

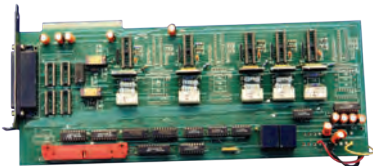
Why Buy Arbin



History of Innovation

Arbin Instruments has provided testing equipment for energy storage applications for over 20 years; from our humble beginnings out of a garage, into the multi-million dollar global corporation that we are known as today with a 65,000 square-foot manufacturing facility in the heart of Texas. Dr. John Zhang, Arbin's founder, has been granted nine patents that are utilized in our products and he remains our chief research and development scientist.

Arbin was the first company to create a multi-channeled potentiostat/galvanostat device. Our innovations lead the industry by also having the most compact multi-channeled design. We accomplished this by a patented heat sink technology that was 40% more efficient than similar designs. The footprint of our boards was as much as 1/6th that of our competitors. We also introduced plug-and-play modularity that allows for easy upgrade and expansion, flexible designs, and a lower cost of production. Arbin has continued this trend by becoming the first company to offer high speed telecom pulse testing ability, increasing the efficiency of heat dissipation, standardizing our circuit designs and creating standardized modules that allow for lower overhead costs. The founder's vision has been to provide quality testing systems at the most competitive cost per channel, thus helping power innovation together with our many users around the world. Arbin balances our history of innovation and experience with the flexibility to always take on new challenges and custom projects, thus setting Arbin apart from competitors and spurring our continued growth and improvement.



World's 1st 8 channel, multi-electrode PST/GST circuit developed by Arbin.



Highest heat dissipation efficiency of its kind with a space saving and light weight patented design.



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Hardware and Flexibility

Flexibility of hardware configuration is an advantage that allows Arbin to supply the most appropriate design and technology to fit each customer's testing requirements. Three different circuit design technologies are available as well as a variety of microcontroller configurations that can be selected for each customer's project. Bipolar linear, Pulse Width Modulation (PWM), and Unipolar circuit technologies each have advantages for certain applications and we will provide the best technology for a customer's testing requirements. This flexibility gives Arbin the advantage to supply customized solutions while providing a technically advanced product.



The **Bipolar** linear circuit design is suitable up to 60V and allows for no switching time between charge and discharge and ensures cross-zero linearity. Our industry leading accuracy specification, 0.02% of the full scale, is calculated based on the full positive (charge) to negative (discharge) range. Bipolar circuitry can discharge below 0V, and has rise times as fast as 10 micro-seconds. Arbin customers can trust that our equipment will have the specifications demanded for advanced research techniques.



High powered applications that reach up to 800V may utilize our **Pulse Width Modulation (PWM)** circuitry which is regenerative. Discharge power is sent back to the grid, which is more energy efficient for our customers, produces significantly less heat, and is environmentally friendly.

Arbin also offers **Unipolar** designs for appropriate applications for voltage up to 120V. Unipolar is a linear circuit, however, it offers a higher voltage than a Bipolar design and offers an alternative to PWM when power regeneration is not required. Unipolar circuitry has a 100ms fixed switching time.

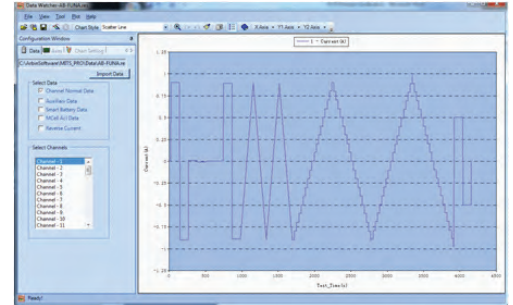
All Arbin systems contain on-board microcontrollers inside the chassis, and the flexibility of our hardware designs extend to these control modules and not just the circuit types. We offer systems with a dedicated microcontroller for each channel, as well as systems where groups of channels share a microcontroller depending on the requirements. One of the key advantages of Arbin's design is that we maintain a constant control loop with the PC which allows us to make changes to a test on-the-fly while it is running. The benefits include being able to increase the number of cycles, adjust a control value, add steps, adjust data logging, etc., without needing to pause or stop a test.



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Software and Features

Arbin's MITS Pro software is regarded as the most powerful and flexible in the industry. Creating and starting a new test is a simple and intuitive two-step process. Arbin offers dozens of control type options including current, voltage, power, and load. A vast library of 90+ unique meta variable conditions are available in addition to our formula feature which allows near limitless potential. The sophistication to use meta variables and formulas instead of fixed numeric values alone is what makes Arbin's software superior. Other beneficial features that have helped build our customer loyalty are listed below:



- Results can be viewed graphically in real time, and data analysis is performed on a Windows-based environment.
- Arbin's DataPro Excel macro is provided with all systems for data viewing and analysis.
- Networking capability is included with Arbin systems, and we will continue to keep up with industry trends; adapting to the latest IT standards and Windows software.
- Running a simulation directly from a data text file, such as the FUDS test or other drive profile, can easily be performed without writing a complicated program.
- CAN Bus communication may be used to receive and transmit messages from a device. No third party equipment, special DLL packages, or additional licenses are required for operation.
- Arbin was the first company to offer high speed pulse testing capability for complex sub-millisecond multi-stage pulses. Pulse stage widths may be as small as 100 micro-seconds. add steps, adjust data logging, etc., without needing to pause or stop a test.
- MITS Pro software can interface with an external charger/load or 3rd party temperature chamber.
- Arbin's smart battery testing systems allow users to log data from their smart battery and compare it to the external data provided by the Arbin testing system. Testing procedures can be referenced and controlled by the data that the Arbin Testing System acquires, or by the SMBus register values. The MITS Pro software is also capable of manipulating SMBus registers during testing.

ID#	Test Name	Schedule Name	Status	Exit Condition	Cycle	Step	Step Time (s)	Test Time (s)	Voltage	Current
001	AB-FUBA	AB-FUBA.ado	Discharge	NA	[1] 10: Step_L	00:00:11.478	0:04:23.088	-797.5616 (mV)	-799.9160 (mA)	
002	AB-FUBA	AB-FUBA.ado	Discharge	NA	[1] 10: Step_L	00:00:51.445	0:04:23.949	-899.6694 (mV)	-898.6727 (mA)	
003	AB-FUBA	AB-FUBA.ado	Rest	NA	[1] 10: Step_X	00:00:07.056	0:04:23.838	-797.2151 (mV)	-8.0000 (mA)	
004	AB-FUBA	AB-FUBA.ado	Discharge	NA	[1] 10: Step_L	00:00:26.152	0:04:23.991	-898.2464 (mV)	-894.3249 (mA)	
005	AB-FUBA	AB-FUBA.ado	Discharge	NA	[1] 10: Step_L	00:00:16.252	0:04:23.824	-798.8545 (mV)	-898.7770 (mA)	
006	AB-FUBA	AB-FUBA.ado	Discharge	NA	[1] 10: Step_L	00:00:26.729	0:04:23.744	-898.8582 (mV)	-899.7879 (mA)	
007	AB-FUBA	AB-FUBA.ado	Charge	NA	[1] 10: Step_R	00:00:15.987	0:04:23.666	2.8897 (V)	2.8891 (A)	
008	AB-FUBA	AB-FUBA.ado	Rest	NA	[1] 10: Step_X	00:00:08.016	0:04:23.558	-328.5400 (mV)	-8.0000 (mA)	

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Safety and Reliability

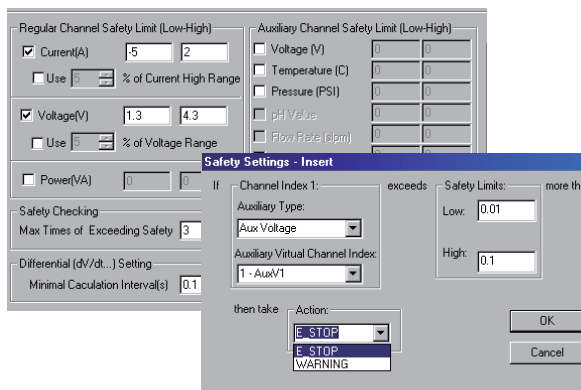
Arbin has built thousands of systems which are now located in over 50 different countries around the world! The first testing systems Arbin built are still operating in the US running on a DOS operating system.

We understand the need for research and industrial testing equipment to be reliable and durable. Arbin places a strong emphasis on this area and strives for continuous design improvement. Some recent improvements include integration of a small uninterrupted power supply in our PWM systems. The UPS guarantees the startup and shut down process is sequenced safely and reliably despite a power failure. Cooling efficiency was increased by altering the board alignment to maximize the convection heat transfer. An independent emergency stop button now comes standard on all PWM systems. These are just a few specific examples that demonstrate Arbin's commitment to applying innovative engineering solutions to continually improve the reliability of our hardware.

Multiple layers of safety provisions come standard with Arbin systems at the hardware and software (user interface) level. The system itself is secure internally to protect from unintentional misuse. Redundant levels of fusing are provided inside the system for protection at the channel or board, and power supply level. Thermoswitches help prevent over-heating, and a watchdog circuit monitors the machine's internal communication and communication between the PC. The watchdog turns off the system in case of a major hardware failure. Arbin systems contain a hardware-based voltage clamp, which helps prevent voltage overshoot, and is especially critical for Li-batteries. Since it is hardware-based, the clamp reacts faster than any form of software control (<1ms) and will respond even in the case of a PC failure.



Watchdog protection circuitry



The software also has several safety functions which the user may implement to avoid over charging the cells, over discharging, over-heating etc. Global safety limits may be applied for each test schedule monitoring current, voltage, and temperature. Additional, more specific safety conditions may be set for individual test steps to trigger an unsafe condition, divert a test into a cool-down period, or allow for conditional procedures using most every variable or meta-variable available in our extensive library.



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Sales and Support

Buying an Arbin system is a direct and easy process. Our knowledgeable sales and application engineers will identify your requirements and specify the best solution for your testing needs. Your Arbin system will be manufactured and tested to the highest specifications in the industry, and arrive pre-calibrated and ready to use by simply connecting the supplied Ethernet cable from the Arbin system to the PC. This is only the beginning of your Arbin experience. We take pride in continuously supporting our customers throughout their time using Arbin.



Our customer service department offers regular training classes at our headquarters in Texas as well as on-site training visits. Another great resource Arbin customers have is access to the vast library of training and tutorial videos on our website. This makes it easy for novice users to learn or experienced users to refresh their knowledge at any time.

Our application engineers are always available by phone or email, and with equipment running in over 50 countries, Arbin has experienced support technicians nearby to help install equipment, answer questions, and provide any repairs that may be necessary over the life of your system.

Arbin's customer service team is well-known throughout the industry for their responsiveness to any questions that arise. The same time and dedication is shown to all customers, whether a large OEM or small startup. Serving our customers is what drives us, and we cherish the opportunity to earn your business.

Find out more information about Arbin's testing systems and solutions by visiting our website www.arbin.com, or call **+1 979-690-2751 x2** to speak with an application engineer today!



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