

Arbin Instruments

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Newsletter

Intelligent Smart Battery Testing



Smart battery has been widely used as an intelligent power source in various electronic equipments such as in notebook PCs, medical equipments, and portable instruments. For the specific smart battery testing requirements, Arbin offers testing systems with optional smart battery testing functions.

The smart battery testing functions are carried through a special smart battery board attachment module. Each board contains eight inputs that operate on eight smart battery packs simultaneously and independently. Commu-



An eight-channel battery testing system with smart battery testing function. System configuration:
4 channels at 2V/5V – 5A/1A/0.1A – 25W
4 channels at 2V/20V – 5A/1A/0.1A – 100W
8 smart-battery-testing (SMB) channels
8 auxiliary thermocouple inputs

nication with the smart batteries is established following the System Management Bus (SMBus) Revision 2.0 or 1.1

protocol. Each board also contains an individual micro-controller to communicate di-

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New Option: System Control with Third-party Custom Software

The adoption of the new Motorola Coldfire® microcontroller in Arbin testing systems is in progress at Arbin. Integration across a wide range of test functionalities and system performance has been and is continued to be developed, tested and implemented for the new microcontroller (MC).

The new features offered with the implementation of the new MC is the burst-mode data collection (see the article on page 3) and the option to buy Arbin's systems to be used with third-party software as discussed in this article. One of the new options for

our customers is to buy Arbin's testing systems without buying Arbin's MITS Pro testing software. The customers in this case want to develop their own software to run and control the system according to their specific testing needs.

The operation of the test system is made possible through the communication between the customer's software and the system's MC. The MC analyzes the inputs and the present state of the system, determines when to switch on and what functions to turn off, and performs other specified actions through the command

interface that is implemented in the custom-built software.

From Arbin's factory, hardware-specific mode settings are programmed in the MC. System configuration and command interface files are provided to the customer to be implemented in the custom-built software. In developing the custom software, the customer should set the maximum and minimum current, voltage and power limits according to the system's configuration for safety measures.

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Smart Battery Testing (Continued from Page 1)

rectly with the PC through the RS422 COM port.

The function of the smart battery board and interface is initiated through settings in Arbin's MITS Pro software. The software supports standard register functions as well as customized revision of specific register arrangement. All of the register functions are readable; some of these are writeable, controllable and/or programmable depending on their functionalities. The following table lists these functions and their access capabilities. These are the standard register functions available with Arbin testing systems and software based on Texas Instruments' BQ2060 gas gauge IC standards. Different types of access or register functions according to specific customers'

requirements can be programmed in Arbin's MITS Pro software.

There are three types of SMBus access: readable, writable and programmable. Readable access allows the software to read and log smart battery information into data file. Writeable access allows the operator to manually change the registers' values by typing over the current values. Controllable access allows the registers to be used as control limit to control testing procedure. Programmable access allows the operator to use the registers in programming the test schedule to allow changing of the registers' values during the test run. Again, these access types can be customized according to specific requirements. ■

Variable	SMBus Access	Variable	SMBus Access
ManufacturerAccess	Read/write/control/program	ChargingCurrent	Read/control
RemainCapacityAlarm	Read/write/program	ChargingVoltage	Read/control
RemainTimeAlarm	Read/write/program	BatteryStatus	Read
BatteryMode	Read/write/program	CycleCount	Read/Control
AtRate	Read/write/program	DesignCapacity	Read
AtRateTimeToFull	Read	DesignVoltage	Read
AtRateTimeToEmpty	Read	SpecificationInfo	Read
AtRateOK	Read	ManufacturerDate	Read
Temperature	Read/control	SerialNumber	Read/control
Voltage	Read/control	Reserved	Read/write/control
Current	Read/control	ManufacturerName	Read
AverageCurrent	Read	DeviceName	Read/write
MaxError	Read	DeviceChemistry	Read
RelativeStateOfCharge	Read/control	ManufacturerData	Read/write
AbsoluteStateOfCharge	Read/control	Pack Status	Read/write
RemainCapacity	Read/control	Pack Configuration	Read/write
FullChargeCapacity	Read/control	VCELL4	Read/control
RunTimeToEmpty	Read	VCELL3	Read/control
AverageTimeToEmpty	Read	VCELL2	Read/control
AverageTimeToFull	Read	VCELL1	Read/control

List of standard SMBus registers and their access types that are available with Arbin's MITS Pro software. Customized registers and access types are available upon customer's request.

Third-party Software (Continued from Page 1)

Recently shipped is a one-channel supercapacitor testing system for hybrid-vehicle power simulation testing (picture on the right). The system will be directly controlled using the customer's LabView-based customized software. Special design MC allows communication via TCP/IP to perform this task. ■



A one-channel supercapacitor testing system with special design microcontroller to allow the system to be controlled using customer's provided software. System configuration: one channel at 0.6V/5V – 1000A/20A – 5kW; 8 auxiliary thermocouple inputs.

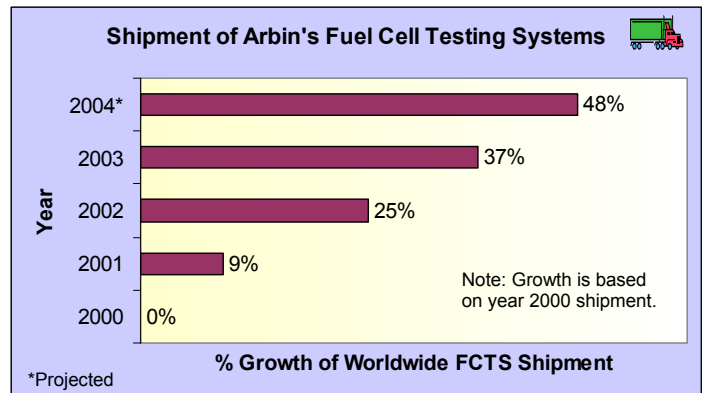
New Face at Arbin

Arbin welcomes Peter Brown as the newest member of the sales and marketing team. Peter recently graduated from the Texas A&M University with a Bachelor of Science degree in Chemical Engineering. Prior to joining Arbin, Peter was the Sales and Installation manager for Circuit City in College Station. He brings nearly six years experience in sales and management, with emphasis in customer relation, to Arbin.

Peter will serve as Arbin's sales engineer and will be the new face to represent Arbin at industry conferences. ■



FUEL CELL TESTING IS GROWING!!

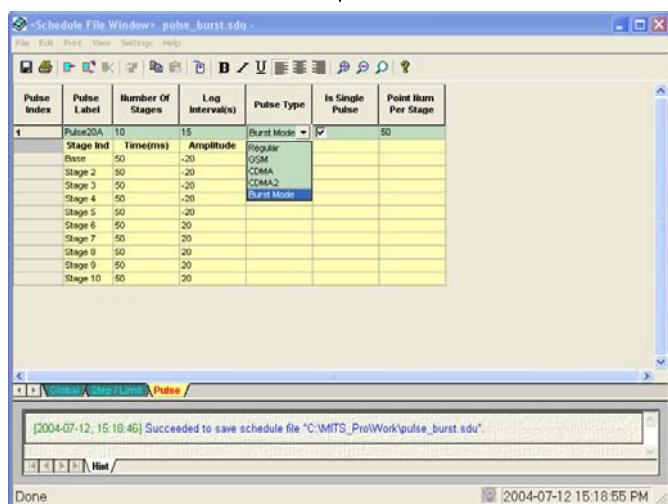


New Feature: Burst Mode Data Collection

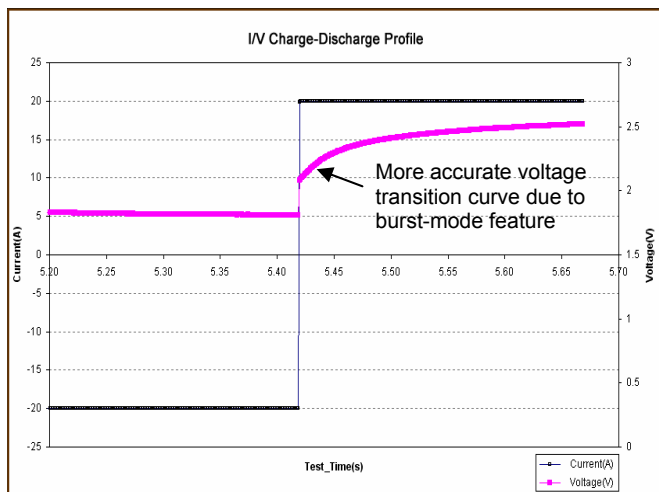
Burst-mode data collection is a new feature offered through the implementation of the new Motorola Coldfire® microcontroller design. It is available as one of the pulse-type selections in Arbin's MITS Pro software (see software screen below). The function applies only on single pulse testing where it allows the user to define between 2 to 50 data logging points per pulse-stage to be captured and recorded into the result database. As more data can be captured, the

pulse profile can be more accurately defined, especially during the charge/discharge transition period. This helps to identify any disturbances in the charge/discharge process of the test objects.

A single pulse has a maximum total duration of 500ms and a maximum of ten time-division stages (including the base). It is normally used for certain applications where fast data logging is required in the range of milliseconds.



Programming burst-mode pulse to capture as fast as one point per millisecond data collection on 500ms single-pulse test. The charge/discharge transition curve is pictured below.



The graph shows the I/V profile during a ± 20A charge/discharge of a 500ms-pulse on a 2V/5AH sealed lead-acid rechargeable battery. Data points are captured every millisecond.

High Flow Rate DPH System Delivered

A high flow rate Dew Point Humidifier (DPH) system was delivered last June to a research institute in China for testing PEM fuel cells. The DPH is configured to humidify up to 1000slpm of fuel gas line and up to 4000slpm of oxidant gas line at gas temperature range of 40-100°C. Control and measurement accuracy for dew point and gas temperatures are at ±1°C. Response time for a change of 10°C temperature is less than 10 minutes. No control software is provided with the system as the customer will control the system manually.



1000/4000slpm DPH system

The 4000slpm is the highest flow rate DPH that Arbin has delivered. Based on Arbin's

proprietary dew point humidification technology, the DPH is capable of humidifying thousands of slpm in a relatively small and compact unit. Currently, the DPH is available to humidify up to 7000slpm of gas flow rate.

Critical Windows Updates and Virus Definition Updates on PCs Controlling Arbin Test Systems

It is important to stay current on critical updates to your operating system and virus definitions in your antivirus software. Virus attacks against PCs on networks have made it necessary to perform these functions on a regular basis. Sometimes these updates are daily occurrences.

Critical Windows Updates often require a reboot of the PC to take effect. Sometimes the download of these critical updates can be lengthy. Running tests should be stopped in an orderly fashion before download and reboot are attempted. Tests can be resumed after the updates are accomplished.

Virus definition updates have never been known to interrupt running tests and these can usually be set up to occur

automatically. However, the PC should never be set up to do unattended virus scans of a hard drive. This can and will likely stop any running test. Sometimes these scans are remotely administered by network administrators. This should be avoided on any PC controlling an Arbin Tester. Hard drive scans can be performed at times of other routine PC maintenance when tests are not running. Most antivirus programs can be configured to monitor network traffic. With up to date virus definitions, this is an effective way to protect the PC from infection.

Any questions involving the appropriate settings and conditions regarding these subjects can be directed to Arbin Technical Support. ■



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A Total Solution the World Over

2500A High-Current-Discharge Battery Tester

Recently delivered to a US aerospace battery manufacturer is a one-channel 2500A/30kW linear system for lead-acid battery testing. The system is capable of discharging at a maximum of 2500A and charging at a maximum of 400A between 6 and 36V. The one-channel system features two current ranges of 2500A/1A, with 0.1% FSR accuracy and minimum rise time of 5 milliseconds.

High-current discharge testing is normally performed as part of standard tests to evaluate and rate the performance of lead acid batteries under conditions simulating the major requirements of their applications. ■



1-channel linear battery testing system of 2500A/1A, 6-36V, and max 30kW power. Maximum discharge current at 2500A within power limit.

Arbin Showcase

Oct 3-8, Honolulu, HI
ECS Meeting
www.electrochem.org

Nov 1-5, San Antonio, TX
Fuel Cell Seminar
www.fuelcellseminar.com

Nov 16-18, Huntsville, AL
NASA Aerospace Battery
[//ntf-2.msfc.nasa.gov/battery.nsf](http://ntf-2.msfc.nasa.gov/battery.nsf)

Dec 6-7, Deerfield Beach, FL
Double-layer Capacitor
www.powersources.net

2004 2-Day Factory Training Schedule

**Sep 6-7 or 20-21
Oct 4-5 or 18-19
Nov 8-9 or 22-23
Dec 6-7 or 20-21**

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