High Speed Pulse Battery Testing Solutions

BT-HSP

Model Numbers:

BT-HSP 1/4

BT-HSP 1/8

The BT-HSP (High Speed Pulse Testing System) is designed to perform sub-millisecond pulses on batteries or supercapacitors, which are common in wireless or telecommunication applications.

Arbin's pulse capability covers a broad range of sub-millisecond communication profiles, which can handle multi-stage pulses as fast as 100 microseconds per stage and up to 10 stages per pulse. The pulses have a maximum length of 2700 seconds.

Each channel of the system functions as an independent potentiostat/galvanostat. Commonly used charge/discharge functions such as ramps, staircases and constant current, voltage, power, and load functions may be used on all channels at the same time. Different pulse profiles may also be performed across groups of four or eight channels depending on the configuration.

The circuit is a bipolar design that affords tremendous flexibility by ensuring cross-zero linearity and negligible current switching time. All these capabilities are further enhanced by our MITS Pro Software, which according to customer feedback is a step above all other software in the industry.

Key Features

- Testing of cellular phones and other smart communication devices
- Cover various standard pulse-testing applications such as GSM, CDMA, iDEN, GPRS, etc.
- Other custom user-defined pulse profiles with 2-10 stages
- Simultaneous pulse generation and data logging
- Multiple, independent channels
- Three current ranges per channel
- Rise times as fast as 50µS
- Windows 7 based software
- Many input auxiliaries available such as temperature and voltage
- Voltage clamp to protect from over or under charge and discharge

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Hardware Specifications

MODEL NUMBER	BT-HSP 1/4	BT-HSP 1/8
Number of Micro Controllers	Four main channels shared by one MC	Eight main channels Shared by one MC
Chassis Size	20.5U Chassis	
Number of Channels per PC	24	32
Voltage Range (min/max)	0 to 5V	
Accuracy of Voltage Control & Reading	±5mV	
Minimum V at Maximum Current	0V @ 5A	
Voltage Measurements Input Impedance	~10GΩ	
Current Ranges Provided 0.05% Full Scale Accuracy	High: 5A ± 5mA Medium: 1mA ± 1mA Low: 100mA ± 100uA	
Maximum Continuous Power Output per Channel	25W	
Current Rise Time[1]	50uS	100uS
Bipolar Circuit Board Type[2]	LPLAB-Arm7	
Current and Voltage Resolution	16 Bit	
Voltage Clamp	Group-Based Voltage Clamp	
AC Power Supply	110 VAC with 30A circuit breaker	
Connection for Batteries	Arbin manufactured cables with alligator clips or other types of connectors upon customer request. Arbin also provides battery holder system on the side of the chassis to provide easy engagement system to the battery tester.	
Connection for Computer	TCP/IP	
Ventilation method	Air-cooled, front-to-rear airflow	
Room Operating Temperature	10 to 35 degrees C	

[1] Time required for current output to get from 10% to 90% of requested value.

[2] Provides zero switching time between charge and discharge.

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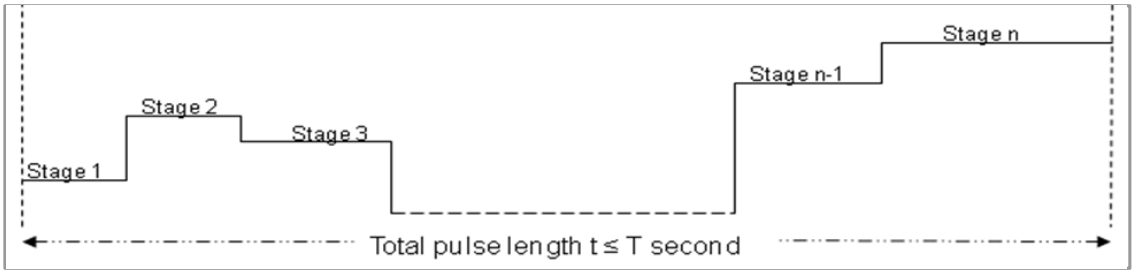
MODEL NUMBER	BT-HSP 1/4	BT-HSP 1/8
Power Plug Type	Hubble Plug	
Location of Circuit Breaker	At the back of the chassis	
Labeling requirements	Power input label Label with PN and serial number on the front of chassis Label each channel on the front panel	



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PULSE CHARACTERISTICS		
Pulse Independency	One pulse profile per group of four channels	One pulse profile per group of eight channels
Maximum Total Pulse Stages (n)[3]	10	
Minimum Pulse Stage Width	100 microsecond	100 millisecond
Minimum Pulse Point Interval	50 microsecond	50 millisecond
Maximum Total Pulse Length	2700 seconds	
Control Type	Current	
REPEATED PULSE DATA LOGGING CHARACTERISTICS		
Maximum # of Points Logged per Stage	2	
Minimum Interval Between Pulses with Data Logged	1 second	
Data Sampling	There will be two samplings, at the beginning and end of each stage.	

[3] Pulse must contain at least one stage with minimum pulse width.

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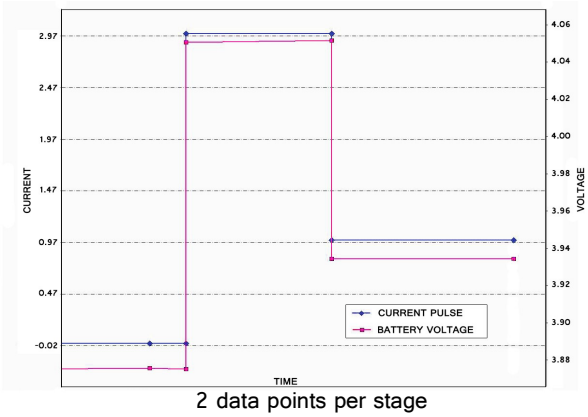
Burst Pulse Mode

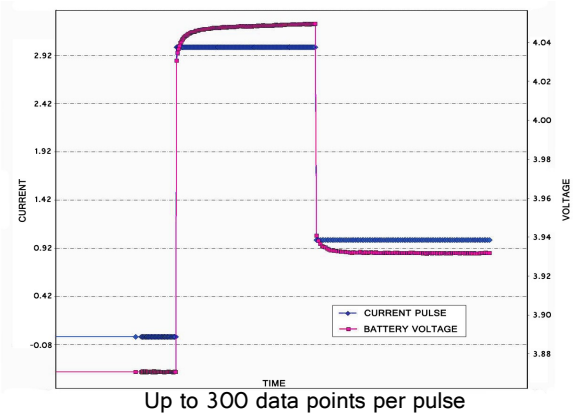
Burst mode operation allows user to log data at a very high rate for a maximum time of 500 milliseconds. Up to 300 points per pulse can be logged across a maximum of 10 stages per single pulse. This application can be useful in instances where fast data logging is required to catch voltage and/or current data during a transition. By capturing more data, the pulse profile can be more accurately defined, especially during the charge/discharge transition period (see software screen below). This helps to identify transition in the charge/discharge process of the objects being tested. The BT-HSP 1/4 will run burst pulse data logging sequentially for each of the four channels controlled per microcontroller.

Single Pulse Profile—Standard Data Logging



2 data points per stage

Single Pulse Profile—Pulse Burst Data Logging



Up to 300 data points per pulse

Hardware Specifications

MODEL NUMBER	BT-HSP 1/4	BT-HSP 1/8
SINGLE PULSE BURST DATA LOGGING CHARACTERISTICS		
Data Logging Independency	Only one channel can perform this function at one time per shared microcontroller while other channels perform non-pulse control.	
Maximum Pulse Length	1S	500mS
Maximum # Points Logged per Pulse[4]	300	300
Minimum Logging Interval Range	100µS to 1mS 50µS increments	100µS to 1mS 50µS increments
Interval Between Pulses	10 second	60 seconds

[4] Software will always log first and last data points.

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Software Control Specifications

Current (A)	Outputs constant current to the cell or battery at the value specified. Positive current refers to charge, and negative current refers to discharge.
Voltage (V)	Outputs constant voltage to the cell or battery at the value specified
C-Rate	C-Rate is common method for indicating the discharge as well as the charge current of a battery. It can be expressed as I=M∗C where I=current A; C=battery capacity; M is the C-rate value
Rest	The battery is disconnected from the charge/discharge circuit but remains connected to the voltage measurement circuit to enable open-circuit voltage measurement
Power (W)	Outputs constant power to the cell of battery at the value specified. This is accomplished by iteratively measuring the battery voltage and calculating the current necessary according to Ohm's law in order to achieve the power level set by the user. Each time the channel is sampled, the calculation is performed allowing the current to quickly stabilize at the desired power level and maintain this power level as the voltage changes.
Load (Ohm)	Applies a constant resistance load to the battery at the value specified. A positve value for load will result in a positive current and a negative value for load will result in a negative current
Set Variable(s)	Change test related variables including channel capacity, energy, and all test counter variables
Current Ramp	Generates a current ramp with a positive scan rate for increasing current and a negative scan rate to generate decreasing current ramp
Voltage Ramp	Generates a voltage ramp with a positive scan rate that increases the voltage ramp, and negative scan rate generates decreasing voltage ramp.
Current Staircase	Generates a current staircase with increasing current, and negative decreasing current staircase with adjustable step amplitude.
Voltage Staircase	Positive dV/stair generates increasing voltage staircase, and negative dV/stair generates decreasing voltage staircase.
Current Pulse	Applies a predefined current profile to the cell or battery pack under test.
Current and Power Simulation	Non-standard time-domain functions may be input from external sources such as ASCII data streams and used as control parameters for repetitive tests.
DC Internal Resistance	This function applies a 10-pulse train with 1ms pulse width of the specified magnitude following a constant-current charge or discharge step.
CC-CP	Combine constant current control and constant voltage control into one step "CC-CP"
End Conditions	Time, Voltage, Current, Capacity, Energy, ΔV, DV/dt, formula, meta-variables, and other combinations
Network Capabilities	Provide TCP/IP access for networking
Data Result File	Imported into Microsoft Excel; Arbin's Excel Data Pro macro included for easy data manipulation.
Data File Content	Channel data: test time, step time, voltage, current, capacity, energy, first/second derivative of I or V, auxiliary input data (optional). Statistical data: Cycle #, Cycle Capacity/Energy, Maximum voltage, etc.

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Auxiliary Options & Accessories

Arbin Instruments provides a wide variety of auxiliary modules for expanding the capability of the main I/V control circuitry.

Input Modules: Auxiliary inputs can be used to record desired data as well as to terminate or regulate charge and discharge processes based upon measured conditions. Selectable inputs are of V (voltage), T (temperature), and P (pressure).

Input / Output Modules Digital I/O is an integrated peripheral on/off control. The output commonly is used to control valves and switches. The input allows external control signal to control testing procedure.

Control Modules: Arbin provides control modules for auto-calibration, Smart Battery Testing, External Charger, Temperature Chamber interface and AC impedance measurement.

For more information please visit: www.arbin.com/products/accessories/auxiliaries.htm

*Auxiliaries are provided in a separate chassis, controlled by the same PC as the test station.

Safety & UPS Features

Several safety provisions are provided in every Arbin system. There are multiple levels of fusing provided inside the system for further protection at the channel/board and power supply levels. The software also has several safety functions with which the user can avoid over charging the cells, over discharging, overheating, etc.

Smart UPS: This option uses a very small Smart UPS to back up power to the computer only. This allows the user to enable auto resume options to all of specific channels after a stop due to power interruption. Provision is provided for the user to intervene if they so desire before the channels resume. This is an essential component for any user with an unreliable power source unless the whole facility is on backup power.