

Software Guide

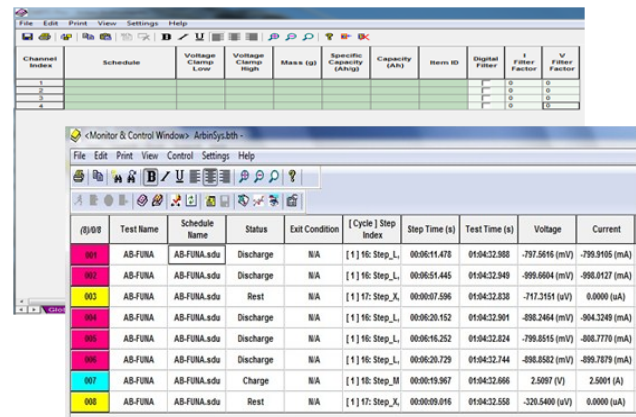


Arbin's MITS Pro Software is the most comprehensive battery testing software solution available in the marketplace today. Over the past decade, MITS Pro has been developed by Software Engineers at Arbin to provide easy and intuitive control over all our test stations for all applications. This flexibility has allowed Arbin to refine and simplify the software and user interface for improved stability and ease of use. Operating on a range of platforms from Windows 98 to Windows 7, the MITS Pro software has become the industry standard in testing and quality.

MITS Pro Software

Implementing Test Schedules

- 1) Write Schedule
- 2) Assign to Channel in Batch File
- 3) Start Test in Monitor and Control Window



The power of MITS Pro comes from its capacity to create and implement tests ranging from a single step up to hundreds, all using a single interface. Using the MITS Pro Software, you can write new test schedules, implement test regimes, as well as monitor, view and graph real-time data.

		Step Label	Number Of Limits	Control Type	Control Value	Extra Control Value 1	Extra Control Value 2	Current Range
1	<input checked="" type="checkbox"/>	Step_A	1	Rest				
		Log Limit	Step Li	Goto Step	Type1	Sign1	Value1	Type2
1	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Next Step	PV_CHAN_Step_Time	>=	00:00:00	
2	<input checked="" type="checkbox"/>	Step_B	2	Current(A)	0.1			Medium
		Log Limit	Step Li	Goto Step	Type1	Sign1	Value1	Type2
1	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Next Step	PV_CHAN_Voltage	<=	2.2	
2	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Next Step	DV_Time	>=	00:00:10	
3	<input checked="" type="checkbox"/>	Step_C	1	Set Variable(s)	Reset	Increment	Decrement	
		Log Limit	Step Li	Goto Step	Type1	Sign1	Value1	Type2
1	<input type="checkbox"/>		<input checked="" type="checkbox"/>	Next Step	PV_CHAN_Step_Time	>=	00:00:00	

An Example of the MITS Pro Menu Driven Test Scheduling

On-The-Fly Modifications

Arbin's hardware and software design allows for real time on-the-fly test modifications to be performed on the running test schedule. With the ability for the user to modify running test schedules, the requirement to stop and restart tests is not necessary, providing for longer uninterrupted testing.



Software Guide

Control Types

MITs Pro allows for extremely flexible test scheduling with its broad availability of control types, and end conditions. A simple pull-down menu allows for easy selection of the available control types which include, but not limited to:

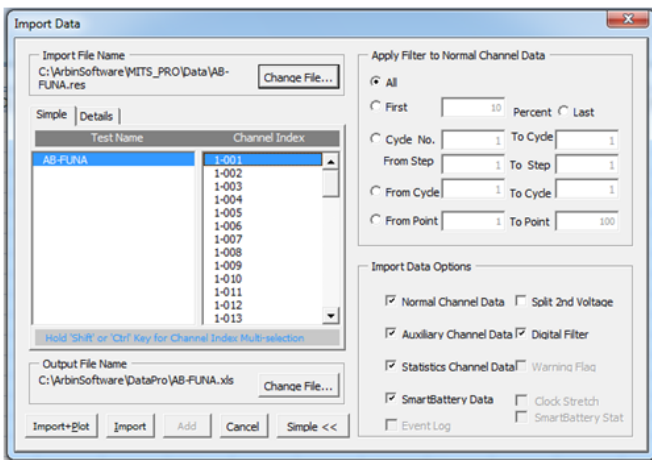
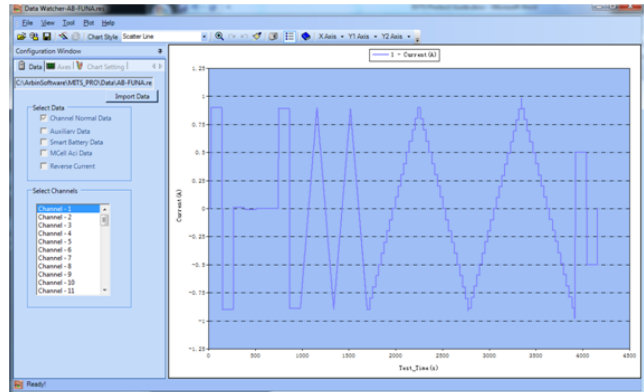
- Current
- Voltage
- Power
- Load
- Cyclic Voltammetry
- Internal Resistance
- Simulation (Drive Cycle)
- C-Rate
- Formula Control
- CC-CV
- Custom Pulses
- Set Variables

Custom written test profiles can consist of an unlimited number of test steps, with end conditions based on changes in time, voltage, current, temperature, as well as external control signals to integrate the system in to existing laboratory equipment.

User defined safety settings at the schedule, step, and hardware level provide an extremely safe testing atmosphere designed to ensure total control over the test station.

Data Watcher

Once a test schedule has been assigned and started, a Microsoft Access file will be created with the results. This Access Database file can be opened using the Arbin software provided at no additional cost. Arbin provides two options for easy data analysis: Data Watcher and Microsoft Excel. The database file can also be opened in third party programs, and saved as a text file.



Data Watcher allows quick and simple plotting of your test results file. Using data watcher, the user can do simple or complex plotting to determine whether or not the battery is reacting as expected. If a data point falls outside of expectations, the user can double click on the graph and the list of data points will appear as well as the cycle count and step number the test is in. If modifications are required to the test schedule, the user can open the specified test schedule in MITs Pro, make the modification and continue testing with no interruption.



Software Guide

Microsoft Excel

	A	B	C	D	E	F	G	H	I
1	Data_Point	Test_Time(s)	Step_Time(s)	Step_Index	Cycle_Index	Current(A)	Voltage(V)	Charge_Capacity(Ah)	Discharge_Capacity(Ah)
2	1	10.030	10.030	1	1	0.00000	-0.00030	0.0000	0.0000
3	2	20.014	20.014	1	1	0.00000	0.00001	0.0000	0.0000
4	3	30.023	10.009	2	1	0.89996	0.90966	0.0025	0.0000
5	4	40.023	20.009	2	1	0.89996	0.90935	0.0050	0.0000
6	5	50.028	30.014	2	1	0.89996	0.90935	0.0075	0.0000
7	6	60.038	40.024	2	1	0.89996	0.90966	0.0100	0.0000
8	7	70.051	50.037	2	1	0.89996	0.90997	0.0125	0.0000
9	8	80.061	60.047	2	1	0.89996	0.90966	0.0150	0.0000
10	9	90.091	70.077	2	1	0.89996	0.90997	0.0175	0.0000
11	10	100.098	80.084	2	1	0.89996	0.90997	0.0200	0.0000
12	11	110.108	90.094	2	1	0.89999	0.90997	0.0225	0.0000
13	12	120.121	100.107	2	1	0.89996	0.90997	0.0250	0.0000
14	13	130.136	110.122	2	1	0.89996	0.90966	0.0275	0.0000
15	14	140.025	120.011	2	1	0.89999	0.90997	0.0300	0.0000
16	15	150.031	10.006	3	1	-0.90001	-0.91025	0.0300	0.0225
17	16	160.035	20.009	3	1	-0.90001	-0.91025	0.0300	0.0250
18	17	170.045	30.019	3	1	-0.90001	-0.91025	0.0300	0.0275
19	18	180.056	40.031	3	1	-0.90001	-0.91025	0.0300	0.0300
20	19	190.060	50.034	3	1	-0.89997	-0.90994	0.0300	0.0325
21	20	200.075	60.050	3	1	-0.89997	-0.91025	0.0300	0.0350
22	21	210.096	70.071	3	1	-0.90001	-0.91025	0.0300	0.0375
23	22	220.137	80.111	3	1	-0.89997	-0.91025	0.0300	0.0400
24	23	230.152	90.127	3	1	-0.90001	-0.91025	0.0300	0.0425
25	24	240.184	100.158	3	1	-0.90001	-0.91025	0.0300	0.0450
26	25	250.214	110.189	3	1	-0.90001	-0.91025	0.0300	0.0475

For a more in-depth data analysis report, Arbin has created an Excel Macro that will allow for simple importation of the test result file. The results file will contain all information gathered to allow for easy manipulation of the data.

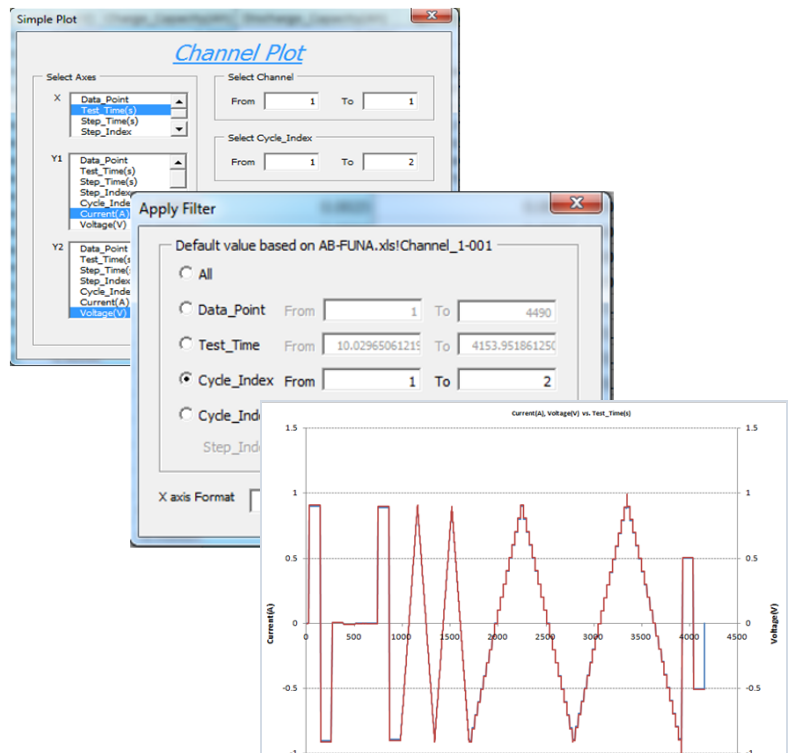
The macro created by Arbin allows the user to plot all of the data or specific cycles or time, based on any criteria that you may require. The Macro and Data Watcher can be installed on any PC which allows for flexible data analysis outside of the laboratory.

Once a test has been started, a Microsoft Access Database file will be created which stores all of the data from the running test schedule. The imported file will list all of the relevant information for data analysis including:

- Test Time & Date
- Current
- Voltage
- Step & Cycle Index
- All Auxiliary Data
- Charge/Discharge Capacity (Ah)
- Charge/Discharge Energy (Wh)

To view either real-time or previously run data files, the user has the flexibility to import the entire data file or filter out only relevant cycles or test points. You can then select the data to import on both the X and Y axes for a custom designed plot.

With the flexibility of the Microsoft Access Database file, the user has the ability to utilize all of Arbin's data analysis tools, or convert the data in to a .CSV file to import the results in to any third party data programs of your choice.



Software Guide

About Arbin

Arbin Instruments is one of the fastest growing manufacturers of energy-related testing equipment. Combining the global talents of electrochemists, electronic and software engineers, customer support staff, Arbin Instruments has revolutionized the automated testing instrumentation market. We offer standard and customized testing solutions for a wide variety of energy-storage devices such as batteries, supercapacitors, and fuel cells.

Arbin's focus is exceptional quality, performance and reliability. Our instruments provide scientists and engineers a tool for performing R&D, quality control, production, and characterization in various markets including Hybrid Electric Vehicles, medical, telecommunications, military, alternative energy, space, and consumer products.



Contact Information

Arbin Corporate Headquarters and Production Facility

762 Peach Creek Cut Off Road
College Station, TX 77845
PHONE: +1 979 690 2751
EMAIL: sales@arbin.com

Arbin China Office

Rm. 721, Lucky Tower B, Bldg. No. 3 Dong
San Huan Bei Lu, Chaoyang District
Beijing, P.R. China 100027
PHONE: +86 10 64635926
EMAIL: chinaoffice@cn.arbin.com

Italy

Genport srl
Via Garcia Lorca, 29
23871 Lomagna (LC) Italy
PHONE: +39 348 900 76 40
EMAIL: paolo.fracas@genport.it

France

Equipment Scientifique
Department Test et Mesure
127 Rue de Buzenval

92380 Garches, France

PHONE: +33 1 47 95 99 45
EMAIL: tem@es-france.com

India

Metrohm India Limtied
"Origin Sri Towers", 3 & 4, Fourrts
Avenue, Annai Indira Nagar,
Thoraipakkam, Chennai - 600 096
PHONE: +91 44 4044 0440
EMAIL: santosh@metrohm.in

Arbin Korea Office

Room 401, Downtown Bldge, 1141-5
Joong-Dong, Wonmi-Gui,
Burchaon-Si, Kyunggi-Do, Korea
PHONE: +81 32 321 1431
EMAIL: jyu@arbin.co.kr

Arbin Germany Office

Kurt-Schumacher-Str. 4h
21629 Neu Wulmstorf
PHONE: +49 40 6898 2456
EMAIL: James.l@arbin.com

Japan

Meiji Electric Industries Co., Ltd.
2-10-5 Takara, Chiryu-Shi,
Aichi 472-0056
PHONE: 0566 81 9123
EMAIL: kooyabu@mbx.meijidenki.co.jp

Singapore

Palico Biotech Pte. Ltd.
18 Boon Lay Way #06-104
TradeHub 21
Singapore, 609966
PHONE: +65 6465 1350
EMAIL: Patrick@palicobio.com

Turkey

Eylullab
Eylul Uluslararası Kalite Kontrol ve
Laboratuvar Test Cihazları Ltd. Sti
Cetin Emec Bulvarı 8. Cadde
No: 35/5 A. Oveçler / Ankara TURKEY
PHONE: +90 312 472 87 20
EMAIL: info@eylullab.com