



Tutorial

BTAS-16

Battery Test and Analysis System

Preliminary – V0.3

Warnings *(general)*

1. This tutorial is intended for professional personnel experienced in the testing of aircraft batteries
2. Refer to the Operator's Manual for complete details on the operation of the instrument
3. Information provided on battery testing is solely as an operational reference - Refer to the manufacturer's battery manual and/or CMM for battery specific information

Warnings *(specific)*

1. Observe precautions when handling batteries
 1. Batteries are heavy
 2. Batteries will generate extremely high currents if shorted
 - Tools can easily be dropped shorting several cells
2. Follow battery test procedures as outlined in the CMMs and OMMs provided by the manufacturers.
3. The Operator is ultimately responsible for the correct and proper analysis of the batteries under test.

Introduction

The BTAS-16 system is designed to automate the measurement and analysis of battery parameters during testing for certification.

1. The BTAS-16 system will automatically take charge/discharge Current, Battery Voltage, Cell Voltage and Battery Temperature readings.
2. Displays data as it is being recorded.
3. Allows for analysis and reporting of Battery Data.
4. Archives data for access at any time.
5. Designed Specifically for Aviation Battery Testing.

Receiving – Inspection

Unpacking the unit

1. Verify that the following are in the package:
 - Data Interface
 - C-Scan(s)
 - Cells Cable(s)
 - Cell Simulator
 - Cabling
 - Software
2. Inspect the equipment for completeness
3. Save the cartons – They will be needed if the equipment has to be sent out for repair.

Hardware Installation

1. C-Scans should be ideally located above the battery working bench (*see picture in the next slide*).
2. Once C-Scans are in position, data cables can be run from the C-Scans to the Data Interface, which is connected to the Computer in the Battery Shop .
3. Data Cables will also have to be run from intelligent chargers to the Data Interface.
4. C-Scans data cables are plugged into ports 1-4 on the Data Interface, while Intelligent Charger data cables are plugged into Ports 5-8.
5. Splitters are available to expand system capacity.

Hardware Installation

Ideal System Configuration



Computer Requirements

1. The Computer must be running Windows 7 or better.
2. Ideally connected to Internet to take advantage of programs automatic updating feature and notification service.
3. Use the largest monitor available (24 inch minimum recommended).
4. The program is designed to take advantage of additional screen space. Two monitors are useful for reviewing tests.
5. Make sure Window's automatic updates will not interfere with normal battery testing hours.
6. The computer should be connected to a UPS.
7. For further information refer to the BTAS Installation Guidelines document.

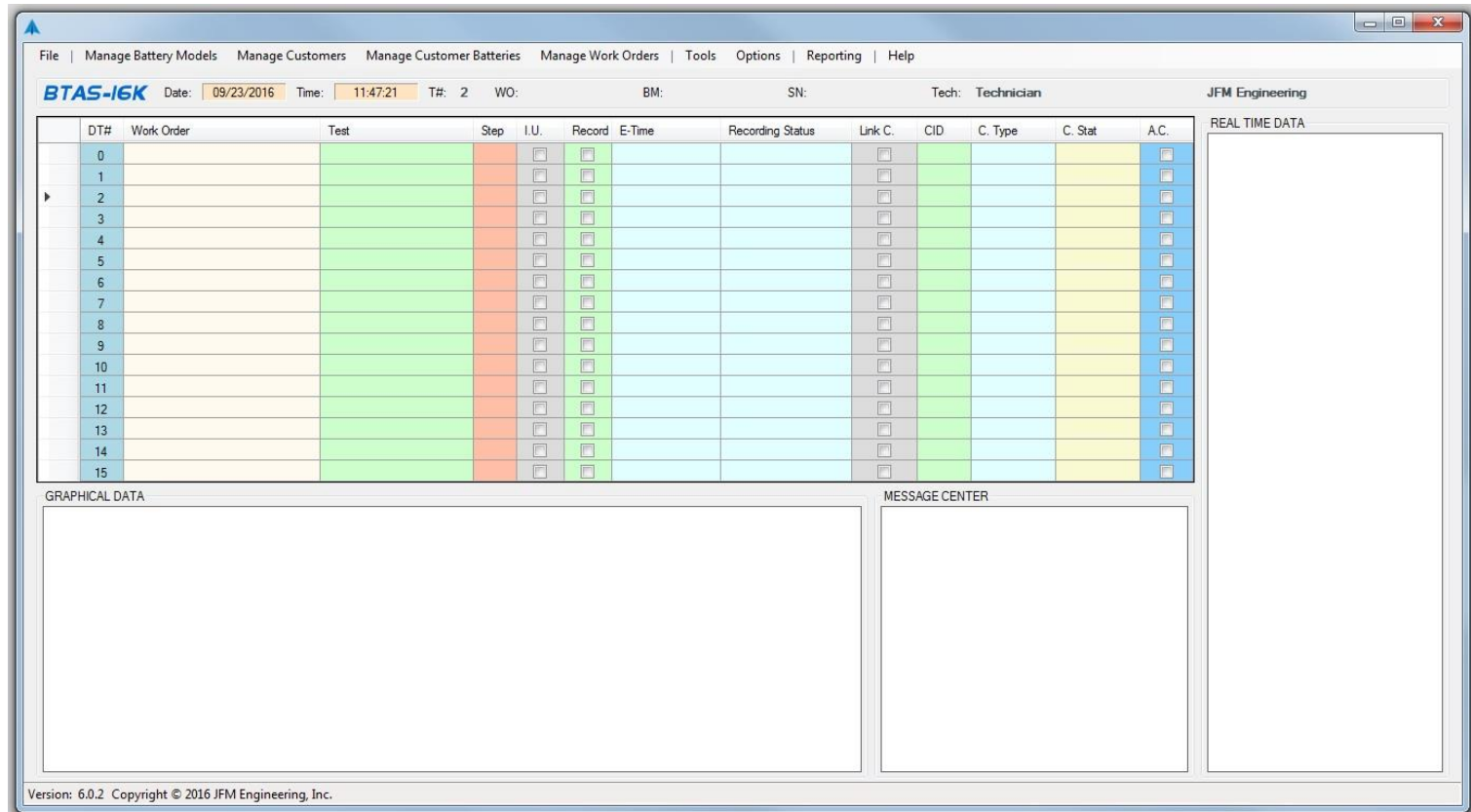
Software Installation

1. Connect both USB plugs from the Data Interface to the computer. If the computer is connected to the Internet, Windows will automatically download the appropriate drivers.
2. To install the BTAS-16K software, insert the provided software CD into the computer or unzip the provided zip file to the desktop and run the setup.exe program.
3. When asked by Windows if you are sure you want to proceed, click yes.
4. Upon first opening of the program, enter your provided License key and setup the comports under the file menu.
5. More information is in the BTAS-16K installation instructions document.

Main Screen

Consists Of:

1. Menu bar along top
2. Main Grid for setting up tests.
3. Graphical and Text information Areas



Hardware Settings – C-Scans

C-Scan Settings:

1. Use the rotary switch on the back of the C-Scan to set its terminal number.
2. The terminal number will be displayed on the front of the C-Scan once the program has begun polling the C-Scan.
 - Pressing the RESET button in the back of the C-Scan will show the Terminal Number
3. The program knows to poll the C-Scan when the In Use column has been checked for its associated data terminal row in the man grid.
4. Use “Find Stations” under tools to find all attached C-Scans.
5. LEDs on the front of the C-Scan indicate BTAS network traffic.
 - The GRN LED will blink indicating being interrogated by the program and the RED LED will blink indicating that it is responding.

Hardware Settings - ICAs

Intelligent Charger Analyzer settings:

1. Set up Intelligent charger Analyzer ID by selecting Opt → 0 through Charger key pad
2. Enter an ID from 0 to 15 and then press enter.
3. This ID will then have to be selected in the main grid under the CID column on the DT row you want the charger associated with.
4. Final step is to set the charger on-line, by pressing Func → 1 and entering 1
5. Charger must be set to be on-line every time the unit is restarted.
6. When charger is set to be on-line the associated link cell in the main grid will turn from red to green.

Hardware Settings – CCAs and Shunts

Legacy Charger Analyzers and Shunt setup:

1. Legacy charger analyzers are controlled by their associated C-Scans
2. Shunts only read back current data and are not controlled by the program, but merely monitored.
3. A charger ID will still have to be defined in the program when using a CCA or shunt. Typically the same ID as the C-Scan controlling the charger
4. In either case the attached charger will need to be set up before running a test.

Basic Process for Use of the BTAS-16K Program

1. Setup databases for:
 - Battery Model
 - Customer
 - Customer's Battery
 - Work Order
2. Place Work Order in Main Grid on line associated with Data Terminal the battery is connected to.
3. Run tests using the assigned Work Order
4. Analyze Data using Graphs or Reports
5. Produce (Print or save) reports

Battery Model Database Interface

View, Edit and Add Battery Models:

1. Enter Model Number, Number of Cells, Technology and Additional Information
2. Can also define tests for auto configuration mode.

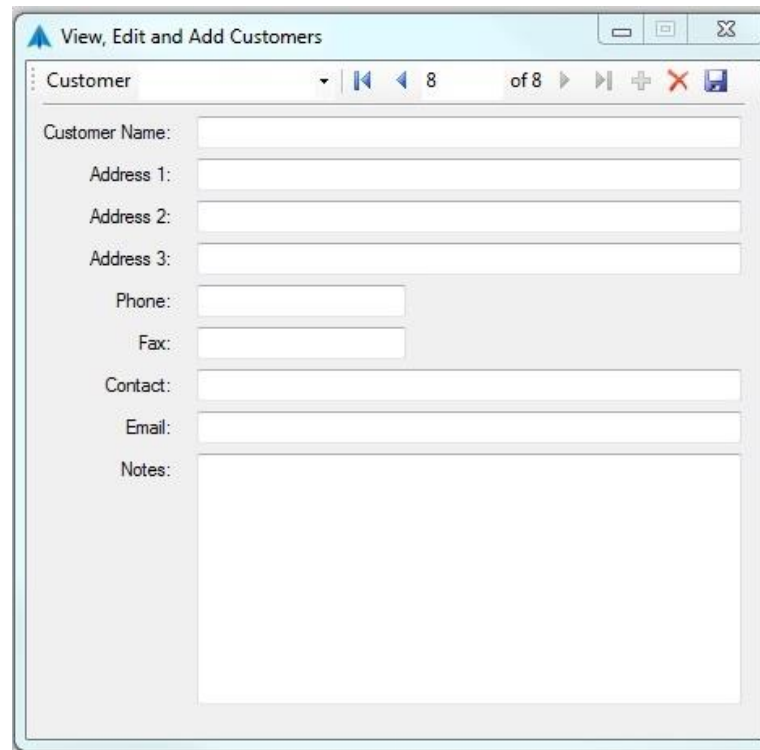
The screenshot shows a software window titled "View, Edit and Add Battery Models". The window contains several input fields and sections for configuring battery models. On the left, there are fields for "Model:", "Manufacturer:", "Part Number:", "Technology:", "Nominal Voltage:", "Capacity:", and "Number of Cells:". Below these are sections for "Cell" (Charge Min Voltage, Charge Max Voltage, Capacity Min Voltage) and "Battery" (Min Voltage, Max Voltage, OverTemp). A "Notes" section is at the bottom left. On the right, there is a "Discharge" section with a table of test configurations: Full Charge-6, Full Charge-4, Full Charge-4.5, Top Charge-4, Top Charge-2, Top Charge-1, and Capacity-1. Below this is a "Mode:" dropdown menu, followed by "Main Charge" settings (Time, Current, Peak Transfer Voltage) and "Topping Charge" settings (Time, Current, Over Voltage).

Discharge	Slow Charge-14	Slow Charge-16	Constant Voltage	Custom Chg	Custom Cap	
Full Charge-6	Full Charge-4	Full Charge-4.5	Top Charge-4	Top Charge-2	Top Charge-1	Capacity-1

Customer Database Interface

View, Edit and Add Customers:

1. Enter Customer name and any other desired information.



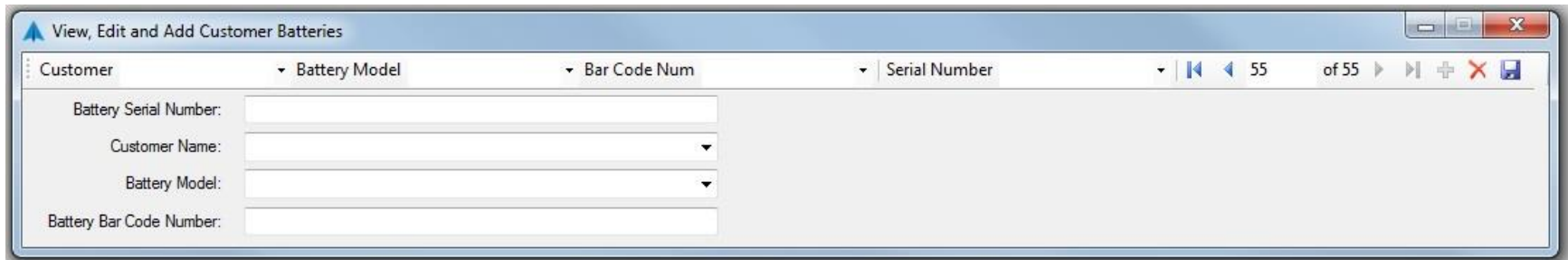
The screenshot shows a software window titled "View, Edit and Add Customers". At the top, there is a navigation bar with a dropdown menu set to "Customer", a list of navigation icons, and the text "8 of 8". Below this is a form with the following fields:

- Customer Name:
- Address 1:
- Address 2:
- Address 3:
- Phone:
- Fax:
- Contact:
- Email:
- Notes:

Customer Batteries Database Interface

View, Edit and Add Customer Batteries:

1. This is where a specific battery is defined as a model.
2. Must enter a serial number, customer name and model.
3. Bar Code is optional.



The screenshot shows a software window titled "View, Edit and Add Customer Batteries". The window contains a form with the following fields:

- Customer: [Dropdown menu]
- Battery Model: [Dropdown menu]
- Bar Code Num: [Dropdown menu]
- Serial Number: [Dropdown menu]
- Battery Serial Number: [Text input field]
- Customer Name: [Text input field]
- Battery Model: [Dropdown menu]
- Battery Bar Code Number: [Text input field]

At the top right of the form area, there are navigation controls including a back arrow, a forward arrow, the number "55", and the text "of 55".

Work Order Database Interface

View, Edit and Add Work Order:

1. Last step before testing. Name the work order and then associate it with the serial number of the battery to be tested.

View, Edit and Add Work Orders

Work Order Status: Open Customer Serial Number Work Order 45 of 45

Work Order Number: Battery Serial Number:

Date Received: 9/23/2016 Battery Model:

Aircraft Type: Battery Barcode Number:

Tail Number: Customer:

Test Requested: Deep Cycle

Date Completed: 9/23/2016

Status: Open

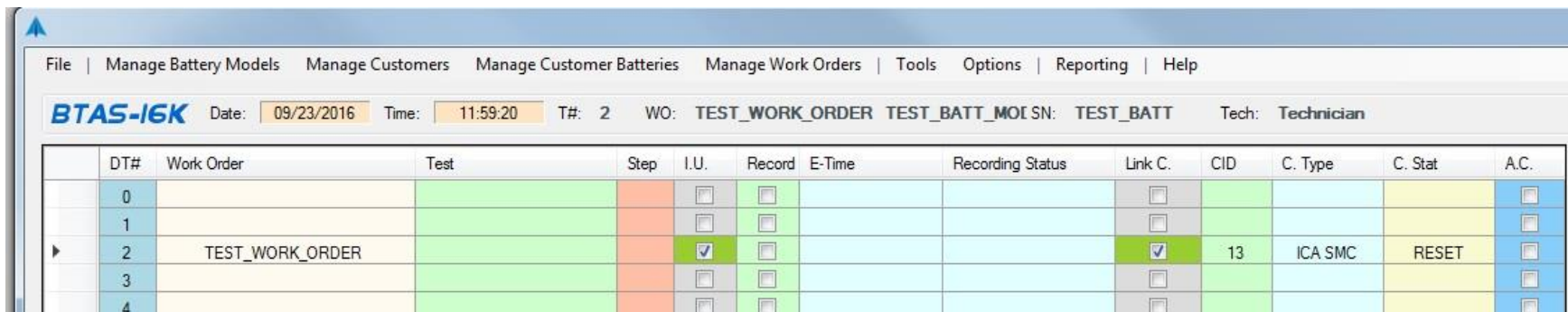
Notes:

Step Number	Test Name	Notes
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Delete Last Test

Add Work Orders to the Main Grid

1. After the Work Order is set up it can be added to the Main Grid.
2. Click on the row associated with the C-Scan you have connected to the battery under test under the Work Order Column.
3. Select the Work Order you just created and click OK.
4. Your work order will now be loaded into the main Grid.
5. Make sure the C-Scan is marked as In Use (I.U.) and also link the associated charger.



The screenshot shows the BTAS-16 software interface. The menu bar includes File, Manage Battery Models, Manage Customers, Manage Customer Batteries, Manage Work Orders, Tools, Options, Reporting, and Help. The status bar displays: BTAS-16K Date: 09/23/2016 Time: 11:59:20 T#: 2 WO: TEST_WORK_ORDER TEST_BATT_MODEL SN: TEST_BATT Tech: Technician. The main table has the following data:

DT#	Work Order	Test	Step	I.U.	Record	E-Time	Recording Status	Link C.	CID	C. Type	C. Stat	A.C.
0				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>				<input type="checkbox"/>
1				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>				<input type="checkbox"/>
2	TEST_WORK_ORDER			<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	13	ICA SMC	RESET	<input type="checkbox"/>
3				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>				<input type="checkbox"/>
4				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>				<input type="checkbox"/>

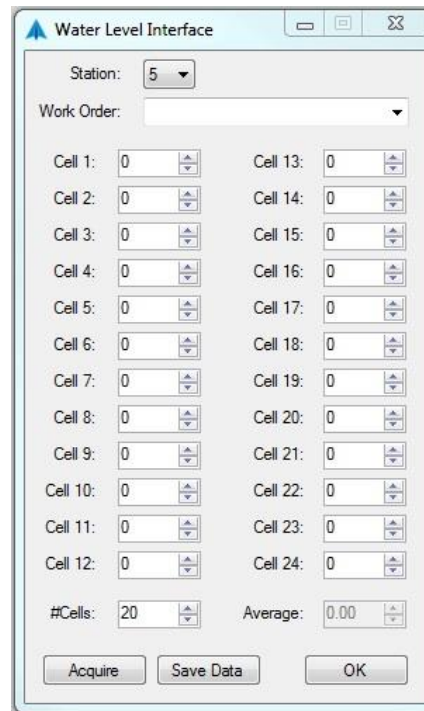
Run Test

1. With a work Order in the Grid you can now select the test you would like to run under the Test Column by clicking on the associated cell.
2. Once the test to be run has been selected, you can click on the Record column and select Start new test.
3. The new test will then start running if the linked charger is under computer control (ICA and CCAs).
4. If you are running a test with a shunt the program will wait until it sees a current to start running.
5. Notice in the example the Auto Configuration (A.C.) is selected. In this case the program will fully set up the charger for the selected test.

DT#	Work Order	Test	Step	I.U.	Record	E-Time	Recording Status	Link C.	CID	C. Type	C. Stat	A.C.
0				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>				<input type="checkbox"/>
1				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>				<input type="checkbox"/>
▶ 2	TEST_WORK_ORDER	Top Charge-1	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	00:00:02	Reading 1 of 61	<input checked="" type="checkbox"/>	13	ICA SMC	RESET	<input checked="" type="checkbox"/>
3				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>				<input type="checkbox"/>

Water Level Data

1. Water level data can also be managed through the program.
2. Can enter values manually.
3. Also works with *MasterFiller*, to allow automatic recording.
4. Water Level Interface is under Tools menu



The screenshot shows a software window titled "Water Level Interface". At the top, there are standard window controls (minimize, maximize, close). Below the title bar, the "Station:" dropdown menu is set to "5". The "Work Order:" field is empty. The main area contains 24 individual input fields, each labeled "Cell 1" through "Cell 24", arranged in two columns. Each field contains the number "0" and has a small up/down arrow icon. At the bottom of the input area, there are two summary fields: "#Cells:" set to "20" and "Average:" set to "0.00". At the very bottom, there are three buttons: "Acquire", "Save Data", and "OK".

View Reports

1. Reports are available under the Reporting menu.
2. Select from Test Reports, Work Order Reports or Battery Reports
3. Report can then be printed, saved as a PDF or as an Office document.

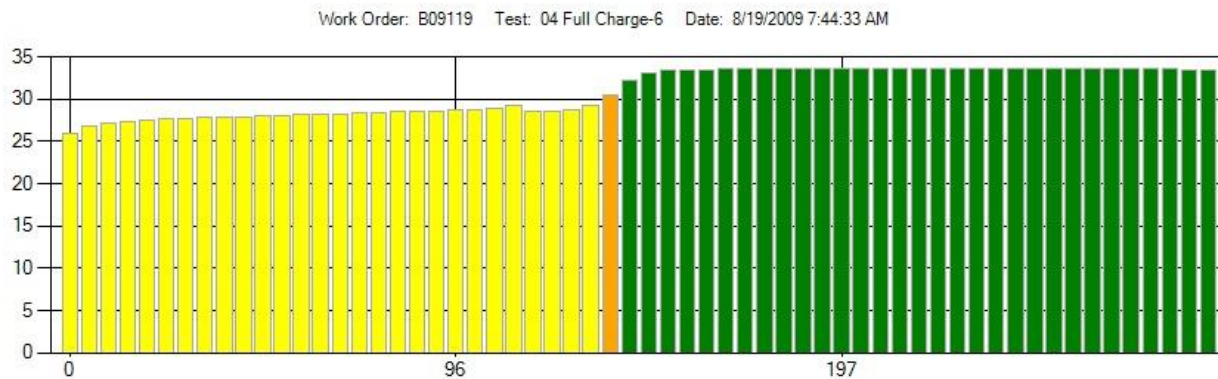
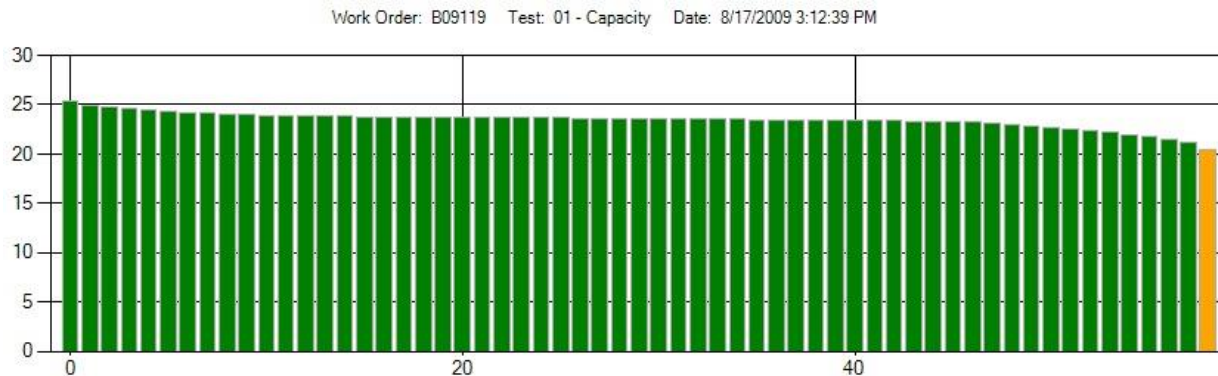
The screenshot shows a software window titled 'Test Reports'. At the top, there are three dropdown menus: 'Work Order' (TEST_WORK_ORDER), 'Test Step' (01 - Top Charge-1), and 'Report Type' (Work Order Summary). Below these are navigation icons and a 'Page Width' dropdown. The main content area features the 'JFM Engineering' logo and a 'C-Scan DATA Report' header. Key report details include: Terminal # 2, Work Order: TEST_WORK_ORDER, Shunt Cable: 1, Cells Order: Neg. to Pos., Model Number: TEST_BATT_MOD, C-Scan Date: 9/23/2016 12:01:48 PM, Cells Cable: 23, Charger: ICA SMC, Temp Cable: 1, Technician: Technician, and Serial Number: TEST_BATT.

01	Test Name	Date Started	Date Completed	Station	Charger	Technician	Notes																		
	Top Charge-1	9/23/2016 12:01:42 PM	9/23/2016 12:02:03 PM	2	ICA SMC	Technician																			
	E-Time	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24
	0:00	1.34	1.34	1.34	1.34	1.34	1.35	1.34	1.33	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.33	1.34	1.34	2.00	-0.05	0.00	0.00

Below the table is a section for 'Water Level Data (cc)' with columns for Cell1 through Cell24 and an 'A/E' column.

View Graphs

1. Graphs are also available under the Reporting menu.
2. Select graph to display using selection tools.



Additional Features

1. Updated Manual can always be found under the Help menu.
2. Additional features:
 1. Notification service: Link an email address or cell phone number to the program to receive remote updates.
 2. Custom tests: Program now supports custom tests with auto configuration parameters. Interface is located under Tools → Edit Custom Test Settings.
 3. Combination test: A series of tests can be executed in order. Setup combination tests under Tools → Setup Combination Test
 4. Batch Reporting: Save reports in bulk as PDFs to file.

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