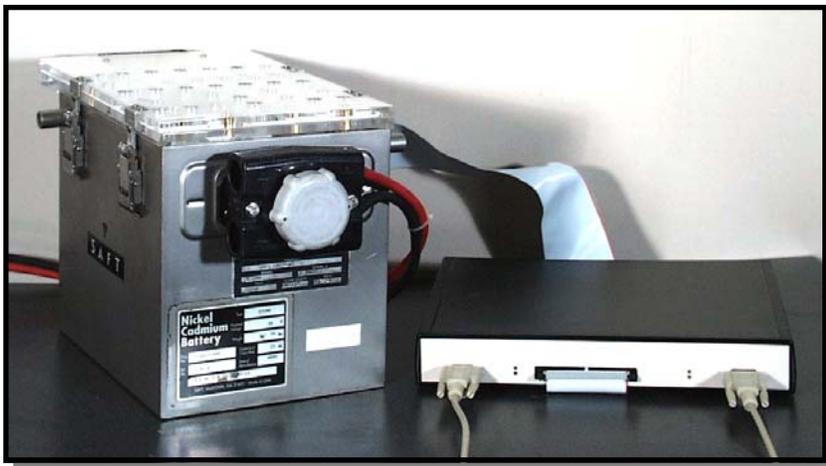


# BTAS16

## Automated Test and Analysis System for Aircraft Batteries

- ✓ Continuous Monitoring of Battery Testing
- ✓ Monitor and Control of Charger Analyzers
- ✓ Accuracy and Efficiency in the Battery Shop



Data Archive  
Data Comparison  
Numerical Results  
Customer Database  
Up to 16 Data Terminals  
Work Order Database  
Graphical Results  
Battery Database  
Printed Reports  
Audit Trail



JFM Engineering, Inc.

# The Process of Testing Aircraft Batteries

Testing of aircraft batteries and eventual certification requires that a variety of tests be performed to determine if the batteries are airworthy. For that, the batteries must meet the performance parameters as established by the manufacturers.

There are two principal tests: charge acceptance and capacity.

Charge acceptance:

The battery must be charged at a specified rate and for a specific duration. At the end of this test the battery voltage and the voltage of the individual cells must be above a minimum and below a maximum. In addition, voltages must not drop and there must not be any significant increase in temperature.

Capacity:

The battery must be discharged at a specified rate and for a specific duration. The battery meets the capacity specification if at the end of the test the voltage of the battery and of each cell is above a minimum.

Proper testing requires that measurements be taken at the beginning, during, prior to the end, and at the end of the test. Simple end voltage tests are incomplete and will not reveal the true performance of the battery and of its components. Incomplete testing can lead to the improper certification of a battery with internal failures or with marginal performance or it may result in the premature condemnation of a good battery which simply needs reconditioning or the replacement of cells.

It is possible to manually obtain all necessary readings but it is a tedious, inefficient and error prone operation.

The BTAS16 automates the process of taking all necessary readings, including battery temperature and Charger-Analyzer performance. The system also provides the means to archive and review the data, in numerical and graphical format, on the screen and through printed reports.

## The Charger-Analyzer

Proper battery testing requires precision Charger-Analyzers to meet the requirements set forth by the manufacturers of batteries, principally in the area of constant current charge and discharge, timed operation and sensing of end voltages. Battery temperature sensing, flexible programming of test parameters and system protection provide additional operating enhancements. Additional charging modes such as Constant Voltage and Peak Voltage make the instruments useful for Nickel-Cadmium, Lead-Acid and other battery technologies.

Instruments providing such characteristics are the SuperMasterCharger and miniMasterCharger. Combined, they satisfy testing needs for a broad range of batteries, from the large main batteries to the small emergency packs.



**SuperMasterCharger**  
for large batteries (10A-Hr to 100A-Hr)

**miniMasterCharger**  
for small batteries and packs up to 20A-Hr



## The Measurement and Recording of Data

Successful battery testing requires that multiple readings be taken during each of the charge/discharge tests and that individual cells be also monitored as required for Nickel-Cadmium batteries. For a typical battery with 20 cells, this means over one hundred readings may have to be taken over the charge/discharge process.

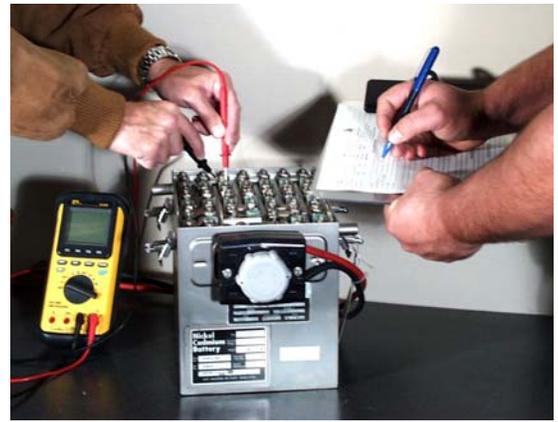
With so many readings to take, it is imperative that record keeping be efficient, legible and above all, error free. The traditional manual method of measuring and writing is definitely not efficient, can have questionable legibility and it is indeed prone to errors.

Since a typical battery can last five years or more in service, detailed and accurate record keeping is a must to determine the performance of the battery in its lifetime. In addition, records have to be easily available to facilitate the comparison of the newest readings with the previous ones.

The BTAS16 provides the capability of automatically measuring and storing all necessary readings, including charge/discharge current, battery voltage, cell voltages and battery temperature.



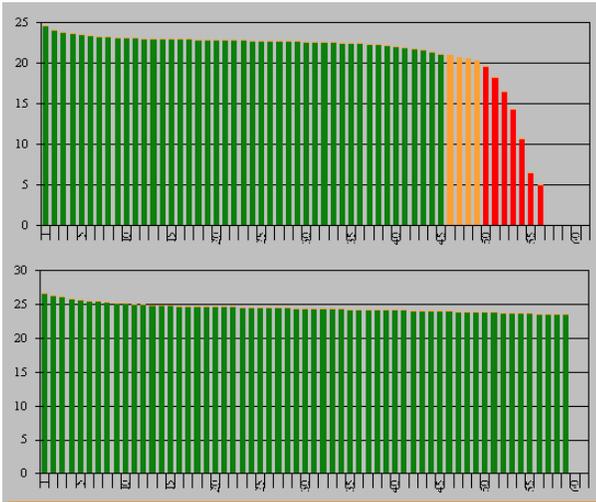
**Superseder Charger-Analyzer and two C-Scans provide simultaneous test and analysis of four MD-80 batteries**



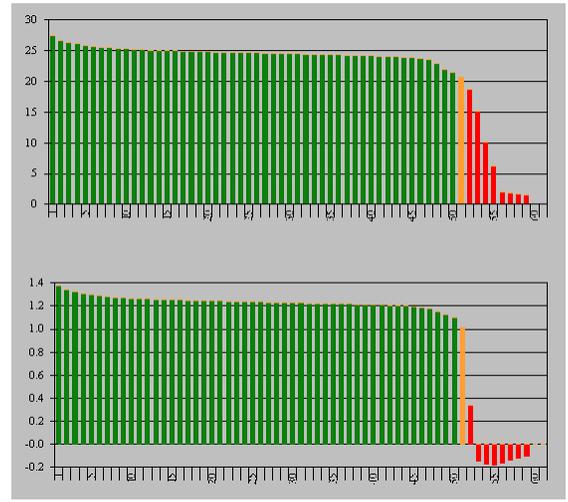
**The traditional method of measuring and recording of battery and cell voltage readings: Measure, write; measure, write; measure, write ...**



**The BTAS16 method of measuring and recording of battery and cell voltage readings. Shown in the picture are the battery specific Crown, which makes contact with the cells and the Data Terminal which takes all the readings and transfers them to the Computer.**



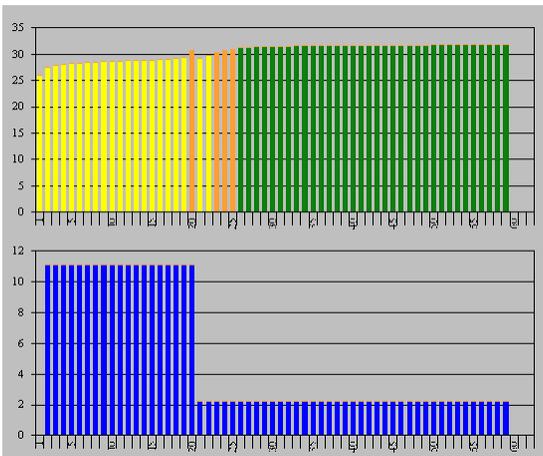
**Comparison of First and Second Capacity Test.**  
 This shows the performance of the battery in the first and subsequent capacity test, with voltage vs. time readings.



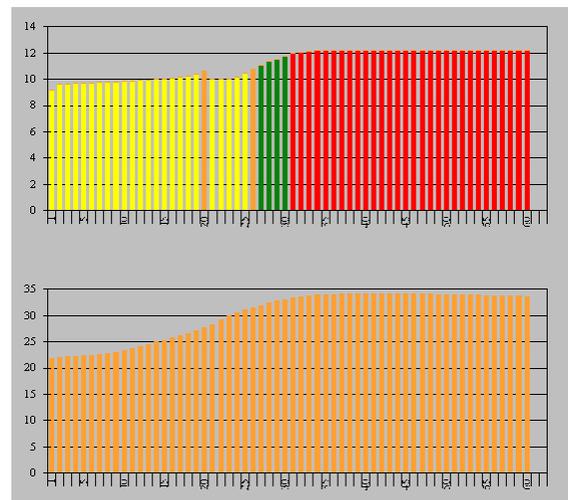
**Capacity Test, Battery and Cell voltage.**  
 Shows the performance of the Battery and of an individual Cell.

## The Analysis of Data

Once data has been taken, the numbers have to be reviewed to determine if the cells individually and the battery as a whole are performing correctly. This means looking at many numbers and making a judgment against manufacturer established pass/fail limits. This requires not only well trained evaluations but also consistency in the analysis.



**Charge Voltage and Charge Current vs Time.**  
 Shows the performance of the battery during charge as well as the current delivered by the Charger-Analyzer.



**Charge Battery Voltage and Temperature vs Time.**  
 Shows the performance of the battery during the charge cycle.

# Data Archive and Reporting

The key to successful data management in the operation of a Battery Shop resides in the form of the data and the method of storage. A comprehensive database provides the operator with easy retrieval, viewing and reporting of the archived data.

The BTAS16 gives the operator of the system the capability to search for, view on screen and generate printed reports on any or all of the data maintained in the system whether it is current data or archived data of past tests.

C-Scan Data Report - Station #4																					
REPORT TYPE			WORK ORDER			TEST STEP															
Cell Data			B03001 -			03 - Capacity			<input checked="" type="checkbox"/> Auto Refresh <input type="checkbox"/> Include Archived												
Terminal # 4 C-Scan DATA Report Tuesday, January 14, 2003 09:18:14																					
Work Order: B03001			Step: 03 - Capacity			Terminal ID: 220			Cells Cable: 01			Shunt Cable: 01			Temp Cable: 02						
						Charger: Superseder						Technician: Edmundo									
RDC	E-Time	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20
001	00:00:00	1.31	1.32	1.32	1.32	1.31	1.32	1.32	1.33	1.32	1.32	1.31	1.33	1.32	1.33	1.33	1.32	1.33	1.32	1.33	1.32
002	00:01:05	1.29	1.30	1.30	1.30	1.29	1.30	1.30	1.31	1.30	1.30	1.31	1.30	1.31	1.31	1.31	1.30	1.31	1.30	1.31	1.30
003	00:02:08	1.28	1.29	1.29	1.29	1.28	1.29	1.29	1.30	1.29	1.29	1.29	1.29	1.30	1.29	1.30	1.30	1.29	1.29	1.29	1.29
004	00:03:12	1.27	1.28	1.28	1.28	1.27	1.29	1.28	1.29	1.28	1.28	1.28	1.28	1.29	1.28	1.29	1.29	1.28	1.28	1.28	1.28
005	00:04:16	1.26	1.27	1.27	1.28	1.27	1.28	1.27	1.28	1.27	1.27	1.27	1.27	1.28	1.27	1.29	1.28	1.27	1.28	1.27	1.27
006	00:05:16	1.26	1.27	1.27	1.27	1.26	1.27	1.27	1.28	1.27	1.27	1.27	1.27	1.28	1.27	1.28	1.28	1.27	1.27	1.27	1.27
007	00:06:20	1.26	1.26	1.27	1.27	1.26	1.27	1.26	1.27	1.26	1.26	1.26	1.26	1.27	1.26	1.28	1.27	1.26	1.27	1.26	1.26
008	00:07:24	1.25	1.26	1.26	1.26	1.25	1.27	1.26	1.27	1.26	1.26	1.26	1.26	1.27	1.26	1.27	1.27	1.26	1.26	1.26	1.26
009	00:08:28	1.25	1.26	1.26	1.26	1.25	1.26	1.26	1.27	1.26	1.26	1.26	1.25	1.27	1.26	1.27	1.27	1.26	1.26	1.26	1.26
010	00:09:32	1.25	1.26	1.26	1.26	1.25	1.26	1.25	1.26	1.25	1.26	1.25	1.25	1.26	1.26	1.27	1.26	1.25	1.26	1.25	1.26
011	00:10:36	1.25	1.25	1.26	1.26	1.25	1.26	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.26	1.27	1.26	1.25	1.26	1.25	1.25
012	00:11:41	1.25	1.25	1.25	1.26	1.25	1.26	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.25	1.26	1.26	1.25	1.26	1.25	1.25
013	00:12:45	1.25	1.25	1.25	1.26	1.25	1.26	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.25	1.26	1.26	1.25	1.26	1.25	1.25
014	00:13:49	1.24	1.25	1.25	1.26	1.24	1.26	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.25	1.26	1.26	1.25	1.26	1.25	1.25
015	00:14:53	1.24	1.25	1.25	1.26	1.24	1.26	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.25	1.26	1.26	1.25	1.25	1.25	1.25
016	00:15:57	1.24	1.25	1.25	1.25	1.24	1.26	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.25	1.26	1.26	1.25	1.25	1.25	1.25
017	00:17:01	1.24	1.25	1.25	1.25	1.24	1.25	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.25	1.26	1.26	1.25	1.25	1.25	1.25
018	00:18:05	1.24	1.25	1.25	1.25	1.24	1.25	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.24	1.25	1.26	1.26	1.25	1.25	1.25
019	00:19:10	1.24	1.25	1.25	1.25	1.24	1.25	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.25	1.26	1.25	1.25	1.25	1.25	1.25
020	00:20:14	1.24	1.25	1.25	1.25	1.24	1.25	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.24	1.25	1.26	1.25	1.25	1.25	1.25
021	00:21:18	1.24	1.25	1.25	1.25	1.24	1.25	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.25	1.26	1.25	1.25	1.25	1.25	1.25
022	00:22:22	1.24	1.25	1.25	1.25	1.24	1.25	1.25	1.26	1.25	1.25	1.25	1.25	1.26	1.24	1.25	1.26	1.25	1.24	1.25	1.24
023	00:23:26	1.24	1.25	1.25	1.25	1.24	1.25	1.25	1.26	1.25	1.24	1.24	1.24	1.25	1.25	1.26	1.25	1.24	1.25	1.24	1.24
024	00:24:31	1.24	1.25	1.25	1.25	1.24	1.25	1.25	1.26	1.25	1.24	1.24	1.24	1.25	1.25	1.26	1.25	1.24	1.25	1.24	1.24
025	00:25:35	1.24	1.24	1.25	1.25	1.23	1.25	1.25	1.26	1.25	1.24	1.24	1.24	1.25	1.25	1.26	1.25	1.24	1.25	1.24	1.24
026	00:26:39	1.24	1.24	1.25	1.25	1.23	1.25	1.25	1.26	1.25	1.24	1.24	1.24	1.25	1.25	1.26	1.25	1.24	1.25	1.24	1.24
027	00:27:43	1.24	1.24	1.25	1.25	1.23	1.25	1.25	1.26	1.25	1.24	1.24	1.24	1.25	1.25	1.26	1.25	1.24	1.25	1.24	1.24
028	00:28:47	1.23	1.24	1.25	1.25	1.23	1.25	1.25	1.26	1.25	1.24	1.24	1.24	1.25	1.25	1.26	1.25	1.24	1.25	1.24	1.24
029	00:29:51	1.23	1.24	1.25	1.25	1.23	1.25	1.25	1.26	1.25	1.24	1.24	1.24	1.25	1.25	1.26	1.25	1.24	1.25	1.24	1.24
030	00:30:56	1.23	1.24	1.24	1.24	1.23	1.25	1.24	1.25	1.24	1.24	1.24	1.24	1.25	1.24	1.25	1.25	1.24	1.24	1.24	1.24
031	00:32:00	1.23	1.24	1.24	1.24	1.23	1.25	1.24	1.25	1.24	1.24	1.24	1.24	1.25	1.24	1.25	1.25	1.24	1.24	1.24	1.24
032	00:33:05	1.23	1.24	1.24	1.24	1.22	1.25	1.24	1.25	1.24	1.24	1.24	1.24	1.25	1.24	1.25	1.25	1.24	1.24	1.23	1.24
033	00:34:09	1.23	1.24	1.24	1.24	1.22	1.25	1.24	1.25	1.24	1.24	1.24	1.24	1.25	1.24	1.25	1.24	1.23	1.24	1.23	1.24

Cells Data Report showing Elapsed Time and individual cell Voltage readings

Battery Work Order Summary Report

Work Order	Date	Customer	Battery	S/N	Cells	A-Hr.	Main	Top	Slow Ch.	Capacity														
T031403A	03/14/2003	JFM Engineering, Inc.	7-75M3	NSN	7	75	40A/2h	8A/4h	A/h	40A/115m														
Test Performed	Time Started	Time Completed	Station	Charger	Technician	Notes																		
01 As Received	03/14/2003 09:55:25	03/14/2003 09:55:25	7	Superseder	Edmundo																			
01 min	C01 1.22	C02 1.22	C03 1.22	C04 1.22	C05 1.22	C06 1.22	C07 1.22	C08 1.22	C09 0.00	C10 0.00	C11 0.00	C12 0.00	C13 0.00	C14 0.00	C15 0.00	C16 0.00	C17 0.00	C18 0.00	C19 0.00	C20 0.00	C21 0.00	C22 0.00	C23 0.00	C01 8.5
02 As Received	03/14/2003 09:57:31	03/14/2003 09:57:31	7	Superseder	Edmundo																			
41 min	C01 1.32	C02 1.31	C03 1.30	C04 1.31	C05 1.31	C06 1.31	C07 1.32	C08 0.00	C09 0.00	C10 0.00	C11 0.00	C12 0.00	C13 0.00	C14 0.00	C15 0.00	C16 0.00	C17 0.00	C18 0.00	C19 0.00	C20 0.00	C21 0.00	C22 0.00	C23 0.00	C01 9.1
03 Full Charge-6	03/14/2003 09:58:46	03/14/2003 09:58:46	7	Superseder	Edmundo																			
05:57 hrs	C01 1.73	C02 1.73	C03 1.77	C04 1.76	C05 1.74	C06 1.75	C07 1.76	C08 0.00	C09 0.00	C10 0.00	C11 0.00	C12 0.00	C13 0.00	C14 0.00	C15 0.00	C16 0.00	C17 0.00	C18 0.00	C19 0.00	C20 0.00	C21 0.00	C22 0.00	C23 0.00	C01 12.
04 Custom Capacity	03/17/2003 08:53:28	03/17/2003 08:53:28	7	Superseder	Edmundo																			
01:59 hrs	C01 1.00	C02 1.05	C03 1.06	C04 1.07	C05 1.06	C06 1.05	C07 0.92	C08 0.00	C09 0.00	C10 0.00	C11 0.00	C12 0.00	C13 0.00	C14 0.00	C15 0.00	C16 0.00	C17 0.00	C18 0.00	C19 0.00	C20 0.00	C21 0.00	C22 0.00	C23 0.00	C01 7.2

Work Order Summary Report showing the test results for each of the tests performed

# Work Orders, Customers and Batteries

Establishing and keeping track of Work Orders is a mandatory part of the discipline of the operation of a Battery Shop.

The BTAS16 provides for the entry of Work Orders against a table of established Customers and Batteries. Subsequently, the system attaches all data recorded against the specific Work Order providing at all times the status of each test performed under that Work Order.

Additional Data Entry Screens allow for entry of Customer information and Custom Battery information.

Work Order Entry Screen

Work Order Log for: T022103-1 Monday, March 10, 2003 1:03:52 PM

Test Performed	Time Started	Time Completed	Station	Charger	Technician	Notes
01 As Received	2/21/03 10:02:32	2/21/03 10:02:32	5	Superseder	Pepe	
02 As Received	2/21/03 13:22:17	2/21/03 13:22:17	7	Superseder	Pepe	
03 As Received	2/21/03 13:22:25	2/21/03 13:22:25	7	Superseder	Pepe	
04 Full Charge-6	2/24/03 08:26:37	2/24/03 08:26:37	7	Superseder	Pepe	
06 Full Charge-6	2/25/03 09:25:43	2/25/03 09:25:43	7	Superseder	Pepe	
07 Custom Capacity	2/28/03 08:47:17	2/28/03 08:47:17	7	Superseder	Pepe	
08 Full Charge-6	2/28/03 12:25:09	2/28/03 12:25:09	7	Superseder	Pepe	
09 Custom Capacity	3/3/03 08:28:13	3/3/03 08:28:13	7	Superseder	Pepe	
10 Custom Charge	3/3/03 11:20:27	3/3/03 11:20:27	7	Superseder	Pepe	
11 Custom Capacity	3/4/03 08:43:49	3/4/03 08:43:49	7	Superseder	Pepe	
12 Custom Charge	3/5/03 12:31:47	3/5/03 12:31:47	7	Superseder	Pepe	
13 Full Charge-6	3/5/03 12:32:17	3/5/03 12:32:17	7	Superseder	Pepe	
14 Custom Capacity	3/7/03 09:38:02	3/7/03 09:38:02	7	Superseder	Pepe	
15 Custom Charge	3/7/03 13:34:20	3/7/03 13:34:20	7	Superseder	Pepe	
16 Custom Charge	3/7/03 13:34:33	3/7/03 13:34:33	7	Superseder	Pepe	
17 Custom Capacity	3/10/03 09:05:23	3/10/03 09:05:23	7	Superseder	Pepe	

Work Order Log showing all tests performed

Work Order List Sunday, November 10, 2002 09:01:16

Work Order	Date Received	Completed	Customer Name	Battery Model	Serial Number	Status
B02097	09/25/2002	11/09/2002	Cables Aviation	23180	087079	Closed
B02098	09/25/2002	11/09/2002	South Beach Avionics	23186	070725	Closed
B02099	09/25/2002	11/09/2002	South Beach Avionics	23180	090597	Closed
B02100	09/26/2002	11/09/2002	Hialeah Astrophysics	2758	K02849	Closed
B02101	10/07/2002	11/09/2002	Hialeah Astrophysics	2758	A01274	Closed
B02102	10/07/2002	11/09/2002	Hialeah Astrophysics	2758	J00587	Closed
B02105	10/08/2002	11/09/2002	Miami-Dade Space Port	CA20H-20	9801301	Closed
B02106	10/08/2002	11/09/2002	Miami-Dade Space Port	CA20H-20	9800398	Closed
B02110	10/10/2002	11/09/2002	Kendall Astronautics	4076-10	092670	Closed
B02111	10/10/2002	11/09/2002	Kendall Astronautics	4076-10	098621	Closed
B02112	10/18/2002	11/09/2002	Hialeah Astrophysics	2758	J00590	Closed
B02113	10/18/2002	11/09/2002	Hialeah Astrophysics	2758	X01189	Closed
B02114	10/24/2002	11/09/2002	Cables Aviation	Saft 23180	078018	Closed
T1109-01	11/09/2002		JFM Engineering	SAF 4076	123456	Assigned

Work Order List showing the Work Orders currently in the system

# System Control

The BTAS16 provides for the monitoring of up to 16 Data Terminals. A user friendly control screen provides all basic information of the status of each of the Terminals and the data being read and accumulated.

The Main Screen of the BTAS16 program is the place to associate a Data Terminal with a particular Work Order, to inform the system of the type of Test that will be performed and what type of equipment will be used. In addition, control can be linked to specially modified Superseder, 24-400T and AMBAC II Charger-Analyzers to synchronize the starting and stopping of the equipment with the data recording.

When a particular Data Terminal is selected, it is possible to view its status and to view data as it is being collected, graphically (bottom of the screen) and numerically (right had of the screen).

At any moment it is also possible to view and print graphs and numerical results of current and past tests.

The Main Screen also provides for the monitoring and control of Charger-Analyzers such as the SuperMasterCharger and miniMasterCharger. Also for other Charger-Analyzers that have been specially modified to interface with the BTAS16.

**BTAS16 Battery Test and Analysis System - Main Screen**

File Work Orders Customers Batteries Customer's Battery Tools Help

Date: 9/22/2009 Time: 13:41:51 **BTAS16** Operator: Technician Find Stations EXIT

DATA TERMINAL STATUS											
DT#	Work Order	Test	Step	In Use	Rec.	E-Time	Status	Link1	Charger	Chg Type	Chg Status
0											
1	T090922-2	As Received		<input checked="" type="checkbox"/>	<input type="checkbox"/>	0:00:00		<input checked="" type="checkbox"/>	1 M	ICA Super	Online
2	T090922-3	As Received		<input checked="" type="checkbox"/>	<input type="checkbox"/>	0:00:00		<input checked="" type="checkbox"/>	1 S	ICA Super	Online
3	T090922-1	Capacity		<input checked="" type="checkbox"/>	<input type="checkbox"/>	0:00:00		<input checked="" type="checkbox"/>	3	ICA Super	Online
4				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			
5				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			
6				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			
7				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			
8				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			
9				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			
10				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			
11				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			
12				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			
13				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			
14				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			
15				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>			

9/22/2009 Terminal: 1  
 Temp. Cable: 2 (Temp-Plate)  
 Cells Cable: 1 (20C Cable)  
 Shunt Cable: 1 (100 A)  
 Current: 00.0  
 Voltage Batt 1: 25.27  
 Cell #1: 1.264  
 Cell #2: 1.268  
 Cell #3: 1.269  
 Cell #4: 1.267  
 Cell #5: 1.269  
 Cell #6: 1.270  
 Cell #7: 1.268  
 Cell #8: 1.269  
 Cell #9: 1.270  
 Cell #10: 1.271  
 Cell #11: 1.273  
 Cell #12: 1.273  
 Cell #13: 1.272  
 Cell #14: 1.273  
 Cell #15: 1.272  
 Cell #16: 1.268  
 Cell #17: 1.265  
 Cell #18: 1.262  
 Cell #19: 1.267  
 Cell #20: 1.266  
 Temp Plate 1: 25.5  
 Temp Plate 2: 26.2  
 Temp Plate 3: 23.6  
 Temp Plate 4: 23.1  
 Ambient Temp: Open  
 Reference: 9.022

Battery Voltage 1   
 Cells Voltages

Data Terminal: 1  
27478

Message Center

v 5.1.1 Sep 2 2009 Copyright (2009) JFM Engineering, Inc. All Rights Reserved

BTAS16 Main Screen showing the status of each of the Data Terminals and graphical and numerical results for the selected Terminal

## SPECIFICATIONS

<b>Data Terminals:</b>	1 to 16
<b>Batteries per Terminal:</b>	One battery of up to 24 cells Two batteries of up to 12 cells per battery Three batteries of up to 8 cells per battery
<b>Battery Parameters:</b>	Current, Terminal Voltage, Cell Voltages, Temperature
<b>Battery Connections:</b>	Universal Leads with Clips and battery specific Crowns plus cables for Lead-Acid batteries and small packs.
<b>Current Measurement:</b>	Internal Shunt in Intelligent Charger-Analyzers and specially modified Charger-Analyzers or an external Shunt on any type of Charger-Analyzer.
<b>Temperature Measurement:</b>	Temp-Plate
<b>Compatible Charger-Analyzers:</b>	SuperMasterCharger, miniMasterCharger, SupersederXG, 24-400xg and specially modified Charger-Analyzers.
<b>Accuracy:</b>	Battery voltage, $\pm 0.05V$ (40V scale) Cell Voltage, $\pm 0.005V$ (2V scale) Current, $\pm 0.2A$ (100A scale), $\pm 0.02A$ (10A scale), $\pm 0.005A$ (2A scale)
<b>Temperature:</b>	$\pm 1^{\circ}C$ ( $\pm 1.8^{\circ}F$ )
<b>Sampling:</b>	Two per minute worst case, with all terminals active (more frequent with fewer terminals)
<b>Recording Interval:</b>	Capacity test (1 hour) - One minute Charge (4 hours) - Three minutes Charge (6 hours) - Five minutes Charge (14 hours) - 12 minutes
<b>Calibration:</b>	None. Periodic Verification of Performance is the only requirement.
<b>Communication:</b>	Standard 6 wire telephone cable
<b>Computer:</b>	Standard PC with a Dual Core 2.5GHz processor running on Windows XP Pro or Windows 7
<b>Printer:</b>	Standard Inkjet
<b>Power backup:</b>	1000VA for the computer and 300VA for the Data Terminals.



V2.3  
30 May 2012

*(Information Subject to Change without notice)*

JFM Engineering, Inc.  
8030 N.W. 67th Street  
Miami, Florida 33166  
305-592-2272  
FAX 305-594-4933  
[www.jfmeng.com](http://www.jfmeng.com)