	TCP Link Status
Target Port 1	6008
Target IP 1	192.168.0.55
Target Port 2	6002
Target IP 2	0.0.0.0
Target Port 3	6003
Target IP 3	0.0.0.0
Target Port 4	6004
Target IP 4	0.0.0.0

Figure 12.7

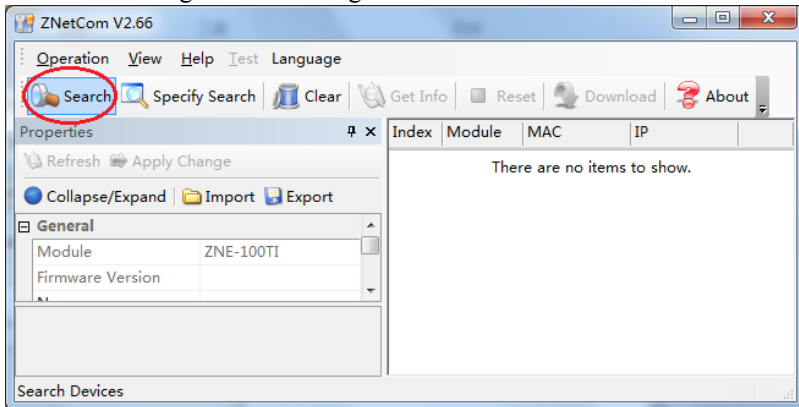
For the Ethernet card to work with your PC, you must change the default **Target IP** to your current PC's IP.

## 12.3.2 CHANGING Target IP

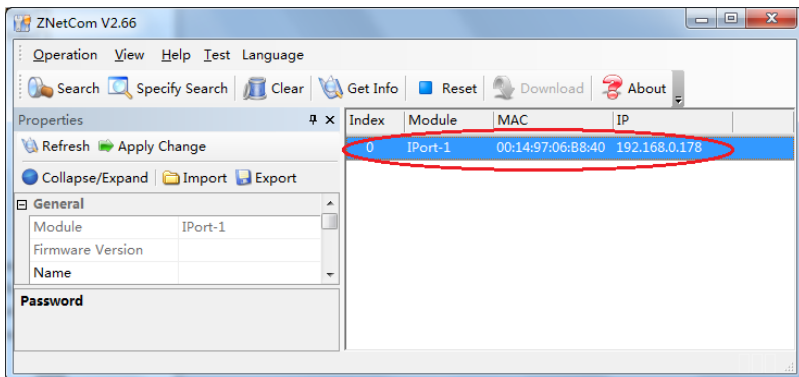
How to change the default **Target IP** of the Ethernet card to match the IP address of the PC.

### Procedure

1. Install and run the ZNetCom software.
2. You should get the following screen.

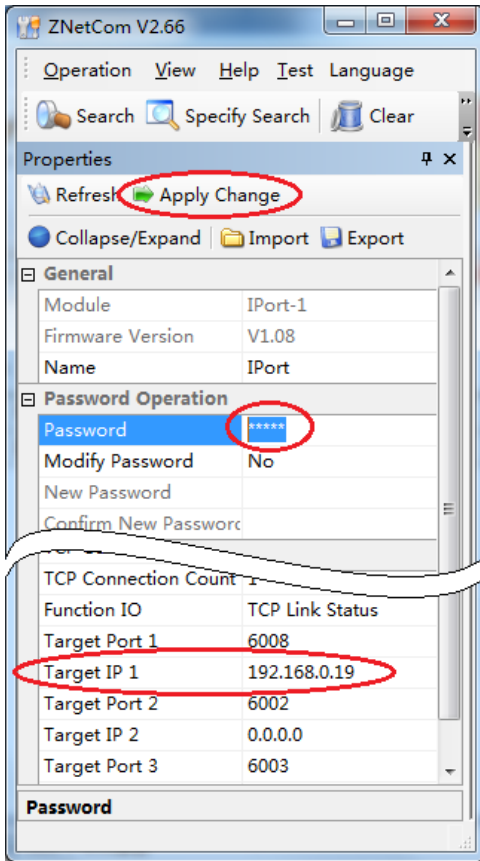


3. Connect the Ethernet(6) RJ45 com port to your PC com port and switch on the power supply. Make sure Selector (4) is in Ethernet position.
4. Click on **Search** to get to SSP-8080 power supply
5. Double click the selected power supply as shown in the below example (192.168.0.178)



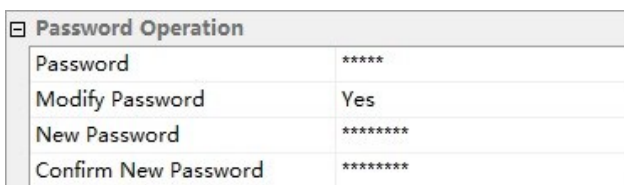
6. Key in the default **Password** 88888 to get permission to change.
7. Change the default **Target IP** to your current PC's IP. (192.168.0.XXX) as shown in the **Network Settings** section of the following template

8. Click **Apply Change** to save changes done.



### 12.3.3 To Change the Password

1. Key in default password 88888.
2. Select “Yes” in the **Modify Password**.
3. Key in new password to both **New Password & Confirm New Password**
4. Click **Apply Change** to save change done.



Note: The maximum length of the password is 9 characters, usable characters are: 'a' ~ 'z', 'A' ~ 'Z', '0' ~ '9'.

### 12.3.4 Change IP of Ethernet card

You are advised not to change the IP of Ethernet card unless you have the same IP in two Ethernet cards or the same IP is used by other network device.

Note : Each IP is unique for one IP card within the same network.  
Do not use X.X.X.0 or X.X.X.255

1. Key in the default password 88888 or your own password to get permission to change.
2. Change the default IP in the **IP Information** section of Ethernet card to a new IP configuration.
3. Click “**Apply Change**” to save changes done.

IP Information	
IP	192.168.0.178
Mask	255.255.255.0
Gateway	192.168.0.1
MAC	00:14:97:06:B8:40
IP Type	Static

### 12.3.5 COM Setting

You are advised not to change the default **COM Setting** as shown below .  
However if there is a need , make sure the changed settings are compatible with the COM Port.

COM1 Settings	
Set the other COMs same with this.	
Work Type	UDP
Work Port	4001
Timeout to Disconnect	0
TCP Alive Check Time(s)	20
The First Byte of a Frame	<input type="checkbox"/>
The Last Byte of a Frame	<input type="checkbox"/>
Baudrate	9600
Data Bits	8
Stop Bits	1
Parity	None
Frame Length	500
Frame Interval(ms)	50
Clear COM Buffer	Never
TCP Turbo	Disable
TCP Disconnect	Keep Connection

TCP Connection Password	None
TCP Connection Info	None
TCP Connection Condition	None
TCP Connection Count	1
Function IO	TCP Link Status
Target Port 1	6008
Target IP 1	192.168.0.55
Target Port 2	6002
Target IP 2	0.0.0.0
Target Port 3	6003
Target IP 3	0.0.0.0
Target Port 4	6004
Target IP 4	0.0.0.0



**Work Type UDP** must be used in order to use the control software of the of power supply.

**Work Port 4001** can be set from 1 to 65535. However some of the configuration are occupied by other network protocol and cannot be used.

**Target IP 192.168.0.55** Change the default to your current PC's IP 192.168.0.19.

**Target Port 6008** This configuration is workable in TCP client and UDP .

### 12.3.6 This power supply and PC software configuration application examples

The screenshot shows the 'Single PS (Setting)' software interface. The 'PC Interface' section is set to 'Ethernet'. The 'Remote IP' is 192.168.1.178, 'Local IP' is 192.168.1.19, 'Remote Port' is 4001, and 'Local Port' is 6006. The 'Upper Limit' section shows 'Voltage Upper Limit (UVL) Setting' at 51.3V and 'Current Upper Limit (UCL) Setting' at 5.45A. The 'Data Log Sampling Time' is set to 3S. The status bar at the bottom indicates 'MaxV: 16V | MaxC: 5A | Now Sampling: 3S | UVL: 51.3V | UCL: 5.45A'.

The 'IP Information' window shows the following details:

IP Information	
IP	192.168.1.178
Mask	255.255.255.0
Gateway	192.168.1.1
MAC	00:14:97:06:B8:40
IP Type	Static

The 'COM1 Settings' window shows the following details:

COM1 Settings	
Set the other CDMs same with this.	
Work Type	UDP
Work Port	4001
Timeout to Disconnect	0
TCP Connect	1/20
Function IO	TCP Line
Target Port 1	6006
Target IP 1	192.168.1.19
Target Port 2	6002
Target IP 2	0.0.0.0

Red arrows indicate the following connections: from 'Remote IP' (192.168.1.178) to 'IP' (192.168.1.178); from 'Local IP' (192.168.1.19) to 'Target IP 1' (192.168.1.19); from 'Remote Port' (4001) to 'Work Port' (4001); from 'Local Port' (6006) to 'Target Port 1' (6006).

## 13.1 APPENDIX A

### Look up table for voltage recalibration

Difference	Offset	Difference	Offset	Difference	Offset	Difference	Offset
+ 0.00	0 or 128	+ 0.33	33	+ 0.66	66	+ 0.99	99
+ 0.01	1	+ 0.34	34	+ 0.67	67	+ 1.00	100
+ 0.02	2	+ 0.35	35	+ 0.68	68	+ 1.01	101
+ 0.03	3	+ 0.36	36	+ 0.69	69	+ 1.02	102
+ 0.04	4	+ 0.37	37	+ 0.70	70	+ 1.03	103
+ 0.05	5	+ 0.38	38	+ 0.71	71	+ 1.04	104
+ 0.06	6	+ 0.39	39	+ 0.72	72	+ 1.05	105
+ 0.07	7	+ 0.40	40	+ 0.73	73	+ 1.06	106
+ 0.08	8	+ 0.41	41	+ 0.74	74	+ 1.07	107
+ 0.09	9	+ 0.42	42	+ 0.75	75	+ 1.08	108
+ 0.10	10	+ 0.43	43	+ 0.76	76	+ 1.09	109
+ 0.11	11	+ 0.44	44	+ 0.77	77	+ 1.10	110
+ 0.12	12	+ 0.45	45	+ 0.78	78	+ 1.11	111
+ 0.13	13	+ 0.46	46	+ 0.79	79	+ 1.12	112
+ 0.14	14	+ 0.47	47	+ 0.80	80	+ 1.13	113
+ 0.15	15	+ 0.48	48	+ 0.81	81	+ 1.14	114
+ 0.16	16	+ 0.49	49	+ 0.82	82	+ 1.15	115
+ 0.17	17	+ 0.50	50	+ 0.83	83	+ 1.16	116
+ 0.18	18	+ 0.51	51	+ 0.84	84	+ 1.17	117
+ 0.19	19	+ 0.52	52	+ 0.85	85	+ 1.18	118
+ 0.20	20	+ 0.53	53	+ 0.86	86	+ 1.19	119
+ 0.21	21	+ 0.54	54	+ 0.87	87	+ 1.20	120
+ 0.22	22	+ 0.55	55	+ 0.88	88	+ 1.21	121
+ 0.23	23	+ 0.56	56	+ 0.89	89	+ 1.22	122
+ 0.24	24	+ 0.57	57	+ 0.90	90	+ 1.23	123
+ 0.25	25	+ 0.58	58	+ 0.91	91	+ 1.24	124
+ 0.26	26	+ 0.59	59	+ 0.92	92	+ 1.25	125
+ 0.27	27	+ 0.60	60	+ 0.93	93	+ 1.26	126
+ 0.28	28	+ 0.61	61	+ 0.94	94	+ 1.27	127
+ 0.29	29	+ 0.62	62	+ 0.95	95		
+ 0.30	30	+ 0.63	63	+ 0.96	96		
+ 0.31	31	+ 0.64	64	+ 0.97	97		
+ 0.32	32	+ 0.65	65	+ 0.98	98		

**APPENDIX A (Continued)**  
**Look up table for voltage recalibration (Continued)**

Difference	Offset	Difference	Offset	Difference	Offset	Difference	Offset
- 0.01	129	- 0.34	162	- 0.67	195	- 1.00	228
- 0.02	130	- 0.35	163	- 0.68	196	- 1.01	229
- 0.03	131	- 0.36	164	- 0.69	197	- 1.02	230
- 0.04	132	- 0.37	165	- 0.70	198	- 1.03	231
- 0.05	133	- 0.38	166	- 0.71	199	- 1.04	232
- 0.06	134	- 0.39	167	- 0.72	200	- 1.05	233
- 0.07	135	- 0.40	168	- 0.73	201	- 1.06	234
- 0.08	136	- 0.41	169	- 0.74	202	- 1.07	235
- 0.09	137	- 0.42	170	- 0.75	203	- 1.08	236
- 0.10	138	- 0.43	171	- 0.76	204	- 1.09	237
- 0.11	139	- 0.44	172	- 0.77	205	- 1.10	238
- 0.12	140	- 0.45	173	- 0.78	206	- 1.11	239
- 0.13	141	- 0.46	174	- 0.79	207	- 1.12	240
- 0.14	142	- 0.47	175	- 0.80	208	- 1.13	241
- 0.15	143	- 0.48	176	- 0.81	209	- 1.14	242
- 0.16	144	- 0.49	177	- 0.82	210	- 1.15	243
- 0.17	145	- 0.50	178	- 0.83	211	- 1.16	244
- 0.18	146	- 0.51	179	- 0.84	212	- 1.17	245
- 0.19	147	- 0.52	180	- 0.85	213	- 1.18	246
- 0.20	148	- 0.53	181	- 0.86	214	- 1.19	247
- 0.21	149	- 0.54	182	- 0.87	215	- 1.20	248
- 0.22	150	- 0.55	183	- 0.88	216	- 1.21	249
- 0.23	151	- 0.56	184	- 0.89	217	- 1.22	250
- 0.24	152	- 0.57	185	- 0.90	218	- 1.23	251
- 0.25	153	- 0.58	186	- 0.91	219	- 1.24	252
- 0.26	154	- 0.59	187	- 0.92	220	- 1.25	253
- 0.27	155	- 0.60	188	- 0.93	221	- 1.26	254
- 0.28	156	- 0.61	189	- 0.94	222	- 1.27	255
- 0.29	157	- 0.62	190	- 0.95	223		
- 0.30	158	- 0.63	191	- 0.96	224		
- 0.31	159	- 0.64	192	- 0.97	225		
- 0.32	160	- 0.65	193	- 0.98	226		
- 0.33	161	- 0.66	194	- 0.99	227		

## 13.2 APPENDIX B

### Look up table for current recalibration

Difference	Offset	Difference	Offset	Difference	Offset	Difference	Offset
+ 0.000	0 or 128	+ 0.033	33	+ 0.066	66	+ 0.099	99
+ 0.001	1	+ 0.034	34	+ 0.067	67	+ 0.100	100
+ 0.002	2	+ 0.035	35	+ 0.068	68	+ 0.101	101
+ 0.003	3	+ 0.036	36	+ 0.069	69	+ 0.102	102
+ 0.004	4	+ 0.037	37	+ 0.070	70	+ 0.103	103
+ 0.005	5	+ 0.038	38	+ 0.071	71	+ 0.104	104
+ 0.006	6	+ 0.039	39	+ 0.072	72	+ 0.105	105
+ 0.007	7	+ 0.040	40	+ 0.073	73	+ 0.106	106
+ 0.008	8	+ 0.041	41	+ 0.074	74	+ 0.107	107
+ 0.009	9	+ 0.042	42	+ 0.075	75	+ 0.108	108
+ 0.010	10	+ 0.043	43	+ 0.076	76	+ 0.109	109
+ 0.011	11	+ 0.044	44	+ 0.077	77	+ 0.110	110
+ 0.012	12	+ 0.045	45	+ 0.078	78	+ 0.111	111
+ 0.013	13	+ 0.046	46	+ 0.079	79	+ 0.112	112
+ 0.014	14	+ 0.047	47	+ 0.080	80	+ 0.113	113
+ 0.015	15	+ 0.048	48	+ 0.081	81	+ 0.114	114
+ 0.016	16	+ 0.049	49	+ 0.082	82	+ 0.115	115
+ 0.017	17	+ 0.050	50	+ 0.083	83	+ 0.116	116
+ 0.018	18	+ 0.051	51	+ 0.084	84	+ 0.117	117
+ 0.019	19	+ 0.052	52	+ 0.085	85	+ 0.118	118
+ 0.020	20	+ 0.053	53	+ 0.086	86	+ 0.119	119
+ 0.021	21	+ 0.054	54	+ 0.087	87	+ 0.120	120
+ 0.022	22	+ 0.055	55	+ 0.088	88	+ 0.121	121
+ 0.023	23	+ 0.056	56	+ 0.089	89	+ 0.122	122
+ 0.024	24	+ 0.057	57	+ 0.090	90	+ 0.123	123
+ 0.025	25	+ 0.058	58	+ 0.091	91	+ 0.124	124
+ 0.026	26	+ 0.059	59	+ 0.092	92	+ 0.125	125
+ 0.027	27	+ 0.060	60	+ 0.093	93	+ 0.126	126
+ 0.028	28	+ 0.061	61	+ 0.094	94	+ 0.127	127
+ 0.029	29	+ 0.062	62	+ 0.095	95		
+ 0.030	30	+ 0.063	63	+ 0.096	96		
+ 0.031	31	+ 0.064	64	+ 0.097	97		
+ 0.032	32	+ 0.065	65	+ 0.098	98		

**APPENDIX B (Continued)**  
**Look up table for current recalibration (Continued)**

- 0.015	143	- 0.048	176	- 0.081	209	- 0.114	242
- 0.016	144	- 0.049	177	- 0.082	210	- 0.115	243
- 0.017	145	- 0.050	178	- 0.083	211	- 0.116	244
- 0.018	146	- 0.051	179	- 0.084	212	- 0.117	245
- 0.019	147	- 0.052	180	- 0.085	213	- 0.118	246
- 0.020	148	- 0.053	181	- 0.086	214	- 0.119	247
- 0.021	149	- 0.054	182	- 0.087	215	- 0.120	248
- 0.022	150	- 0.055	183	- 0.088	216	- 0.121	249
- 0.023	151	- 0.056	184	- 0.089	217	- 0.122	250
- 0.024	152	- 0.057	185	- 0.090	218	- 0.123	251
- 0.025	153	- 0.058	186	- 0.091	219	- 0.124	252
- 0.026	154	- 0.059	187	- 0.092	220	- 0.125	253
- 0.027	155	- 0.060	188	- 0.093	221	- 0.126	254
- 0.028	156	- 0.061	189	- 0.094	222	- 0.127	255
- 0.029	157	- 0.062	190	- 0.095	223		
- 0.030	158	- 0.063	191	- 0.096	224		
- 0.031	159	- 0.064	192	- 0.097	225		
- 0.032	160	- 0.065	193	- 0.098	226		
- 0.033	161	- 0.066	194	- 0.099	227		

### 13.3 APPENDIX C

#### Command set of the SSP-8080

Command Code	Description
SOUT <OFF> <CR> [OK] [CR]	Set Output On/Off
GOUT <CR> Output [?] [CR] [OK] [CR]	Get Output Status
GOVP <CR> Voltage [???] [CR] [OK] [CR]	Get UVL Setting Value
SETD Abc{0-2} Voltage{????} Current{????} <CR> [OK] [CR]	SET Voltage and Current
GOCP <CR> Current [???] [CR] [OK] [CR]	Get UCL Setting Value
SOVP Voltage {????} <CR> [OK] [CR]	Set UVL Value
SOCP Current [????]<CR> [OK] [CR]	Set UCL Value
GETD <CR> Voltage [????] Current [????] [0] [CR] [OK] [CR] Voltage [????] Current [????] [1] [CR] [OK] [CR]	Get Reading Volt & Current CV Mode CC Mode
GETS Abc {0-2} <CR> Voltage [????] Current [????] [CR] [OK] [CR]	Get Setting Volt & Current
VOLT Abc {0-2} Voltage {????}<CR> [OK] [CR]	SET Output Voltage Value
CURR Abc {0-2} Current {????}<CR> [OK] [CR]	SET Output Current Value
GABC <CR> ABC {0-2} [CR] [OK] [CR]	Get ABC Selection
SABC Abc {0-2} <CR> [OK] [CR]	Set ABC Selection
GCHA <CR> Range [0-2][CR] [OK] [CR]	Get Range Selection

SCHA Range {0-2} <CR> [OK] [CR]	Set Range Selection
SESS <CR> [OK] [CR]	Disable Keyboard
ENDS <CR> [OK] [CR]	Enable Keyboard
GDLT location {0-5}<CR> delta time [00-20] [CR] [OK] [CR]	Get Delta Time Setting Value
SDLT location {0-5} time {00-20} <CR> [OK] [CR]	Set Delta Time
GSWT location {0-2} <CR> sw time [000-600] [CR]  [OK] [CR]	Get SW Time
SSWT location {0-2} time {000-600} <CR> [OK] [CR]	Set SW Time
RUNP first {0-2} end {0-2} <CR> [OK] [CR]	Run SW
STOP <CR> [OK] [CR]	Stop SW Running
GEEP location {0-3}<CR> location 00 [000-255]                      location 01 [000- 255]  location 15 {000-255} [CR] [OK] [CR]	Get EEPROM Data
SEEP location {0-3} location 00 {00-FF} location 01 {00-FF}  location 15 {00-FF} <CR> [OK] [CR]	Set EEPROM Data (Hex Data Format)
Note: Output [ON] on = 31h, [OFF] = 30h	

## 13.4 APPENDIX D - Operation Mode Description

<b>Working Mode</b>	<b>Description</b>
<b>TCP Server</b>	When using TCP, connection must be established before transferring data. TCP Server waits for the client to connect, while TCP Client actively connects the destination IP and destination port.
<b>TCP Client</b>	Two Ethernet card modules can therefore work to communicate with one being a TCP Server; while the second one should be setup as a TCP Client to receive and transmit.
<b>UDP</b>	UDP mode does not setup the connection, so if UDP is used to transmit data, it only transmit and receive data from the specified destination IP and destination port. If there are more than one network components connected to the Ethernet card module, then the TCP should be first setup to establish the connection. Afterwards, the connection should be closed so that the other network components can connect the Ethernet card module. Note: Since UDP does not have the maximum packet limit, the Ethernet card module is set to have valid frame with a maximum of 560 bytes, the packet might be lost if more characters are used.
<b>RealCOM</b>	RealCOM Mode is the virtual serial ports working mode.
<b>Group Mode</b>	Group Mode is a working mode with multicast. Under group mode, the Ethernet card modules that have the same multicast ID and ports will share the network data, i.e. the Ethernet data from one module is received by others and changed to serial communication.
<b>TCP Auto Mode</b>	TCP Auto mode is an automatic TCP working mode. If the serial ports have not received the data, the Ethernet card module will work as a server and listening to the working ports, waiting for the clients to connect. If the Ethernet card module can receive the data, then the Ethernet card module will automatically establish connection with destination IP and destination ports, and then transmit the data.



## 13.5 APPENDIX F

### List of default ports that are assigned by TCP and UDP

Protocol	Port
Reserved	0
TCP Port Service Multiplexer	1
Management Utility	2
ECHO	7
Reserved	9
Reserved	11
Reserved	13
Netstat	15
FTP	20
FTP	21
TELNET	23
SMTP	25
Printer	35
Time Server	37
Host Name Server	42
Reserved	43
Login Host Protocol (TACACS)	49
DNS	53
DHCP	67
DHCP	68
TFTP	69
Gopher	70
Finger	79
HTTP	80
Remote TELNET	107
SUN Remote Procedure Call	111
Network News Transfer Protocol	119
Network Time Protocol	123
SNMP	161
SNMPTRAP	162
IPX	213
Reserved	160-223

## 13.6 APPENDIX G - **IPORT-1** module speed test result

Protocol	Transmission Direction	Baud rate	Description
TCP	Serial to Ethernet	<19200bps	No delay
		>38400bps	Continuously sending 512 bytes with a period 230ms
	Ethernet to Serial	Free	TCP has flow control, maximum baud rate 115200, speed was 10.6KB/s
UDP	Serial to Ethernet	<115200bps	No delay
		9600bps	Continuously sending 512 bytes with a period >500ms
		19200bps	Continuously sending 512 bytes with a period >250ms
		57600bps	Continuously sending 512 bytes with a period >100ms
	Ethernet to Serial	115200bps	Continuously sending 512 bytes with a period >80ms