

Keysight電池測試解決方案

品勛科技股份有限公司

技術經理 Vincent Lin



Keysight authorized distributor

- 為是德科技年度優秀業績經銷商

www.pinsyun.com.tw



品勛官網QR code

- 分別於**台北、新竹、台南**皆有據點
- 專業AE 團隊 / 設有開放實驗室
- 提供到府教育訓練



N6700 Modular Power System Family



N6700 Low-Profile
MPS Mainframe (3
models)



N6700
DC Power
Modules



N6705 DC Power Analyzer
Mainframe with 14585A Software
Minframe with BenchVue Software

Family of 4 mainframes and >40 DC power supply modules

Module Category	Characteristics
Basic N673xB, N674xB, N677xA	Set it and forget it, 1 digitizer, slow measurement, slow output
High-Performance N675xA	Fast output, up to 2 digitizer
Precision N676xA	Fast output, 2 digitizer, precise measurement
Source/Measure Unit N6781A, N6784A, N6785A	Source/Sink, Seamless Measurement, high precision, fast output, measurement only
Electronic Load Modules N6790A	Small, Fast, Flexible

Keysight N6705C 直流電源分析儀 可提高研發工程師的工作效率

將多種儀器功能到一台主機裡面!



- 1 to 4 advanced power supplies; >40 different models available
- Digital voltmeter and ammeter
- Arbitrary waveform generator
- Oscilloscope
- Data Logger
- All functions and measurements are available from the front panel

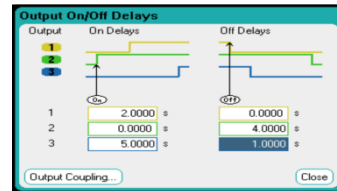
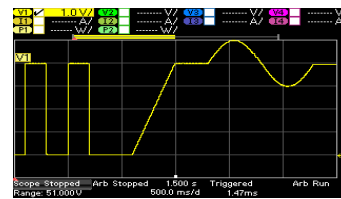
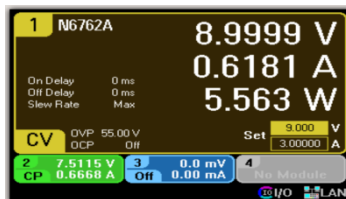
**Gain insights into your DUT's power consumption
— in minutes, not hours —
without writing a single line of code!**

DC Power Analyzer

SOURCING AND MEASUREMENT CAPABILITIES

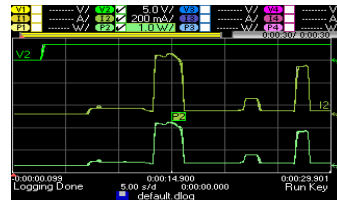
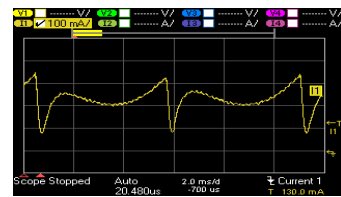
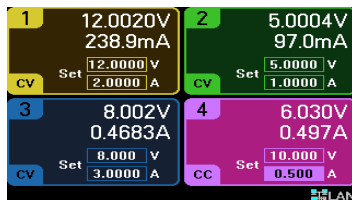
Sourcing functions

- Simple DC bias
- Arbitrary waveform generator-like functions
- Sequencing outputs

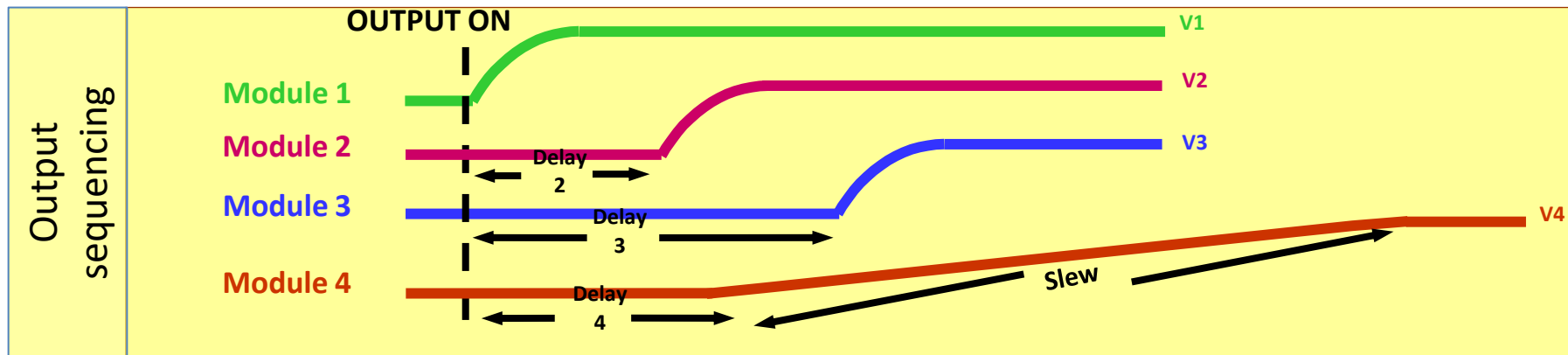
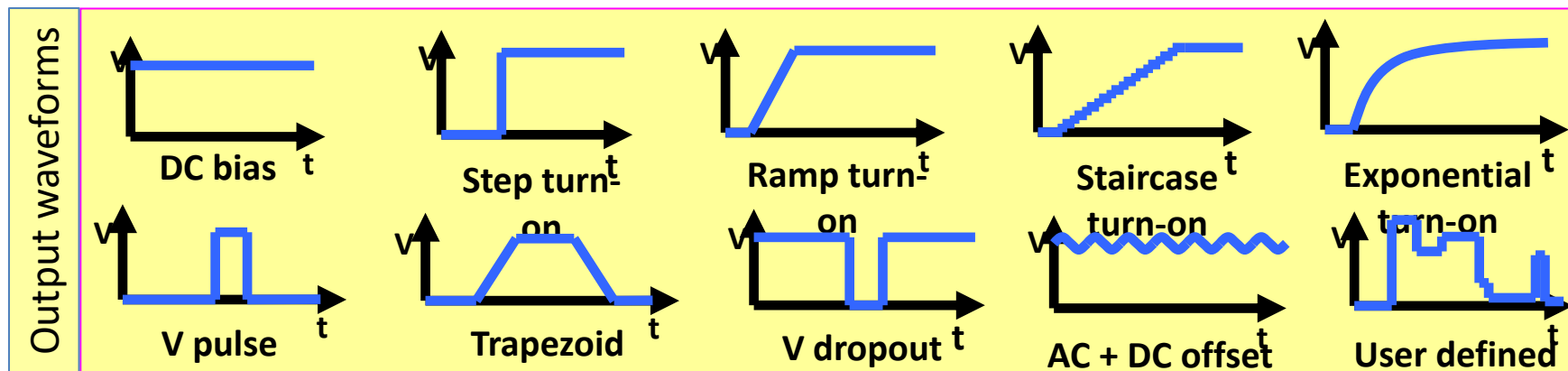


Measurement functions

- DC measurements
- Oscilloscope-like functions
- Data logger function



Keysight N6705C Sourcing Capabilities



Arb Sequence

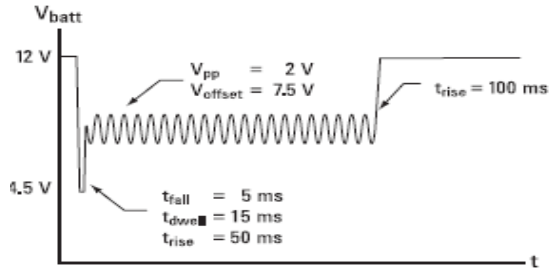
The Arb Sequence allows multiple and different Arbs to run one after another in succession. Any of the standard Arb types, except for Constant Dwell Arbs, can be included in the Arb sequence.

Output 1 - Sequence Voltage Properties

Step	Name	Time	Pacing
0	Ramp	1	Dwell
1	Ramp	1	Dwell
2	Sine	1	Dwell
3	Ramp	1	Dwell

Total Time = 4 s
Waveform quality: 100
Advanced... *Press Properties to Edit Step

Buttons: Add, Delete, Edit*, Up, Down, Load, Save, Close



Each waveform in the ARB sequence must be configured to recreate desired waveform

Output 1 - Ramp Voltage - Step 0

V_0 12.0000 V
 V_1 4.5000 V
 t_0 1.0000 s
 t_1 0.0050 s
 t_2 0.0150 s
 $T = 1.02$ s

Move to next step via Dwell $\pm$
Continuous Repeat Count 1 Close

Output 1 - Ramp Voltage - Step 1

V_0 4.5000 V
 V_1 7.5000 V
 t_0 0.0000 s
 t_1 0.0500 s
 t_2 0.0000 s
 $T = 0.05$ s

Move to next step via Dwell $\pm$
Continuous Repeat Count 1 Close

Output 1 - Sine Voltage - Step 2

V_0 1.0000 V
 V_1 7.5000 V
 f 2.0000 Hz
 $T = 0.5$ s

Move to next step via Dwell $\pm$
Continuous Repeat Count 20 Close

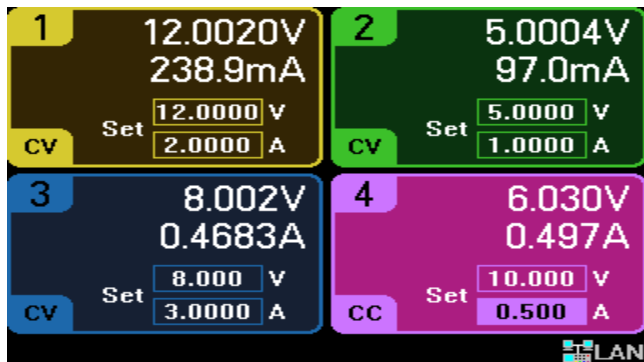
Output 1 - Ramp Voltage - Step 3

V_0 7.5000 V
 V_1 12.0000 V
 t_0 0.0000 s
 t_1 0.1000 s
 t_2 1.0000 s
 $T = 1.1$ s

Move to next step via Dwell $\pm$
Continuous Repeat Count 1 Close

Keysight N6705C Measurement Capabilities

Meter View

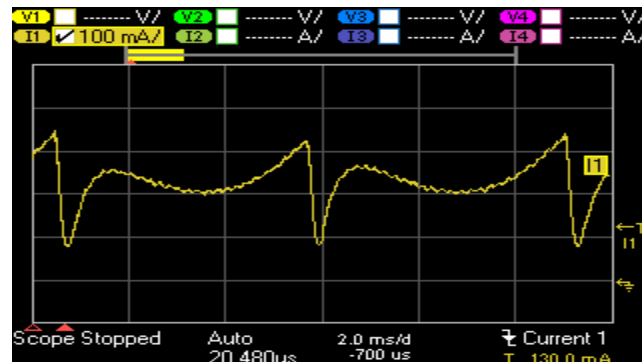


DC measurements on
all 4 outputs

Actual
screenshots

All can be
controlled from
front panel
w/o prog.

Scope View



Voltage and/or current
waveform capture

Data Logger



Log data for seconds,
hours, days even weeks

N6781A , N6785A Battery Drain Analyzer

» Single-wide module, 2-quadrant operation

» Voltage Source and Current Source

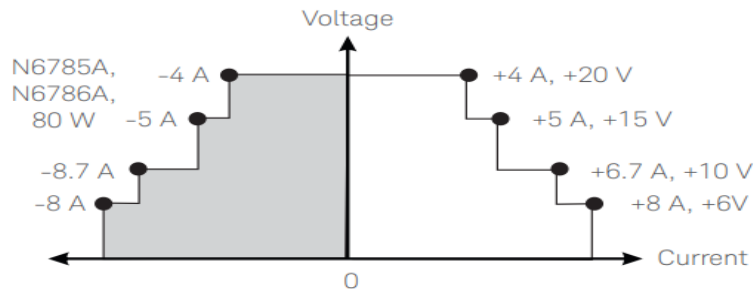
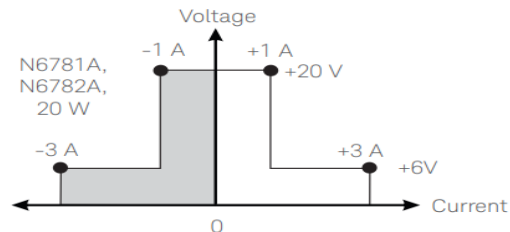
- “Glitch free” operation
- Excellent transient response with a peak deviation of 30 mV in response to 0.15A/ μ s slew
- Stable with capacitive loads up to 150 μ F
- Programmable output resistance: -40m Ω to +1 Ω
- Auxiliary voltage measurement input for battery rundown test

» Measurement

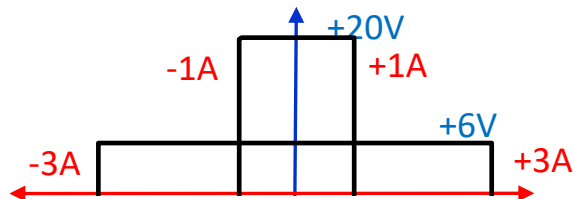
- Built-in digitizer of 200,000 samples/second

• N6785A

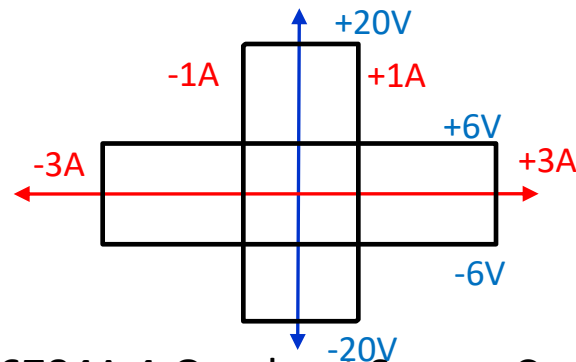
- Voltage: 20 V / 15 V / 10 V / 6 V
- Current: ± 4 A / ± 5 A / ± 6.7 A / ± 8 A
- Power: Up to 80 W



N678xA Usability Enhanced via Front Panel Modes

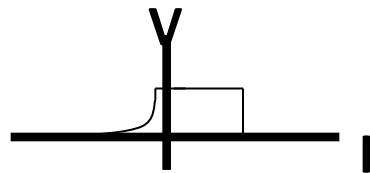


N6781A, N6782A 2-Quadrant
Source Capabilities

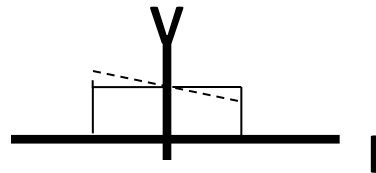


N6784A 4-Quadrant Source Capabilities

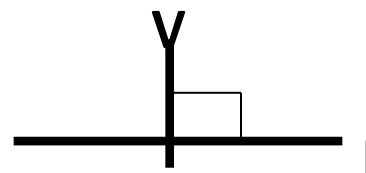
- To simplify using the new BDA module, select one of the modes below
- Keeps operation in quadrant and behavior that is best fit for the application



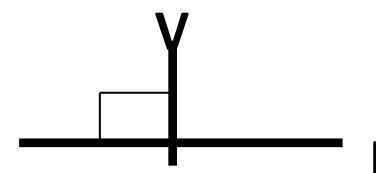
Standard DC
Supply



Battery Emulator
with programmable Rout

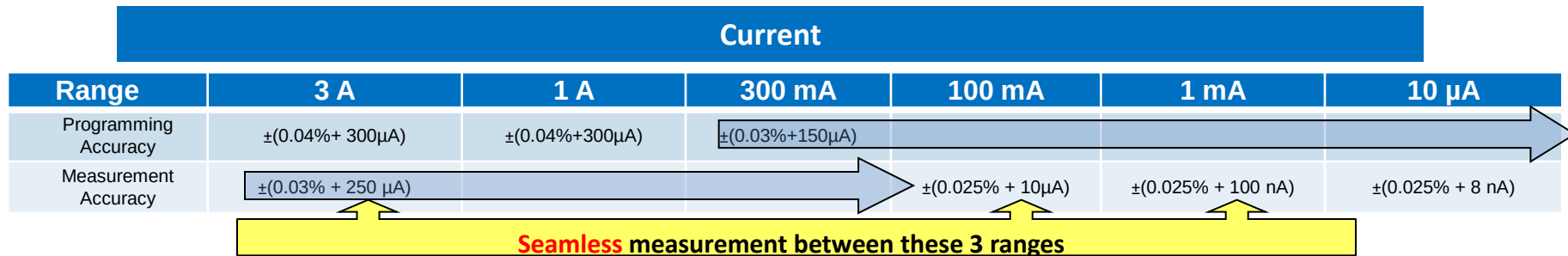
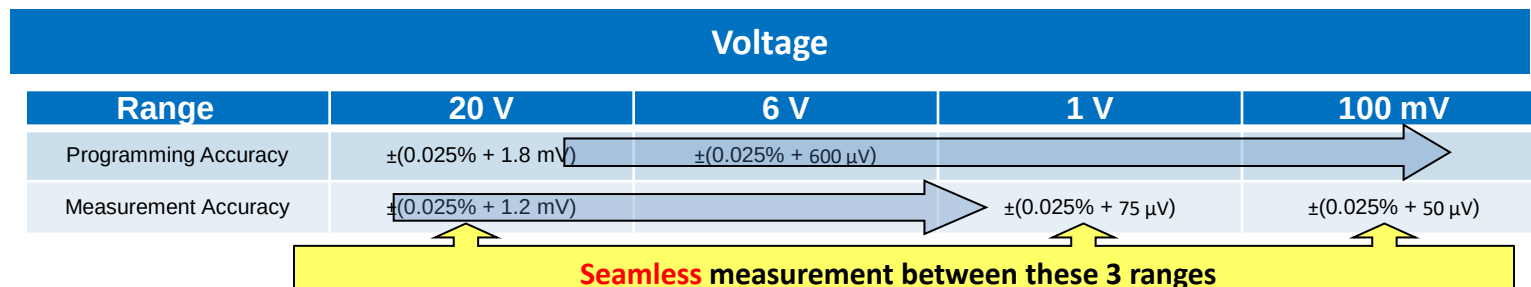


Battery Charger



CC or CV Load
(Electronic Load)

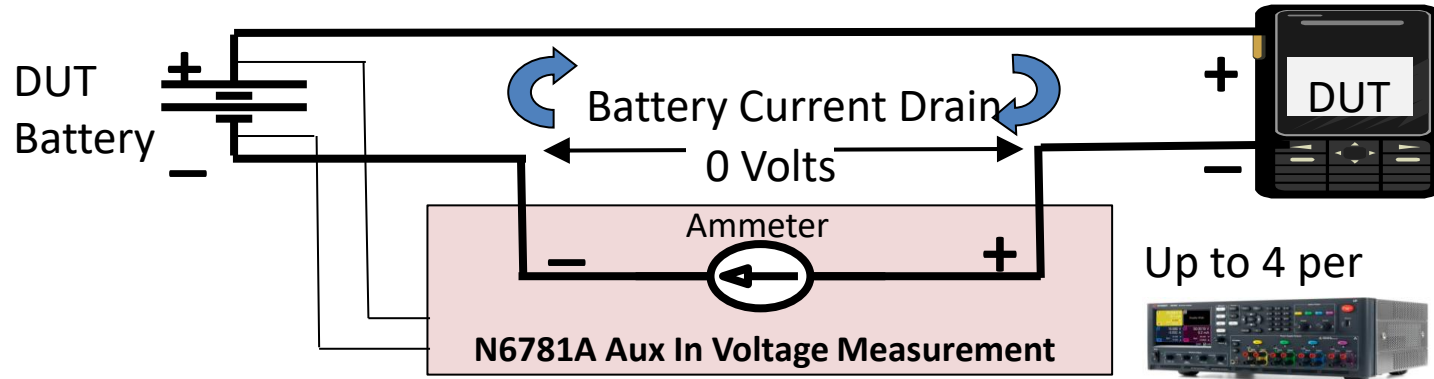
Agilent N6781A Accuracy and Seamless Ranging



- **Seamless** ranging continually changes ranges without glitch and does not lose readings
- 200 kHz, 18-bit digitizer, with seamless ranging, acts like single range of ~28-bits
- Allows for accurate measurements from Amps to μA during a single scope sweep or data log (1,000,000:1)

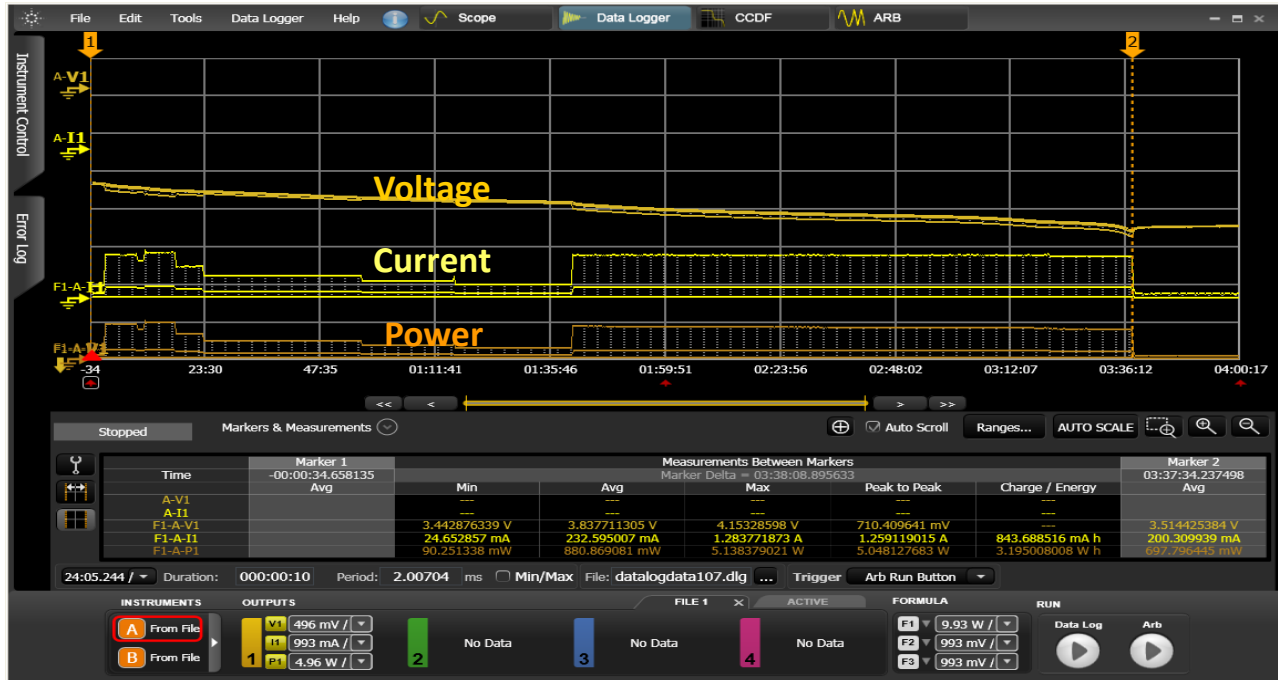
N6781A/5A Measure Only Mode– Zero Burden Ammeter

- Module uses its power output to regulate zero volts across itself while measuring current (in either direction of flow)
- Single reading, scope, or data log
- N6781A Aux DVM input measures battery voltage
- Gives most realistic assessment of DUT operation with actual battery
- Application note under development



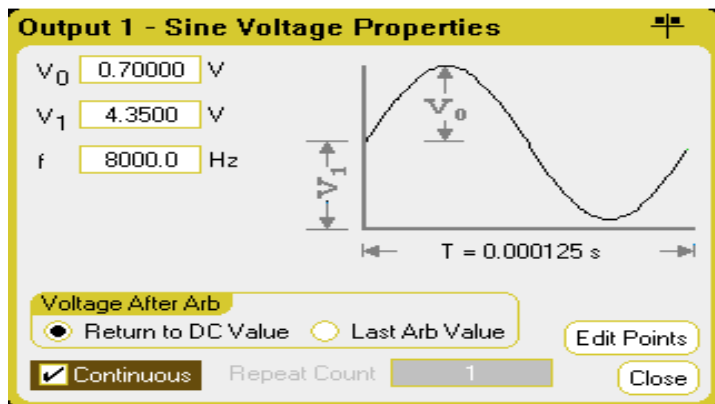
N6781A/5A SMU Measure-only Operating Mode Actual Battery Run-down Test Example

- Battery run-down for a GSM/GPRS handset logged with an N6781A SMU & 14585A SW
- Logged min, avg & max volts, amps, & watts
- By placing markers at start & shutdown points:
 - Avg current = 233 mA
 - Avg voltage = 3.82 V
 - Charge = 843 mA h
 - Energy = 3.19 W h
 - Run time = 3 hr 38 min



測試波形

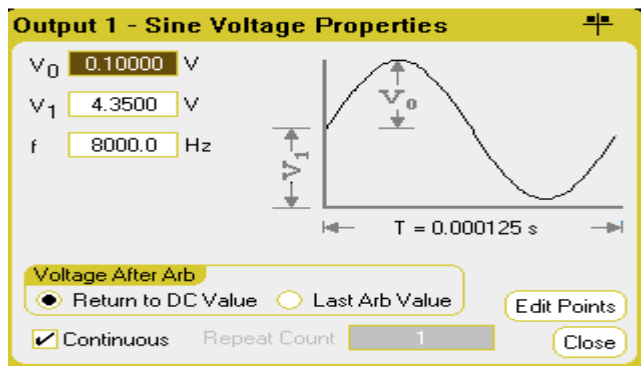
- 產生一8000Hz弦波。上半週振幅為+0.7V，下半週振幅為-0.1V。
- 產生一8000Hz弦波。振幅為+0.7V正弦波。



Arb User Defined Voltage				
A	B	C	D	E
1	Arb User Defined Voltage Waveform			
2	%arbtype=arbuservolt			
3	VALUE	TIME	TRIGGER	
4	4.35	0.000001	0	
5	4.386035	0.000001	0	
6	4.421975	0.000002	0	
7	4.493186	0.000001	0	
8	4.52827	0.000001	0	
9	4.562881	0.000001	0	
10	4.596926	0.000002	0	
11	4.662966	0.000001	0	
12	4.694784	0.000001	0	
13	4.725687	0.000001	0	
14	4.755595	0.000001	0	
15	4.784427	0.000002	0	
16	4.838561	0.000001	0	
17	4.863719	0.000001	0	
18	4.887516	0.000001	0	
19	4.909887	0.000002	0	
20	4.95012	0.000001	0	
21	4.967875	0.000001	0	
22	4.983992	0.000001	0	
23	4.998427	0.000001	0	

測試波形

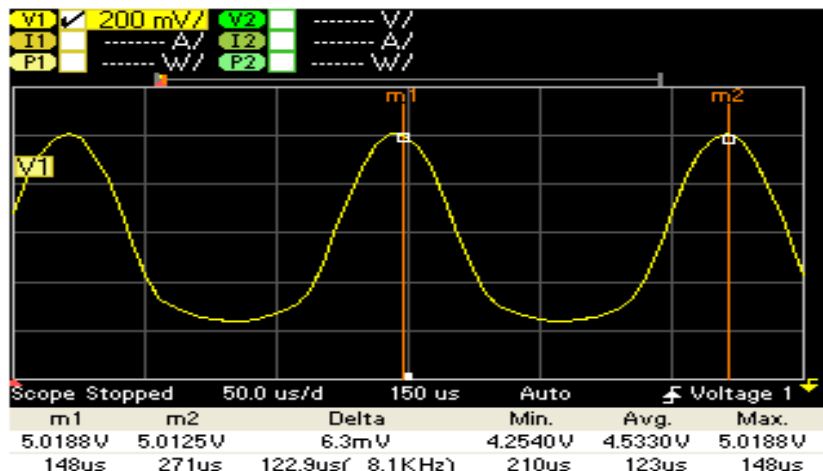
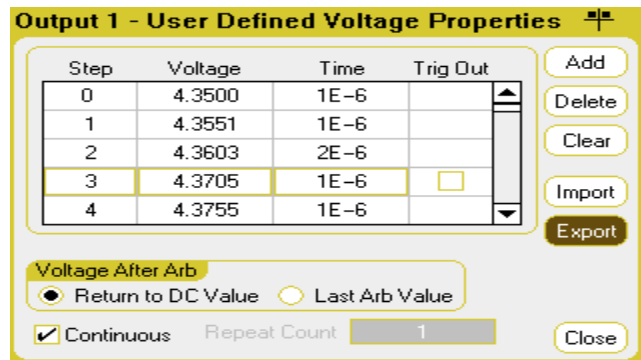
- 產生一8000Hz弦波。振幅為+0.1V正弦波。



Arb User Defined Voltage					
A	B	C	D	E	F
Arb User Defined Voltage Waveform					
%arbtype=arbuservolt					
1	VALUE	TIME	TRIGGER		
4	4.35	0.000001	0		
5	4.355148	0.000001	0		
6	4.360282	0.000002	0		
7	4.370455	0.000001	0		
8	4.375467	0.000001	0		
9	4.380412	0.000001	0		
10	4.385275	0.000002	0		
11	4.394709	0.000001	0		
12	4.399255	0.000001	0		
13	4.403669	0.000001	0		
14	4.407942	0.000001	0		
15	4.412061	0.000002	0		
16	4.419795	0.000001	0		
17	4.423388	0.000001	0		
18	4.426788	0.000001	0		
19	4.429984	0.000002	0		
20	4.435731	0.000001	0		
21	4.438268	0.000001	0		
22	4.44057	0.000001	0		

測試波形

- 結合產生一8000Hz弦波。上半週振幅為+0.7V，下半週振幅為-0.1V。



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