BK PRECISION®

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OPERATION MANUAL

Models 1696 / 1697 / 1698

LABORATORY GRADE

SWITCHING MODE PROGRAMMABLE DC POWER SUPPLIES with PC INTERFACE

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Limited One-Year Warranty

B&K Precision Corp. warrants to the original purchaser that its product and the component parts thereof, will be free from defects in workmanship and materials for a period of one year from the data of purchase.

B&K Precision Corp. will, without charge, repair or replace, at its' option, defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form a sales receipt.

To obtain warranty coverage in the U.S.A., this product must be registered by completing and mailing the enclosed warranty card to B&K Precision Corp., 22820 Savi Ranch Parkway Yorba Linda, CA 92887 within fifteen (15) days from proof of purchase.

Exclusions : This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alternations or repairs. It is void if the serial number is alternated, defaced or removed.

B&K Precision Corp. shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

Model Number: _____ **Date Purchased:** _____

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1. IMPORTANT SAFETY INSTRUCTIONS

1. Do not use this apparatus near water.
2. Clean only with dry cloth.
3. Do not block any ventilation openings.
4. Do not install unit near any heat source or heating emitting devices.
5. Prevent the power cord from being walked on or pinched.
6. Unplug this unit during lighting storms or when unused for long periods of time.

PRECAUTIONS

1. The unit must be used within its specified range.
   The rated input voltages can be found on the rating label at the back the unit.
   Before plugging into the AC supply, check with the rating label.
2. This unit has a built-in Tracking O.V.P.(Over Voltage Protection) feature. In the event of the output voltage becoming 10% greater than the set value, the O.V.P. will be triggered and the output power will be cut off and > **FAULT**< warning appear.
   When you get this warning, switch off the unit and remove all loading.
   If you switch the unit back on again it should resume normal operation.
   In the event that this problem persists contact the manufacture.
3. This unit has a buzzer built inside. The buzzer will sound when Over Temperature/Overload/Over Voltage Protection has been triggered.
   When you get this warning, switch off the unit and remove all loading.
   Check your load and output voltage setting.
   Allow the unit to cool down for 30 minutes.
   If you switch the unit back on again it should resume normal operation.
   In the event this problem persists , the unit must be investigated by your agent.
4. Only use the supplied software and optional accessories with this unit.
5. Refer all servicing to manufacturer.

Warning !
Model 1698, the maximum output voltage for this is upto 60Vdc.
It may be hazardous to touch metal part of the terminals.

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2. Technical Specifications of models 1696, 1697, and 1698

Specifications	**1696**	**1697**	**1698**
Output Voltage:	1-20VDC	1-40VDC	1-60VDC
Output Current:	0-10A	0-5A	0-3.3A
Ripple & Noise (P-P):	25mV	25mV	25mV
Load Regulation:	0.5% + 200mV	0.5%+200mV	0.5% +200mV
Line Regulation:	50mV	50mV	50mV
Input Voltage :	100 - 240 VAC, 50Hz / 60Hz		
Display Meter:	4 digit - display LCD Ammeter, Voltmeter and Power meter		
Meter's Accuracy:	1.5% + 2 counts		
LCD Module Back light :	48 x 6mm		
Cooling System:	thermostatic control fan		
Protection Devices:	Over Temperature, Tracking OVP		
Approvals:	CE		
Dimension (HxWxD):	3.85 x 7.6 x 8.46"	(98 x 193 x 215 mm)	
Weight:	6.6lbs.	(3 Kg)	
Accessory:	PC WindowsTM software, RS-232 cable and Operation manual		

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3. INTRODUCTION

This series of laboratory grade, switching mode, programmable power supplies are ideal for repetitive test routines in R&D, Production, Product Evaluation and various applications.

Information appearing on the large back-lit LCD makes the panel controls simple and easy to use in spite of it's sophisticated features.

Because of the MCU (Micro-Controller Unit) and the related software, user re-calibration without opening the case is an added bonus.

When used with a standard PC, the supplied user friendly software and built in RS-232 interface provides two way communication improving the functionality of these unit.

Data logging with color graphic display in adjusting range Voltage, Current, Watts, and time periods are all valuable tools in data analysis.

Please keep this manual in a safe place and contact the manufacturer for any special requirements in application software or other features.

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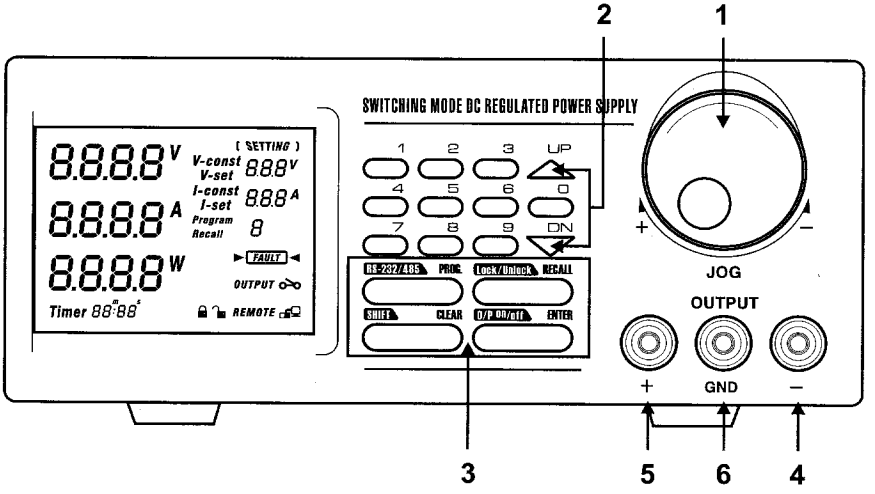
4. CONTROLS AND INDICATORS

Front Panel



1. JOG DIAL
2. UP & DOWN KEY
3. DUAL FUNCTION CONTROL KEYS
4. BLACK COLOR NEGATIVE POLARITY OUTPUT TERMINAL
5. RED COLOR POSITIVE POLARITY OUTPUT TERMINAL
6. GREEN COLOR GROUND TERMINAL (connected to chassis)

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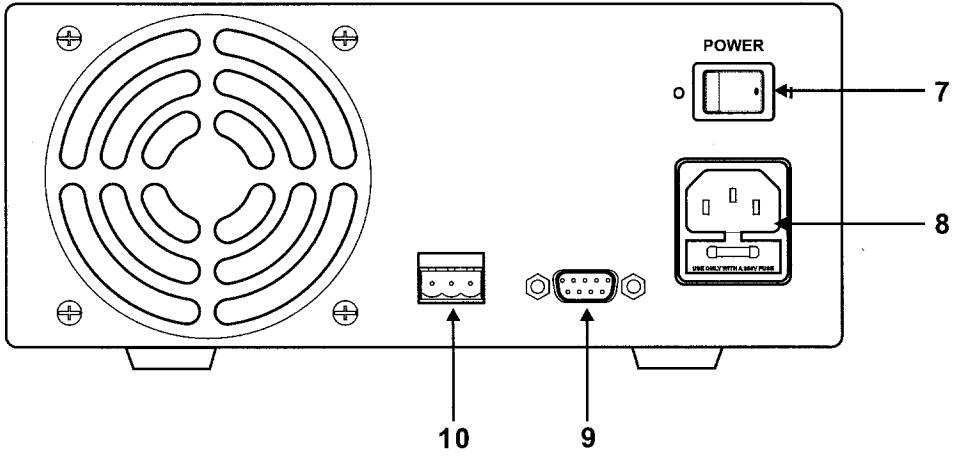
4. CONTROLS AND INDICATORS

Back Panel



7. POWER SWITCH
8. AC 100 - 240VAC POWER SOCKET WITH INPUT POWER FUSE
9. RS-232 PORT
10. RS-485 PORT

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5. GENERAL OPERATION PRINCIPLE

There are four operation methods for this unit;

- Manual Operation,
- Presets
- Timed Program
- PC Interface Mode.

The large Liquid Crystal Display will guide you through the various operations/procedures interactively once you understand the operation principle.

There are four Dual Function Control Keys for various operation modes and input states of the unit.

To change/set operation mode (**output on /off, key lock** & etc.), in most cases you need to two Dual Function keys to complete the operation.
To change input values of various settings (voltage, current, preset number, cycles, time period & etc.), use the ENTER key to get ready and confirm the new settings.

Liquid Crystal Display

The back-lit display shows both the preset and the actual voltage, current levels at the output terminals; and status of constant current (**CC**) or constant voltage (**CV**) mode. Be aware for new symbols appearing on the display while inputting. They will guide you and remind you of the correct procedure.

Example: Inputting values of various settings

When a new setting (voltage, current, time periods & etc.) is ready for inputting, the symbol for the related setting will appear on the display. After you key in the required value, always follow by pressing **ENTER** to confirm or to complete the operation.

Presets and Timed Subprograms

This unit has the capacity to store 10 programs.

Program 1 to 9 is for nine sets of Presets of voltage and current.

The program 0 is reserved for the 20 timed subprograms, each is capable of storing 1 second to 99-minute operation period with its preset voltage and current levels.

The timed subprograms can be set to operate repeatedly in sequence from 1 to 9999 cycles.

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6. OPERATING INSTRUCTIONS

6.1 Setting of Operation Modes

Output On/Off Mode

1. Press **SHIFT** key.
   The display will show **Sh:Ft**.
2. Press (**O/P On/Off**) key within 3 seconds.
   Watch for the appearing On/Off symbol in the display to confirm your setting, otherwise repeat the above procedure.

Lock/Unlock the Keypad and Jog Dial

1. Press **SHIFT** key.
   The display will show **Sh:Ft**.
2. Press (**Lock/Unlock**) key within 3 seconds.
   Watch for the appearing **Lock/Unlock** symbol in the display to confirm your setting, otherwise repeat the above procedure.

PC Interface RS-232/RS485

1. Press **SHIFT** key.
   The display will show **Sh:Ft**.
2. Press (**RS232/485**) key within 3 seconds.
3. Select desired PC Interface by the (**RS232/485**) key.
4. For RS 232 press **RECALL** confirm setting.
5. For RS 485 enter 485 address followed by **RECALL** confirm setting.

Upper Voltage Limit Setting

This feature limits the upper level setting of output voltage to prevent inadvertent setting of high voltage, which may damage your application.
The value of this upper voltage range limit will be retained until further reset.

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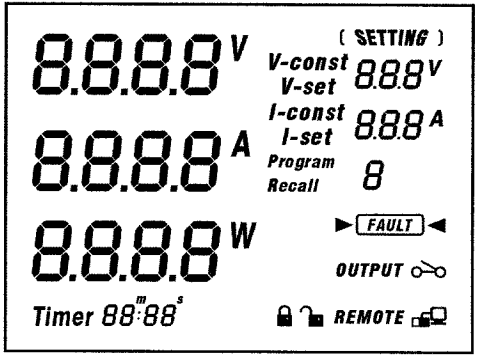
Precaution:

Reset back to the maximum rated voltage of the unit is recommended to avoid false fault report of the unit.

1. Press **SHIFT** and follow by 0 key.
2. The display will show OVEr V 88.8 and the present upper voltage limit.
3. Input your desired voltage followed by **ENTER** to confirm.
4. Recheck setting by repeating step 1.

CONTROL SYMBOLS ON DISPLAY



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OUTPUT OUTPUT	Showing output terminals in ON/OFF state.
	Showing keypad & Jog dial are in Locked (de-activated) or Unlock (activated) state.
REMOTE	Unit is ready for or has already been linked up with computer.

WARNING SYMBOL ON DISPLAY

► FAULT ◄	Over Voltage Protection is activated. Take off all loads. See Precautions at first page.

UPPER VOLTAGE LIMIT SYMBOL ON DISPLAY

OPEr V 888	Press the SHIFT then the 0 key . The display on the LCD shows the unit ready for input of Upper Limit Range and the original set voltage.

STANDARD OPERATION SYMBOLS

V-const	Constant Voltage mode showing set voltage.
V-set	This only appears voltage level is ready for setting.
I-set	This only appears current level is ready for setting.
I-const	This only appears when unit is in CC (constant current) mode.
8.8.8.8 V 8.8.8.8 A 8.8.8.8 W	They show the actual Volts, Amperes and Watts at the output terminals.

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6.2 Manual Operation Mode

In the Manual Operation Mode, once the voltage and current levels have been set, the unit will keep these settings even after unit has been switched off until further reset.

There are 3 ways to input a setting:

1. By the **Jog Dial**.
2. By the **UP** or **DOWN** key.
3. By the **Key Pad**.

For any wrong input, e.g. out of specification values, display will show **"OUT OF RANGE"** FOR ABOUT 3 SECONDS, then returns to it's previous settings and ready for correct new input.

Manual Setting of Voltage and Current by Jog Dial

1. To change the voltage setting, just rotate the Jog Dial, no other step is needed.
2. To change the current setting, press **ENTER twice** ,the LCD will show **I-set, push** for desired value.
3. Press **ENTER** to confirm your chosen current setting.

Manual Setting of Voltage and Current by Up & Down Key

1. To change the voltage setting, just press the Up &Down Key, no other step is needed.
2. To change the current setting, press **ENTER twice** , the LCD will show **I-set** ,push the **Up** & **Down** key for desired value.
3. Press **ENTER** to confirm your chosen current setting.

Manual Setting of Voltage and Current by Key Pad

1. Press **ENTER**.
   Display will show **V-set** and the present voltage setting, key in the desired voltage level.
2. Press **ENTER** to confirm your chosen voltage setting, and the display will show **I-set**.
3. You can key in the desired current setting now, if you do not want to change the current setting, you still need to press **ENTER** again to confirm the new settings of voltage and current to complete the operation.
4. You must press the **ENTER** key 3 times in total even if you want to change the voltage, otherwise the unit will flash **CANCEL** and returns to its old settings

Note :

If during any of the above keypad operations, you fail to input a setting within 10 seconds, the unit will cancel the procedure and resume it's previous settings.
You can exit any of the above operations by pressing the CLEAR key and the unit will revert to its previous settings.

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7. Using the Preset Features

PRESET PROGRAM SYMBOLS

Program Unit is ready for inputting of a Preset Program Number (19).

Recall Unit is ready for recalling a Preset Program Number.

The unit can store nine preset voltage and current settings.
Once programmed, these settings will be retained even when the unit is switched off.

Preset Programming

1. Press **PROG** key
   The display will show **Program_**
   Key in Program Number (1-9) at the keypad

2. The display will show :-
   A) The newly keyed in Program Number.
   B) The old settings of voltage and current with **V-set** ready for voltage to be reset.
   C) Set the required voltage level then press **ENTER** to confirm.
   D) The display will show **I-set** ready for current level to be reset.
   E) Set required current level then press **ENTER** to confirm.
   F) The program will automatically advance to the next Preset (as shown in the display **Program_** section).
   G) If you want to change the voltage and current setting of next Preset repeat procedure B to E, otherwise just press **ENTER** to go to the next Preset.

Whenever you want to determine Preset Programming you can press the **CLEAR** key to return to normal operation mode.

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Selecting Presets

1. Press the **RECALL** key
   The display will show **Recall__**
2. Press the number key (1-9) .
   The display will show the chosen Preset Number, its voltage and current level.
3. Press **ENTER** to activate .The unit will resume the chosen reset values.

If during any of the above procedures, you fail to input a setting within 10 seconds, the unit will cancel the procedure and resume the previous settings. You can exit any of the above operations by pressing the **CLEAR** key and the unit will resume to its previous settings.

7.1 Operating the Timed Program

The unit can be programmed to operate up to 20 timed subprograms (1-19 STEP as shown in the display). Each subprogram is capable of running a preset operation period of 1 second to 99 minutes and 99 seconds with its own preset voltage and current level. The timed subprogram can be set to run in sequence repeatedly from 1 to 9999 cycles. You can run the unit through the sequence of sub programs for the input cycles number unless interrupted by pressing the **CLEAR** key.

Programming the Unit

1. Press the **PROG** key
2. Press the 0 key (to get to the Timed Program Mode)
   and the display will show **Program 0 StEP-.-.00**
3. Input subprogram number 0 to 19 and press **ENTER** to confirm.
4. Input voltage level followed by **ENTER** to confirm and the display will show **I-set.**
5. Input current followed by **ENTER** to confirm. The bottom left corner of the display will show **Timer00m00s** and the appearing minute symbol **m**.
6. Input minute period(0-99) followed by **ENTER** to confirm. The bottom left corner of the display will show **Timer00m00s** and the appearing second symbol **s**.
7. Input seconds period (0-99) followed by **ENTER** to confirm. The timed subprogram will automatically to next subprogram number ready input of new settings.
8. Repeat procedure 4 to 7.
9. A subprogram is confirmed to retain the new settings only when procedure 7 is completed .
10. **You can always input zero time period as a terminating subprogram.**

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Note :

A. Once the subprograms are filled, the unit will return to manual operation mode.
B. Any subprogram with zero time period will become the Terminating Subprogram. For example if you set the subprogram 7 with zero time period, all the subprograms after 7 (i.e.8, 9, 10-19) become non-existent.
The timed program will only cycle from subprogram 0 (**STEP**) to subprogram 6. You can use this feature to cut off the subprograms that are not required for the sequence.
C. A subprogram is confirmed to the new settings only when procedure 7 is done.
D. During any of the above procedures, if you fail to input a setting within 10 seconds, the unit will exit from that procedure and return to manual operating mode.
For any wrong input, display will show **OUT OF RANGE** for about 3 seconds and then returns to its previous procedure/settings ready for the correct new input.

7.2 Running the Timed Program Cycles

Once the desired numbers of subprograms have been filled as explained in the previous section, all the presets of voltage and current levels and operation periods will be retained until further programming.

1. Press **RECALL** followed by the **0** key.
The display will show **STEP 00** and **Recall 0** and the settings of the first timed subprogram.
2. Use **UP^** or **DN/** keys to check the settings of all the timed subprograms.
3. Press **ENTER** and the display will show **CYC-0000**, the unit is ready for input of repetitive operation cycles.
4. Key in number of cycles required, 1-9999 followed by ENTER to start the cycle operation.
5. The unit will run through the Timed Subprogram 0 to 19 or 0 to any subprogram prior to the subprogram with zero timed period.
6. The display will show the on-going cycle's count down time of operation period, actual and set voltage and current, number of cycles executed.
7. You can also see the power (Watt) display if you press **ENTER**.
8. To return to the previous display press **ENTER** again.

Note : Beware that the life span of the power supply is limited by the life of the relay, which is 100x10,000 operation as stated by the relay manufacturer.

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8. MAINTENANCE

8.1 RECALIBRATION

Introduction

This in-case recalibration is to reduce the difference between the Set values and the displayed values on the LCD Display. You only use the recalibration when the difference is greater than 0.1V for voltage or -0.01A / +0.02A for current. The whole recalibration for voltages and current takes less than 15 minutes. It is performed by a proprietary software using regression algorithm.

The recalibration software is compatible to Window XP, Me, 2000, 98SE, 98.

Installation of the recalibration software

1. In the installation disk, run Setup.exe inside the folder of Re-calibration to install the recalibration software.
2. Follow the instructions in the setup program.
3. Finally a SDP Recalibration icon is created in the Program Menu.

Operation Instruction

1. Ensure your PC is off, connect RS-232 to serial com. port of your PC and the power supply.
2. On Your Power Supply, press **[SHIFT]** key, then quickly press **[RS232/485]** key and select RS-232 followed by **[ENTER]** key.
3. Switch on your PC and run the SDP recalibration software.
4. Follow the instructions shown in the software.

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8. MAINTENANCE

8.2 TROUBLE SHOOTING

1. Keypad and Dial do not work.
   Check key lock symbol for lock state, unlock unit by pressing **SHIFT** then **Lock/Unlock** key, otherwise switch the unit off and then back on to see if the problem persists.

2. No output power.
   Check the output for on/off symbol on the display. Press **SHIFT O/P ON/OFF** key.

3. Cannot get a high voltage setting within the rated maximum.
   Check the upper voltage limit setting by pressing **SHIFT** then the **0** key.
   Reset to the rated maximum voltage.

4. **CANCEL** symbol keeps appearing in all keying in operations.
   Keying in time may not be fast enough as only 10 seconds are allowed for data inputting and 3 seconds for operation mode setting.

5. OUT OF RANGE keeps appearing.
   Check if setting is within the rated range.
   If this occurs during voltage setting, see point 3.

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9. PC Interface Control User Manual

9.1 Introduction

We integrate the micro-controller technology and our proprietary software with switching mode power technology to make this unit user friendly, time saving and reliable power supply.

In PC interface mode:

1. With our proprietary software one PC can perform remote access/control and output data logging for one programmable power supply with RS-232 or up to 31 programmable power supplies using RS-485 interface.
2. Outputs for dynamic loading like power surges can be recorded stored (also as XLS file) and displayed on the PC.
3. The PC can input, stored, retrieved, and transferred for all the data entries for the Timed Programs and the Memory Presets to the power supply. This eliminates the tedious process of keying in data for different groups of Timed Programs and Memory Presets to the programmable power supply.
4. Using the data logging function, the actual output voltage, amperes, watts, and time periods are recorded in the PC for later analysis. Adjusting the scales of voltage, current, power and time parameters can high light further graphical analysis.

9.2 System Requirement and Software Installation

1. CPU must be 450MHz or above.
2. Ram 128 MB.
3. Min. monitor screen size (area) 800 x 600 pixels.
4. Operating System Windows® Xp, Me, 2000, 98SE, and 98.

Installation of software

1. Run Setup.EXE with installation disk that comes with the unit.
2. Follow the instructions in the setup program. During the running of the setup program, you may encounter "**VERSION CONFLICT**" remarks, ignore it and click yes to complete the installation.
3. Finally a software icon is created in the program menu.

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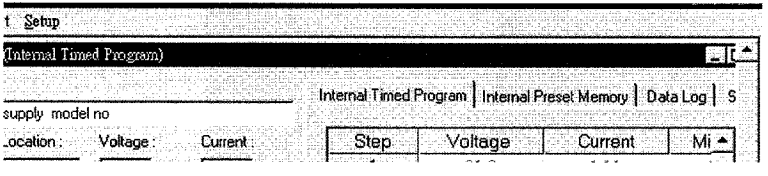
9.3 Operation Instruction for RS-232 Interface

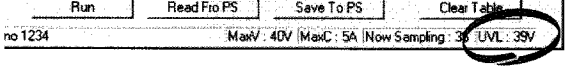
1. Ensure that the PC is off; connect RS-232 to serial COM port of your PC and the power supply.
2. On your power supply, press the [**SHIFT**] key, and then quickly press [**RS-232/485**] key and select RS-232 followed by the [**ENTER**] key.
3. Switch your PC and run the program.
4. Click on **Setup**, and select the desired COM port. The default is set at COM port 1.

5. Click on **Supply Connect**, and then click on **Single** in the drop menu.
6. An "Internal Timed Program" window will appear. Click on the Data Log header on the top left and a window as shown in Fig 1 will appear.



Note:

When the right bottom corner of the display windows shows the UVL value, connection to the PC is made correctly and the power supply is operating normally.



If it shows **No Connection**, check the following:

A. Go back to setup and check to see if the correct COM port has been assigned.
B. Check the power supply; make sure that the RS-232 has been selected.
C. Check the RS-232 cable connection.
D. Check to make sure that the power supply is turned on.

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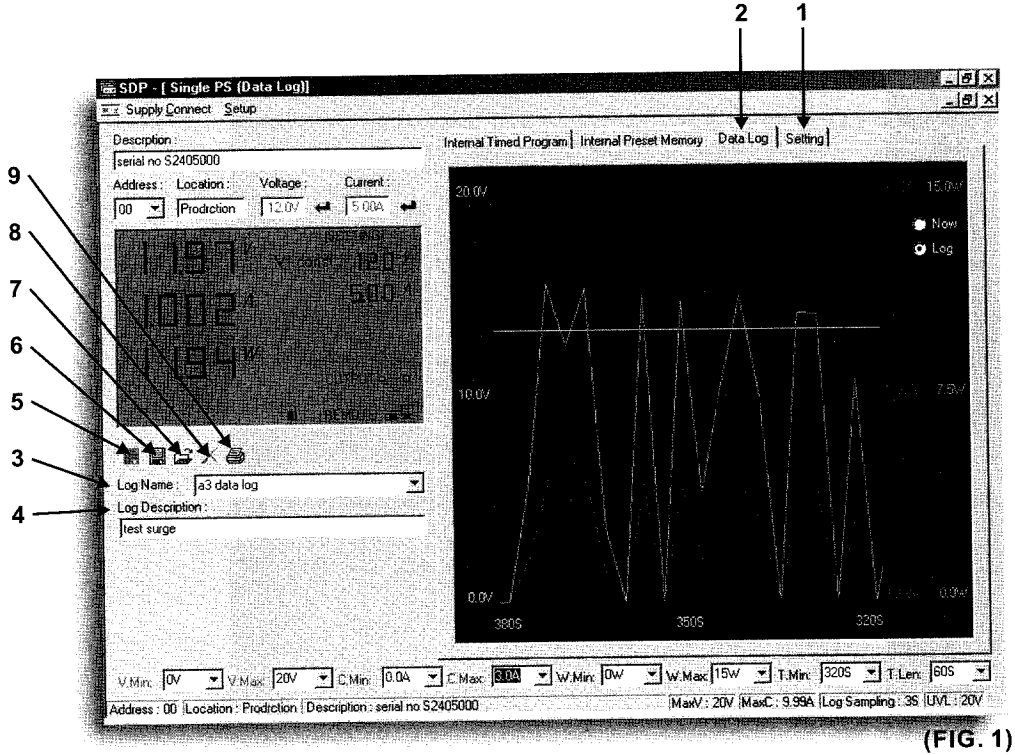

(FIG. 1)

1). Setting

Once you bring up the software you can your desired sample time from 1 second up from the drop menu.

Data log Sampling Time

You can set your output voltage upper limit value to further safeguard your low voltage applications.

Voltage Upper Limit Setting

2). Data Log window

A). You can use the Data Log window to view present output data or stored data .

B). All the parameters at the bottom of the window display can be changed by direct entry from the PC (with decimal point) and then confirmed by the Enter key of the PC, or you can select the values from the respective drop menu.

Parameters at the bottom of the Data Log window:

V Min.	--------	Minimum voltage level.
V Max.	--------	Maximum voltage level.
C Min.	--------	Minimum current level.
C Max.	--------	Maximum current level.
W Min.	--------	Minimum power level in watt.
W Max.	--------	Maximum power level in watt.

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3). Log Name

Untitle

Click cursor on "Untitle", type in a name for your log.
Note how the ###(5) icon changes to solid color.

4). Log Description

You can type in a detailed description of your log.

5). ##### Save Log

a) This function (and the icon) becomes effective when a Log Name is entered to replace the "Untitle".
b) By clicking on it will save the current data onto the PC.
c) To retrieve the data , go to the drop menu at (3) Log Description.

6). ##### Export to a file of xls type

Clicking on this icon will export the collected data (in the Save Log) in xls format to your PC.

7). Open file log of xls type

Clicking on this icon will import the collected data in xls format file to the software.

8). XXX Delete

Clicking on this icon will delete the current or retrieve log on display at (3).

9). Print Log in xls format.

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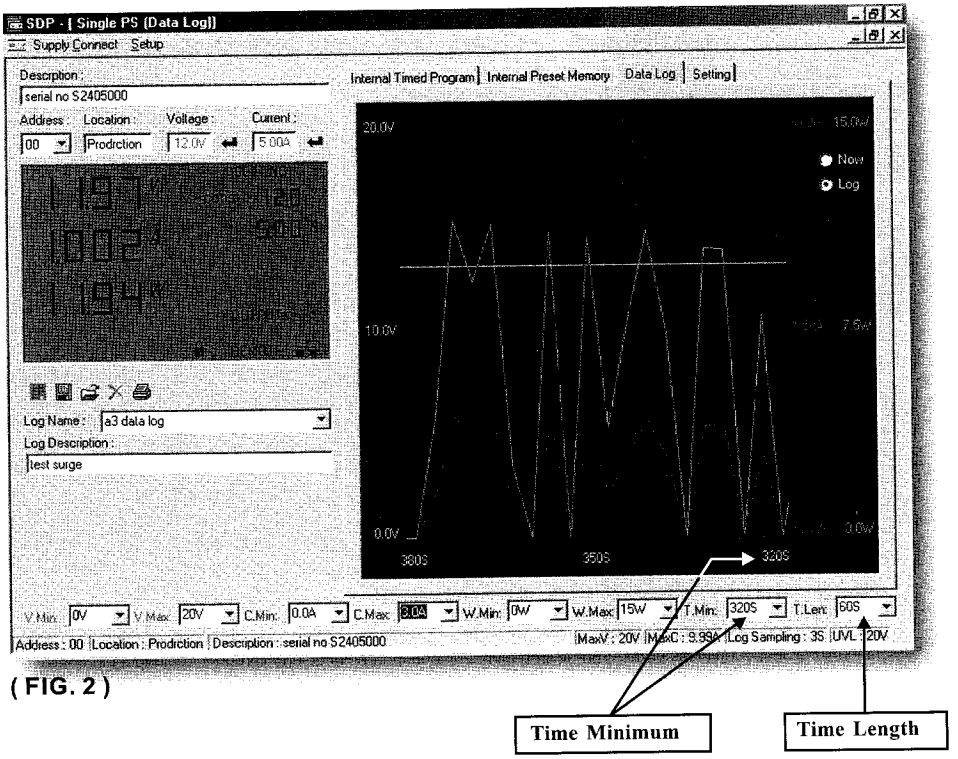
THE DATA LOG WINDOW DISPLAY



(FIG. 2)

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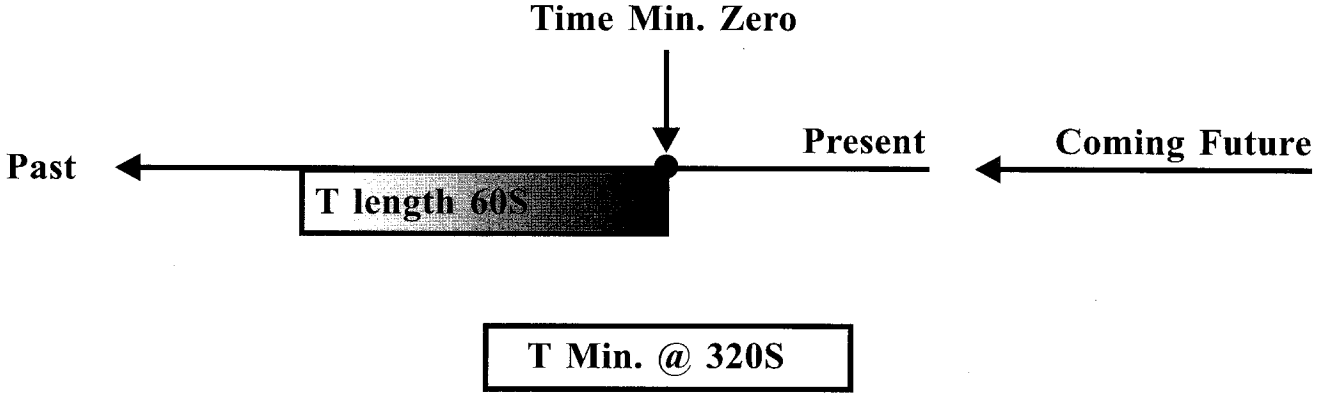
THE TIME FRAME CONCEPT OF DATA LOG

The data logging function starts when the software begins to run.
When T Min is set to zero seconds, it means the unit is on real time and the length of time lapsed is on the left hand side of the Time Minimum.
T Len is the length of time lapsed strating from the Time Minimum.
Both parameters are adjustable so that any time period of the log can be displayed for analysis.
In the above example, T Min is set to 320 seconds and T length to 60 seconds, the display shows the output data starting at 320 seconds ago and ending at the 380 second mark.



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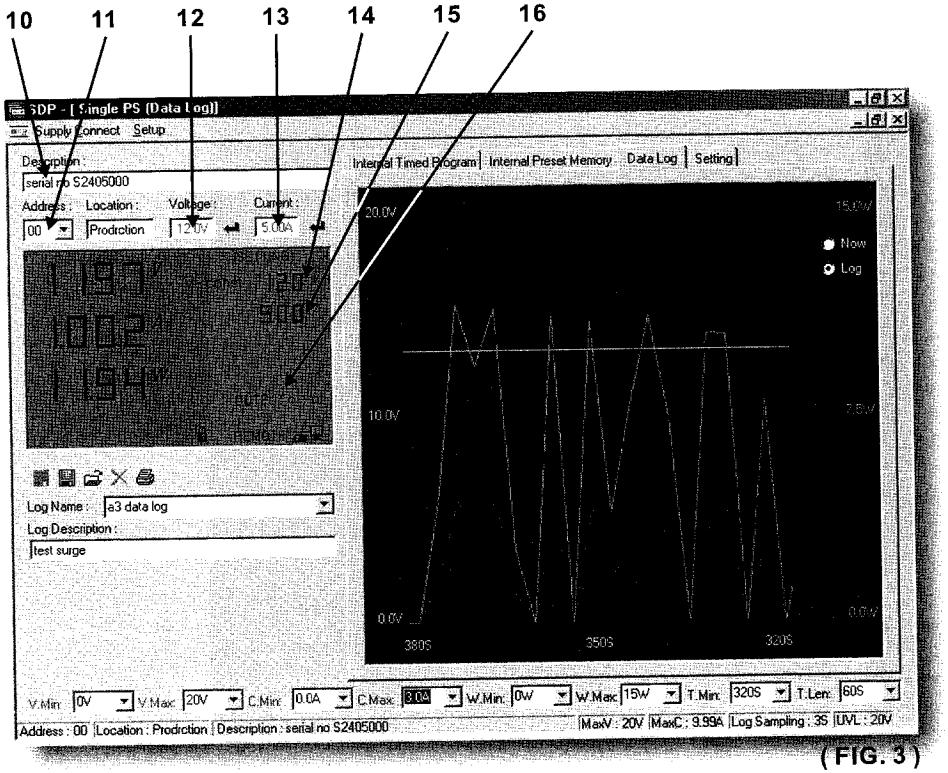
General Operation

Please refer to (Fig. 3) for the following description.



(FIG. 3)

10). Power Supply Description:

serial no S2405000

You may click on and assign an identification number for your power supply in use.
Actually this feature is used mainly when you have multiple power supplies in use via the RS-485.

11). Address : 00

This function is for multiple power supply applications.
Each power supply has a unique address.
Ignore this function when using RS-232.

12). Voltage: ##.# V

Enter the desired output voltage with decimal point.

13). Current: #.## A

Enter the desired current limit with decimal point.

(14) and (15)

Alternative way to adjust output voltage and current ;
Left click increases by 0.1 unit
Right click decreases by 0.1 unit.

16). OUTPUT o------o

Left click on icon will switch on or off the output.

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Internal Timed Program

The PC interface remote mode really eliminates the tedious process in keying in groups of entries on the power supply. Because all the data are displayed together in the monitor, the possibility of wrong entry is greatly reduced. Data of different groups can be classified, store, exported and retrieved for use at any time.

Retrieved data will be in red color if they exceed the present pre-set limits of voltage in upper voltage level or current limiting value.

The operation principle of *Saving, Exporting, Filing, Deleting and Printing* are the same as the Data Log function.

CLEAR TABLE ..... Deletes all data on the display table to prepare for new data entry.

SAVE TO PS ..... Transfers data from the Display table to the power supply.

READ FROM PS ..... Get data from the power supply.

RUN ..... To run the timed program.

Running Cycle 9999

Enter the number of the desired running cycles here, **Maximum cycles is 9999**.

Operation

1. Clear old data in the power supply by first click [Clear Table] then click [Save to PS].
2. Check if no data in power supply by clicking [Read Fro PS].
3. Enter data in the table using the Up/Down/Left/Right keys on PC keyboard for new locations.
4. Data exceeding the rated voltage and current will not be accepted.
5. Voltage exceeding set UVL (upper output voltage limit) will not be accepted.
6. If retrieved or entered data exceeds upper or lower limit, setting of voltage, current, time the date will become red in color.
7. Transfer set data to power supply by clicking [Save to PS].
8. Click [Read Fro PS] to initiate the [run] command.
9. Set number of desired [[running cycle] and click [run].

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Internal Preset Memory

The operation principle is the same as Internal Timed Program.
To activate the selected preset click on the box of the **[Select]** column then click Run.

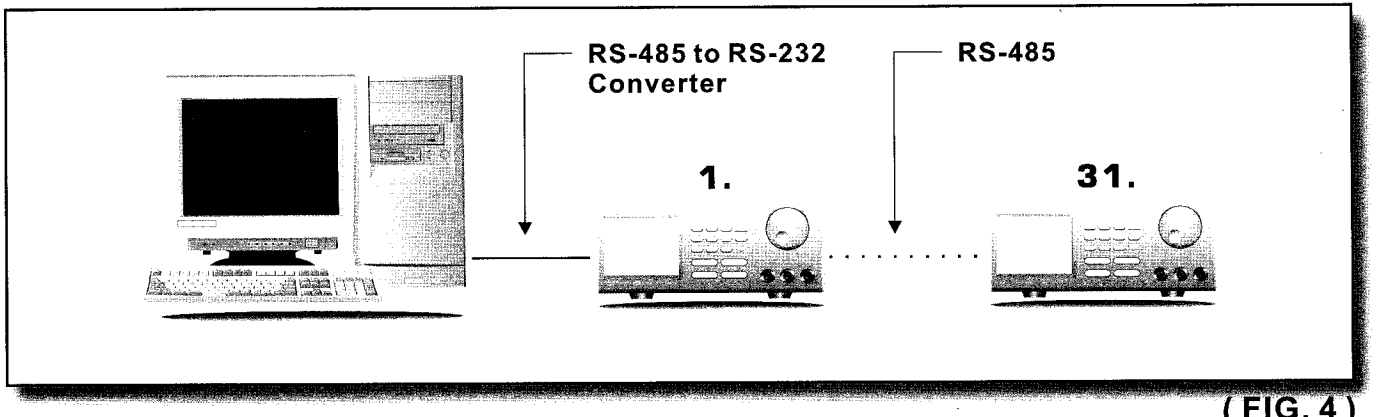
If retrieved or entered data exceed present Upper or Lower limit setting of voltage /current/time, the data will becomes red in colour.

9.4 Operation Instruction for RS-485 Interface

This interface operation is provided for remote access/control up to 31 power supplies. The setup procedures below:

9.4.1 Configuration of each power supply

1. Make certain that your PC is OFF, use RS-485 plug to connect the power supplies to each other.
2. Check to see if the PC's are interconnected, use RS-485 to RS-232 converter to connect power supplies and the serial com port of your PC (Fig. 4).



(FIG. 4)

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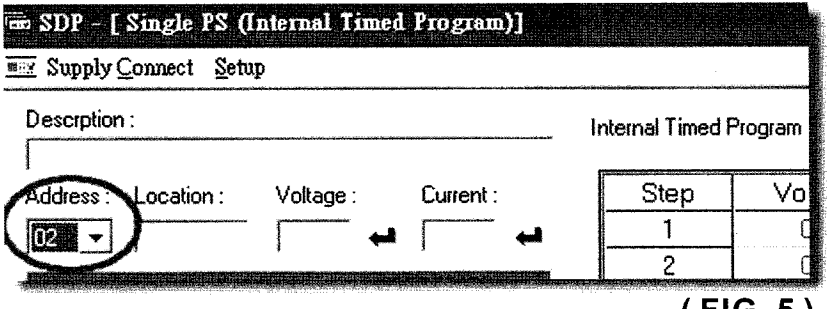
3. On your power supplies, press [SHIFT] key, then quickly press [RS-232/485] key and select RS-485.
4. A 3-digit number will be displayed. This number is the address assigned to the power supply and will be used in the software.
5. Using the Key Pad to key in the address to assign for each power supply. The range is 001-031 and each of the power supplies requires a unique address.
6. Switch on your PC and run the SDP program.
7. Click on set up and select the desired Com. Port 1.
8. In the tool bar, click on supply connect, then click on single in the drop menu.
9. An internal timed program window will appear.
10. By choosing the address in the address field (Fig. 5) you can input the desired settings for each power supply as given in Section 9.3 on page 12.



(FIG. 5)

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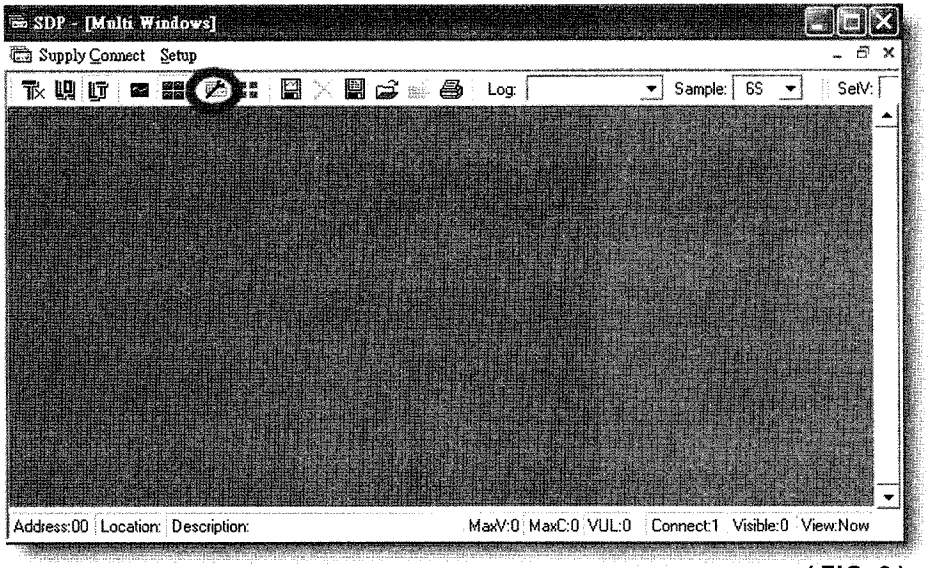
9.4.2 Configuration of Multi Windows Analysis

1. In the tool bar, click on Supply Connect, then click on Multi in the drop menu.
2. A multi-window (Fig. 6) will appear.
3. Click on the icon (circled as below) a Multi Power Supply Connect Set Up (Fig. 7) will appear.



(FIG. 6)

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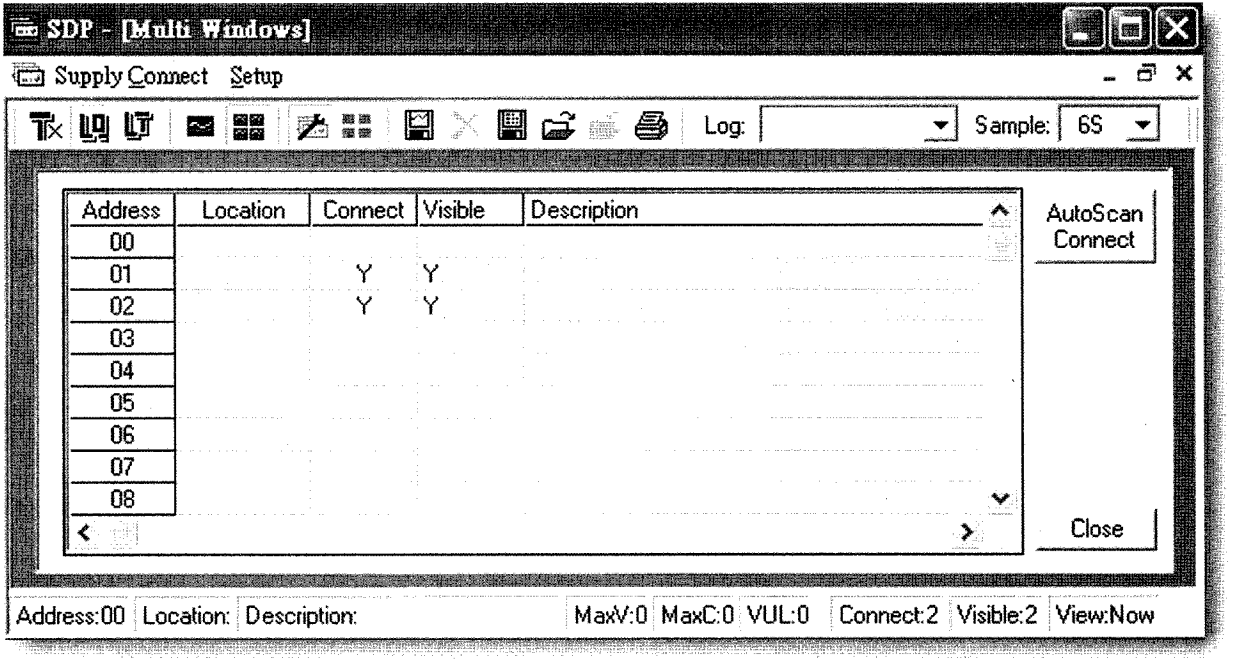
4. Click on AutoScan Connect, the window will show the connected power supply indicated with "Y".



(FIG. 7)

5. Click on the box along the visible column to set the desired power supply to be visible in Multiple Data Log Window.
6. You can type in the description and location of your power supplies in the location and description column.
7. Click on Close Icon (at right bottom of window) to return to Multiple Data Log Window.

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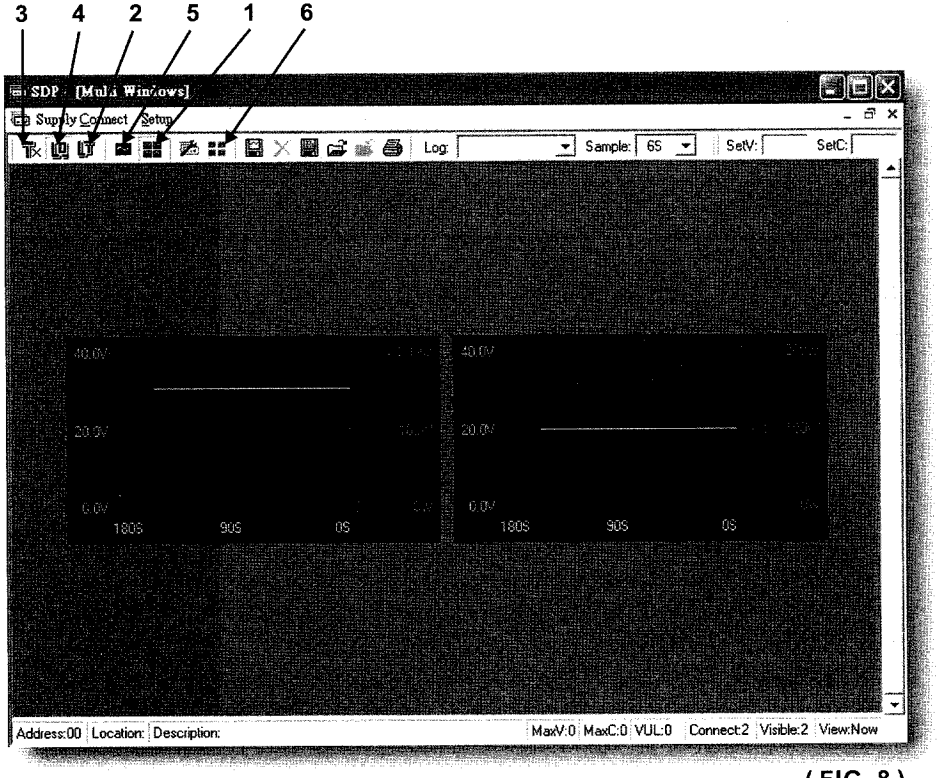
8. Remarks:



(FIG. 8)

1. **Multi Alleyway Display** one click and it will display the Data Log and output data of all the power supplies. It will activate the icon 2, 3 & 4.

2. **Show Digital and Log** one click and it will show both the data log of all connected power supplies.

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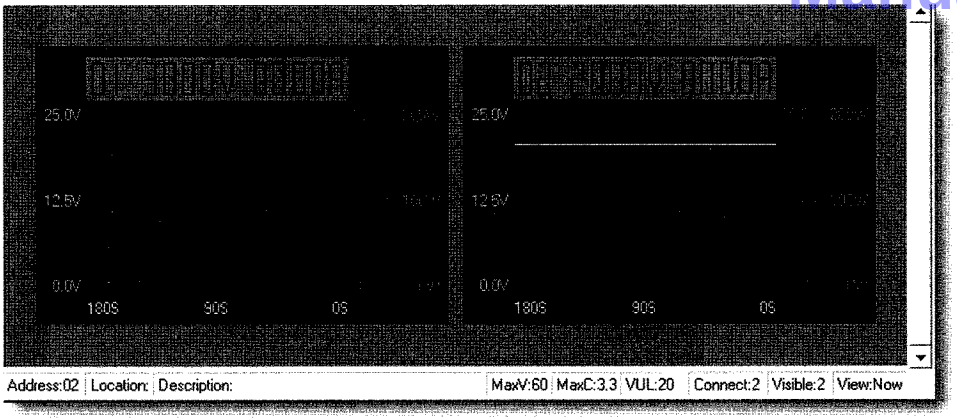

(FIG. 9)

You can click on the data log to select the power supply, the data log will highlight in blue and the address bar in the left bottom window will show the selected power supply.

3. **Show Digital** one click and will show the digital readings of all the connected power supplies.

4. **Show Log** on click and it will show the data log of all the connected power supplies.

5. **Single Alleyway Displays** one click and it will only display the Data Log of the selected power supply (Fig. 10). It will disable the icon (2, 3, & 4). The parameter at the bottom are the same as the Data Log Window in RS-232 Interface on Page 14.

   The All SP Tick box --- Tick to apply the parameters to all Data Log Windows in Multi Alleyway Display.

6. **Log Thumbnails Size Set Up** one click allows user to adjust the window size of the Data Log Window in Multi Alleyway Display. Use the sliders to adjust the height and width of the Data Log Windows. Save 4:3 tick box can enable 4:3 screen size for the Data Log Windows.

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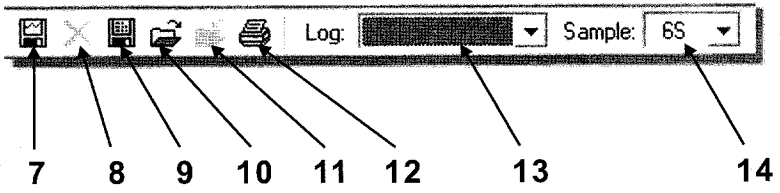
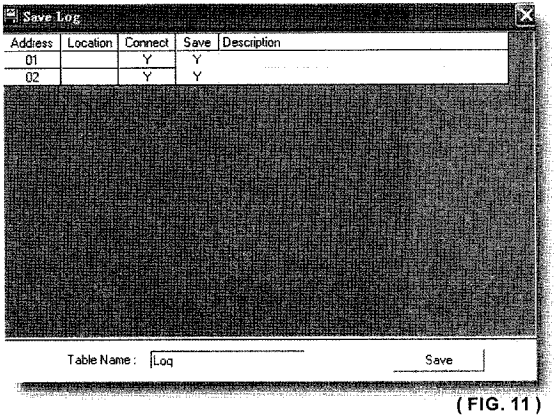


(FIG. 10)

7. Save Log:

- **a.** Click on it and save log window (Fig. 13) will appear.
- **b.** Click on the box along the Save column to choose the desired power supply data log to save.
- **c.** Type in the table name.
- **d.** Click save will save the current data onto the PC.
- **e.** To retrieve data, go to the drop menu at Log (13).
- **f.** To delete the log data, click on Delete Log icon (8).



(FIG. 11)

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8. **Delete Log**
   It will delete log data in PC.

9. **Export to a file log of xls type**
   click on this icon to export the collected data in Data Log in xls format to your PC.

10. **Open File Log of xls type**
    click on this icon to export the collected data to the SDP software.

11. **Close File Log of xls type**
    click this icon to close the import xls format file.

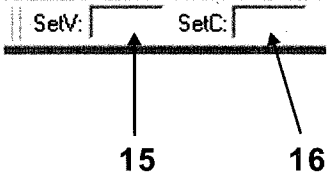
12. **Print Log**
    prints log into xls format.

13. **Log**
    click on it to select the sale log data.

14. **Sample**
    click to select the sampling time

15. **SetV**
    click and type to change the voltage setting of the selected power supply.

16. **SetC**
    click on it and type in to change the current setting of the selected power supply.



(FIG. 12)

SAMPLING TIME & AVAILABLE LOG TIME RECORD

The available log time record for each log is 1800 x sampling time.

- A sampling time of 3 seconds will allow log time record of up to 1800x3 = 5400 seconds
- A sampling time of 6 seconds will allow log time record of up to 1800x6 = 10800 seconds

When logging record is in excess of allowable log time record, the new log will overwrite the first log record.

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Service Information

Warranty Service : Please return the product in the original packaging with proof of purchase to the below address. Clearly state in writing the performance problem and return any leads, connectors and accessories that you are using with the device.

Non-Warranty Service : Return the product in the original packaging to the below address. Clearly state in writing the performance problem and return any leads, connectors and accessories that you are using with the device. Customers not on open account must include payment in the form of a money order or credit card. For the most current repair charges contact the factory before shipping the product.
Return all merchandise to B&K Precision Corp. with pre-paid shipping. The flat-rate repair charge includes return shipping to locations in North America. For overnight shipments and non-North America shipping fees contact B&K Precision Corp.

B&K Precision Corporation
22820 Savi Ranch Parkway
Yorba Linda, CA 92887
Phone : 714-921-9095
Facsimile : 714-921-6422
Email : service@bkprecision.com

Include with the instrument your complete return shipping address, contact name, phone number and description of problem.

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Command Sets
BK models 1696/1697/1698 August 2004

BLUE – Input Command

RED – Return Data from Power Supply

PS = Power Supply

Command Code	Description
SESS <address> <CR> [OK] [CR]	Disable front panel keypad and make PS to Remote Mode
ENDS <address> <CR> [OK] [CR]	Enable front panel keypad and make PS to exit Remote Mode
CCOM <address> <RS> {000-255} <CR> [OK] [CR]	Change RS-232/RS485 <RS> = 0 -> RS-232 <RS> = 1 -> RS-485
GCOM <address> <CR> [RS] RS485 Address [###] [CR] [OK] [CR]	Get the RS-485 address
GMAX <address> <CR> Voltage [???] Current [???] [CR] [OK] [CR]	Get maximum voltage and current of PS
GOVP <address> <CR> Voltage [???] [CR] [OK] [CR]	Get Upper Voltage Limit of PS
GETD <address> <CR> Voltage [????] Current [????] [0] [CR] [OK] [CR] Voltage [????] Current [????] [1] [CR] [OK] [CR]	Get Voltage & Current reading from PS PS in CV mode PS in CC mode
GETS <address> <CR> Voltage [???] Current [???] [CR] [OK] [CR]	Get Voltage & Current Set Value from PS

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GETM <address> <CR> Memory 1 Voltage [???] Current [???] [CR] Memory 2 Voltage [???] Current [???] [CR] . . . . Memory 9 Voltage [???] Current [???] [CR] [OK] [CR]	Get All Preset Memory Values from PS
GETM <address> location {1-9} <CR> Voltage [???] Current [???] [CR] [OK] [CR]	Get Memory from Specific Preset of PS
GETP <address> <CR> Program 00 Voltage [???] Current [???] Minute [??] Second [??] [CR] Program 01 Voltage [???] Current [???] Minute [??] Second [??] [CR] . . . . Program 19 Voltage [???] Current [???] Minute [??] Second [??] [CR] [OK] [CR]	Get all the Timed Program Memory of PS
GETP <address> program {00-19} <CR> Voltage [???] Current [???] Minute [??] Second [??] [CR] [OK] [CR]	To Get Anyone Timed Program Memory from 20 Steps Program of PS
GPAL <address> [CR] Reading voltage [####] V [ON] Reading current [####] A [ON] Reading watt [####] W [ON] Timer minute [####] second [##] timer [ON] colon [ON] m [ON] s [ON] Setting voltage [###] V-const [ON] V-bar [ON] V [ON] Setting current [###] I-Const [ON] I-bar [ON] A [ON] Program [#] Program [ON] P-bar [ON] SETTING [ON] Key lock [ON] Key open [ON] FAULT [ON] Output on [ON] Output off [ON] Remote [ON] [CR] [OK] [CR]	Get LCD Display Information
VOLT <address> voltage {010-XXX} <CR> [OK] [CR]	Set Voltage Level XXX-Max. Output Rating Voltage = XX.X V Current = X.XX V

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CURR <address> current {001-XXX} <CR> [OK] [CR]	Set Current Level
SOVP <address> voltage {010-XXX} <CR> [OK] [CR]	Set Upper Voltage Limit of PS
SOUT <address> 0 <CR> [OK] [CR]	Disable Output of PS
SOUT <address> 1 <CR> [OK] [CR]	Enable Output of PS
PROM <address> location {1-9} Voltage {010-XXX} Current {001-XXX} <CR> [OK] [CR]	Set Voltage and Current values of Preset Memory
PROP <address> location {00-19} Voltage {010-XXX} Current {001-XXX} Minute {00-99} Second {00-59} <CR> [OK] [CR]	Set Voltage, Current and Time period of Timed Program
RUNM <address> location {1-9} <CR> [OK] [CR]	Recall Preset Memory 1-9
RUNP <address> times {0000-9999} <CR> [OK] [CR]	Run Timed Program (0000 = run infinite times)
STOP <address> <CR> [OK] [CR]	Stop Timed Program

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NOTES:

{ }- command data, [ ] - return data, [OK] = "OK", [CR] = 0dh

???? = 30h, 30h, 30h, 30h - 39h, 39h, 39h, 39h (4 bytes data)

??? = 30h, 30h, 30h - 39h, 39h, 39h (3 bytes data)

?? = 30h, 30h – 39h, 39h (2 bytes data)

= 30h, 30h, 30h, 30h – 3Fh, 3Fh, 3Fh, 3Fh (4 bytes data)

= 30h, 30h, 30h – 3Fh, 3Fh, 3Fh (3 bytes data)

= 30h, 30h – 3Fh, 3Fh (2 bytes data)

= 30h –3Fh (1 byte data)

<address> 30h, 30h - 3fh, 3fh (2 bytes data)