

# Application SD-Card option LAB HP & LAB SMP series



At the present time it has become essential run not only static but also dynamic power processes in the laboratory. ET System electronic has developed the LAB-HP and LAB SMP series of microprocessor controlled laboratory power supplies which are ideal in both static and dynamic applications.

These user friendly units have a simple menu driven navigation which access a variety of standard features and functions. One useful option is the SD card slot. This is a cost effective solution which can be used for setting up complex dc waveforms and automating test routines.

Function sequences and Output characteristic can be programmed via a script. A script is a text file in which a sequence of instructions is stored. This script can be read via the memory card. The unit can handle up to 1000 commands. Furthermore, it is possible to use the SD card as a data logger.

Command	Description	Result
; or #	comment	Entering commented text
DELAY <t>	t in ms	Delays execution of the script for duration of time t in Milliseconds Maximum time 65535 Millisecond
DELAYS <t>	t in s	Delays execution of the script for duration of time t in Seconds Maximum time 65535 Second
I	output current in Amps	Set point output current
Impp	MPP current	Set MPP current limit (for PV simulation)
LOOP	Loop	Define return address
LOOPCNT <n>	-	As loop, but the loop n times passed
Pmax	maximum output UIP mode	Maximum output for UIP mode
PV	PVsim mode	Activate PVsim mode
Ri	internal resistance UIR mode	Set point internal resistance in ohm for UIR mode
RUN	open output	Enable output
STANDBY	close output	Disable output
U	set point output voltage	Set point output voltage in V
UI	UI mode	Activate UI mode
UIP	UIP mode	Activate UIP mode
UIR	UIR mode	Activate UIR mode
Umpp	set point MPP voltage	Set point MPP voltage (for PV simulation)
USER	set points current and voltage	Generates set points for current and voltage using the internal table
WAIT	wait	Waits for user action (push standby button)
WAVE	characteristic programming	Start internal table
WAVELIN	characteristic programming	Start internal table
-WAVE	characteristic programming	Stop internal table
-WAVELIN	characteristic programming	Stop internal table



## Generating characteristic curves

Output characteristic fields or the output response of the source be used to define at different loads. Examples here are the one existing in device performance limitations, internal resistance simulation or the PV simulation to mention.

The characteristics you can indeed provide an infinite number of points, but makes no sense. Theoretically the characteristic is stored internally with a matrix. This matrix has a resolution for Voltage of 8 bits (= 256 values) and the current of 16 bit (= 65,536 values). It makes sense, therefore, is a maximum of 256 voltage values indicate. The difference in the voltage value should be greater  $U_{max} / 256$ th if it is not greater, which does not matter, but it is stored at the same point in the matrix.

So you can run characteristics as:

### Example

; Characteristic with layered interim values

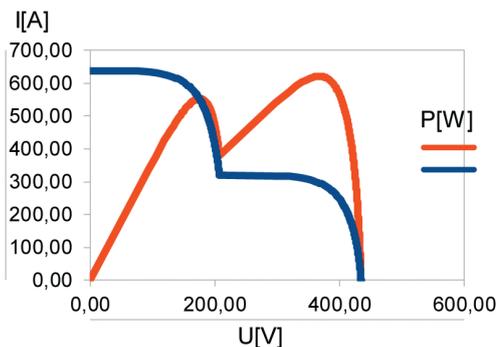
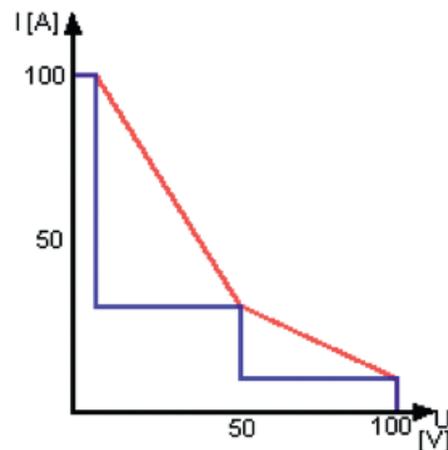
; This script delivers the **blue** characteristic in the diagram

```
WAVE      ; Start of the table
100 10    ; 100 V 10 A
50 25    ; 50 V 25 A
10 100   ; 10 V 100 A
-WAVE     ; End of the table
RUN       ; Output active
```

; Characteristic with linear interim values

; This script delivers the **red** characteristic

```
WAVE      ; Start of the table
100 10    ; 100 V 10 A
50 25    ; 50 V 25 A
10 100   ; 10 V 100 A
-WAVELIN  ; End of the table
RUN       ; Output active
```



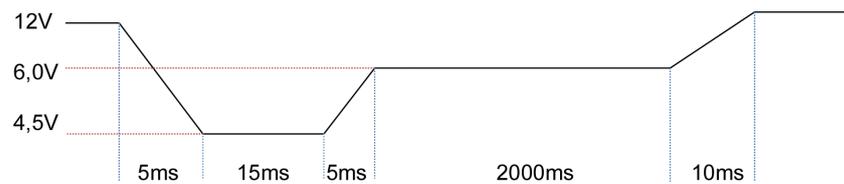
You can use this function to create more complex of characteristics such as following curve simulating two different series-connected solar cells.

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## Functional sequences

The functional sequences can be used to fixed and reproducible test sequences to realize. An example can be seen at this standardized MOBILE occasion curve here the examination of vehicle electronics.

### Test of mobile electronics by simulation of Starting curve according to DIN 40839



UI	; UI-Mode
i 10	; Current limit set to 10 A
U 12	; Output Voltage set to 12 V ( $\geq 100\%$ )
RUN	; Enable output
LOOP	; Defined return address at the end of script
WAIT	; Waits for user action Push Standby Knop
u 10,5	; First Ramp
u 9	; One command needs time of 1ms
u 7,5	; For this we build a Ramp with 5 Steps
u 6	
u 4,5	
delay 15	; 15 ms Delay
u 4,8	; Second Ramp
u 5,1	; One command needs time of 1ms.
u 5,4	; For this we build a Ramp with 5 Steps
u 5,7	
u 6	
delay 2000	; 2000 ms Delay
u 6,6	; Third Ramp
u 7,2	; One command needs time of 1ms
u 7,8	; For this we build a Ramp with 10 Steps
u 8,4	
u 9	
u 9,6	
u 10,2	
u 10,8	
u 11,4	
U 12	
; End of script, Jump to LOOP	

In example above, the ease preparation of such sequences can be seen. The functional sequences are easy to configure. Recurring test sequences on the SD-card are read into the unit and thus reproducibility of tests or other application is given.

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## Data Log Function

The device has a data log function. A memory card may be used as data logger. All measurement values will be saved, separated by tabulators, in a text file. The time interval may be adjusted from 1-4294967 s (= 71 minutes). To activate the data log function, a memory card must be inserted. The root directory of the memory card must contain a text file named "LABLOG.txt". The new data will be written into this file.

**The memory card must be inserted or removed in standby mode only!**

In case, that the first entry of the first line of the file is "interval=xxxx" (xxxx = time in seconds), the memory interval is adjusted accordingly. The entry must be written in lower case letters and without space characters. If the interval remains unspecified, the memory interval is 60 seconds.

### Example

```
interval=30
```

The data log function is active whenever the device is not operating in standby mode. The function is indicated by a small memory card symbol in the upper right corner of the main display. Whenever a new data set is written, the symbol will be displayed as filled for ca. 1 second. In case the memory card is full, the symbol will be crossed out.

### Format of the Saved Data

The first entry shows the present operation mode. The second entry shows the present operation mode followed by ,Udc' and ,Idc'.

### Example

USER	I-Limit 1,0	10,02
USER	OVP 0,0	0,00
UI	U-Limit 100,01	0,10
UIP	U-Limit 100,0	0,10