MPM-100 and BDS-256 Monitors and Battery Monitor Data Manager Software with Report Generator

User's Guide

Alber

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and
Battery Monitor Data Manager
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This manual is for use with the following
versions of software and firmware:

BMDM Software Version 5.0 or later
MPM Firmware Version 1.23 or later
BDS Controller Firmware Version 2.21 or later
DCM Firmware Version 2.37 or later

Regulatory Information

Type of Service: The MPM Series and the BDS Series equipment is designed to be used on standard device telephone lines. It connects to the telephone line by means of a standard jack called the USOC RJ11C (or USOC FJ45S). Connection to telephone company provided coin service (central office implemented systems) is prohibited. Connection to party line service is subject to state tariffs.

Telephone Company Procedures: The goal of the telephone company is to provide you with the best service it can. To do this, it may occasionally be necessary for the company to make changes in its equipment, operations or procedures. If these changes might affect your service or the operation of your equipment, the telephone company will give you notice, in writing, to allow you to make any changes necessary to maintain uninterrupted service.

In certain circumstances, it may be necessary for the telephone company to request information from you concerning the equipment that you have connected to your telephone line. Upon request of the telephone company, provide the FCC registration number and the ringer equivalence number (REN); both of these items are listed on the equipment label. The sum of all the RENs on your telephone line should be less than five in order to assure proper service from the telephone company. In some cases, a sum of five may not be useable on a given line.

If Problems Arise: If any of your telephone equipment is not operating properly, you should immediately remove it from your telephone line, as it may cause harm to the telephone network. If the telephone company notes a problem, it may temporarily discontinue service. When practical, the company will notify you in advance of the disconnection. If advance notice is not feasible, you will be notified as soon as possible. When you are notified, you will be given the opportunity to correct the problem and informed of your right to file a complaint with the FCC. Contact your telephone company if you have any questions about your telephone line.

Safety Information

- Except as explained in this manual, do not attempt to service Albércorp equipment yourself. Opening the equipment may expose you to dangerous voltages. Refer servicing beyond that described in this manual to authorized personnel.

- Do not allow liquids or moisture to get into the equipment. If liquid does get into the equipment, unplug it immediately and contact your nearest authorized service center or Albércorp directly.

- Ensure equipment is provided adequate ventilation. Do not block equipment ventilation openings.

- Do not exceed equipment voltage or power ratings and capabilities.

- Make sure that equipment is properly grounded.

- Do not let unauthorized persons operate the equipment.

- Do not energize the cabinet or any component with 115VAC or battery voltage until after the installation is complete.

- Use of this product in a manner not specified could compromise the designed-in safety of this product.

WARNING: High voltage or current may be present in the equipment. Only qualified personnel should perform the operations described in this manual.

WARNING: High voltages exist inside the system components and on the equipment terminals. Calibration must be performed only by technically qualified persons. Observe electrical safety precautions when removing and installing equipment covers, and when connecting leads and making adjustments.

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Table of Figures

1. What's New

This section describes the new features in Version 5.0 of the Battery Monitor Data Manager (BMDM) program.

Polling - The following features have been added:

- You may use the Extract All Data button or right click a string on the String Status screen to extract historic float data, resistance data, and discharge data on demand for the entire system or per-string.

- The Call All Modem Strings button or right clicking a string on the String Status screen lets you call on demand all remote sites or a single modem connection for present status and alarm events.

- The program now polls all strings connected to the same modem with a single phone call. Previously, a call was required for each string.

- A Force All Strings to Direct Connection check box on the Communication Setup dialog box puts all connections to a direct connect port. This is especially useful when using a service or local computer on a temporary basis.

- You can assign a dial prefix to the modem ports on Communication Setup. This is typically the in-plant access code to obtain an outside telephone line. The prefix no longer is embedded in the database.

- The port number assignment on Communication Setup is now 16 for modem and direct connect.

- Polling Enable and Disable on the Setup|System|Link dialog box enables or disables polling on a per string basis. The avoids receiving error messages when a system is known to be off-line.

- Communication setup is now stored in the registry, not in the database configuration file.

- The communication and status areas on the lower portion of the String Status screen now have more information about names, connection status and errors.

- Two modems selected on Communication Setup can now be used simultaneously for polling and remote reporting. Previously, the program would hang up the polling modem before using the reporting modem.

Reports - The following features have been added:

- All Report Generator dialog boxes and reports are accessible from the String View screen by clicking View|Reports.

- All trend graphs may be printed. Previously, only certain graphs would print.

Alarms - The following features have been added:

- The Show All Alarm Events button on the String Status screen lets you view all alarms that occurred.

- Separate alarm event screens for paging, faxing, and printing provide detailed information about problems.

Database - The following features have been added:

- Using the Backup Database button or File|Backup on the String Status screen, you can back up the open database on demand.

Miscellaneous - The following features have been added:

- Graphs now have a cleaner look and are more readable.

- The String View screen has tabs that let you view voltage or resistance.

- Timelines on the discharge playback screens are now tied together for easier viewing of bar graphs and curves in a particular area.

- The Windows™ short date format is used for all displayed dates.

- Improved the table view of cells using Control key + cell selection during real time viewing of cells.

- Improved discharge playback setup.

2. System Requirements

The following are the minimum system requirements for Battery Monitor Data Manager program and monitor operation.

Microsoft Windows™ 95, 98, 2000, NT4.0 or XP.
Personal computer using a Pentium™ 400MHz or higher microprocessor.
One modem, or two modems or Ethernet connection for managing more than 100 monitors.
64M of memory.
20M of hard disk space for software installation. 1G of hard disk space for future data storage.
3.5" high-density (1.44MB) disk drive.
CD-ROM drive.
SVGA monitor.

A typical MPM system requires the following manuals:

MPM-100 and BDS-256 Monitors and Battery Monitor Data Manager Software with Report Generator User's Guide, 4200-004 (this book)
MPM-100 Series Installation Instructions, 4200-034
MPM-100 and BDS-256 Monitors Product Description Guide, 4200-039
UPS (uninterruptible power supply) manufacturer's instruction manual (if a UPS is used)

A typical BDS system requires the following manuals:

MPM-100 and BDS-256 Monitors and Battery Monitor Data Manager Software with Report Generator User's Guide, 4200-004 (this book)
BDS-256 Battery Diagnostic System with BDS Controller Installation Instructions, 4200-007 (non–UL version) or 4200-028 (UL version)
BDS-256 Commissioning Procedure and Acceptance Test for the DCM-480 System, 4200-009 (optional)
MPM-100 and BDS-256 Monitors Product Description Guide, 4200-039
UPS (uninterruptible power supply) manufacturer's instruction manual (if a UPS is used with the system)
BDS Quick Start Cards, 4200-026 (optional)

3. String Status Screen Buttons

This page describes buttons on the String Status screen, which appears when the Battery Monitor Data Manager (BMDM) program starts. Each button name or function is listed in the index for ready reference.

Open / Close /
Back Up Database
(File|*selection*)
Open or close a file
or back up a database

Set Up Communication
(Setup|Communication)
Define ports, modems,
network timeout. Force
direct connect. Disable
auto polling

Show All Alarm Events
Display the Report Alarm
Event dialog boxes

Set Up System
(Alternate is
Setup|System)

Historical Events
(View|Historical Events)
List reported events and the
history of one or all strings

Extract All Data
Get data from all
strings in the
system

Battery Monitor Data Manager for Central Computer : sample-nw setup for 2v.MDB

File   Setup   View   Sort   Help

Password Active   String Status

String ID	Customer Name	Battery Name	String Name	String Status	Monitor Status	Update Date/Time
1	ALBERCORP	BATTERY 8X40	STRING 1	Alarm Disabled	Active	04/09/2003 12:18:47 PM
2	ALBERCORP	BATTERY 8X40	STRING 2	Alarm Disabled	Active	04/09/2003 12:18:48 PM
3	ALBERCORP	BATTERY 8X40	STRING 3	Good	Active	04/09/2003 12:18:50 PM

Polling Site   Customer: ALBERCORP   Location: BOCA RATON LAB   Battery: BATTERY 8X40   String: STRING 6

Communication Status: Polling Alarm Events   Sort: Location Name   Modem Status:

Connection
Connect to
the selected
string

Summary
Displays status
for all strings and
monitors

Summary Report
Create a report for
the entire system

Call All Modem
Strings
Poll all strings
attached via modem

Hang Up
Disconnect
the modem

This portion of the screen displays communication
information, polling status, connection names, and
error status

4. Installing the Data Manager (BMDM) Software

The Battery Monitor Data Manager (BMDM or "Data Manager") program is distributed on one CD-ROM. To install the program, insert the CD into the computer and select Start|Run from the Windows screen. At the Run box, type **d:\setup** (or other appropriate drive letter) and follow the on-screen instructions.

4.1. Starting the Program

To start the Data Manager, double-click the Data Manager icon on the desktop. At start-up, the program asks if you want to load a sample database. Load the database only if you want to explore the Data Manager software; otherwise, do not load the database. The first time the program runs, a question about computer type appears.
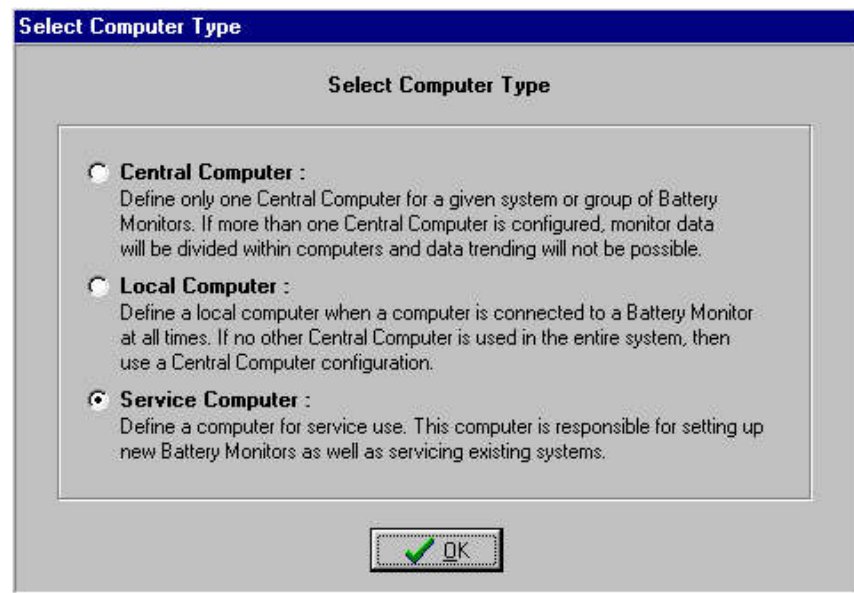
Figure 1. Select Computer Type

You need to select a computer type only once. Afterwards, each time the program starts, it configures for the type selected. Refer to *Understanding Computer Types* before answering. The following text appears on the Select Computer Type dialog box:

Central Computer - Define only one Central computer for a given system or group of battery monitors. If more than one Central computer is configured, monitor data will be divided within computers and data trending will not be possible.

Local Computer - Define a Local computer when a computer is connected to a battery monitor at all times. If no other Central computer is used in the entire system, then use a Central computer configuration.

Service Computer - Define a computer for Service use. This computer is responsible for setting up new battery monitors as well as servicing existing systems.

If an earlier database version exists on the computer, the program asks if you want to update it to the latest database version. Usually you would select Yes. After initial setup, the title bar at the screen top indicates whether the computer is configured for Central, Local or Service. To change the computer type, refer to the following *Changing Computer Type* section.
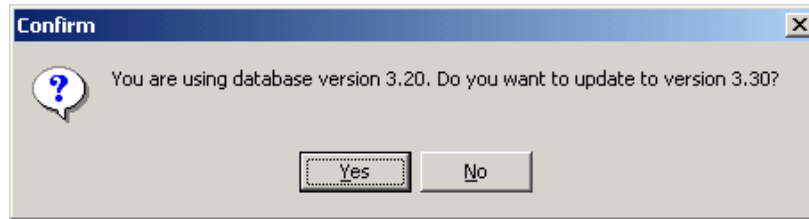
Figure 2. Update Database Version

4.2. Changing Computer Type

The Select Computer Type screen appears only the first time you install the program. You cannot change the computer type by re-installing the software. To change the type, you must edit the text file. Close all programs, including the BMDM program, and open a text editor, such as Microsoft Notepad or WordPad under Start|Programs|Accessories.

Open the text file **Config3.MPM** under Program Files\Alber\MPM Manager. Use the text editor to edit the number beneath the line labeled #2 Computer Type so that the digit indicates the computer type you want. Select 1 for Central, 2 for Local, or 3 for Service. For example, in the following figure, the 1 under line #2 indicates a Central computer.
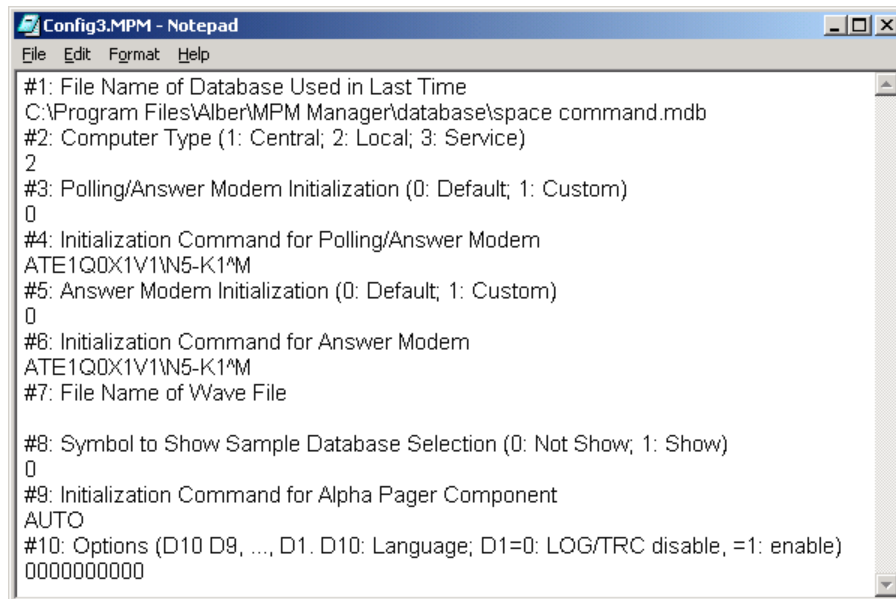
Figure 3. Config3.MPM File

Save the text file and close the text editor. Run the BMDM program and confirm the title bar indicates the correct computer type: Central, Local or Service. The Config3.MPM file shown above is for illustration and is not meant to be copied.

5. Understanding Computer Types

There are several ways to interface to the monitoring systems. When installing the BMDM program, select one of three computer types: Local, Central or Service. This section explains the types of computer connections.

5.1. Central Computer

For managing many sites, a central computer running Windows 95, 98, 2000 or NT4.0 is recommended. The computer can be a remote computer with at least one modem, or two modems for more than 100 monitors. A computer continuously running the Data Manager can automatically poll the monitoring systems, test for normal status, answer calls from alarming monitors, receive and store data in a central database, and report problems to key personnel. The String Status screen can help you quickly determine where problems are.

If you are using only one site per Central computer, you may connect the Central computer to a monitor via the RS-232 DB-9 rear port for continuous viewing of battery and monitor status. In this configuration, no other Central computers may exist for the same site.

You may temporarily use a portable computer as the Central computer. To manually extract data, connect the computer via modem or the RS-232 Local port. This type of Central computer is the least desirable because it cannot automatically poll units for status and automatically extract data or receive calls from alarming monitors.

Only use one Central computer per site. This is important because only a Central computer removes data permanently from monitor memory. If multiple Central computers were doing this, no one computer would have all the site data, and data trending analysis could not be performed.

Select Central Computer when you want to:
Connect a computer remotely via a telephone line to manage one or more monitors, or when you want to use an on-site (Local) computer with no remote Central computer.

A Central computer can do the following:
Set up alarm parameters and test intervals.
Collect data manually or automatically, which permanently removes the data from monitor memory.
Report string and monitor status automatically.
Upon an alarm occurrence, it can page personnel, fax a report, and sound an alarm.
Control more than 1000 monitors from a remote location (not on-site).
Assign location, battery, and string names when setting up a new system.
Calibrate a monitor via only an RS-232 connection, when the Central computer is on-site.
NOTE: You may set up an on-site, remote (off-site) or laptop (portable) computer as Central, but there must be only one Central computer per battery site.

NOTE: A serial multiplexer is required when using more than one monitor with an on-site computer. Refer to *Multiple Monitors on One Telephone Line* in the *Telco Serial Port Multiplexer (MPM* or *BDS)* section for remote applications or *Multiple Monitors on One Local Computer* in the *RS-232 Serial Port Multiplexer (MPM* or *BDS)* section for on-site applications.

5.2. Local Computer

When you want an on-site display of battery information at all times, a Local computer is recommended. You can use a Local computer in conjunction with a Central computer. A Local computer can perform most of the functions of a Central computer, except that only a Central computer can permanently remove data from monitor memory. Typically, this computer type is connected via the RS-232 port on the MPM or BDS rear panel.

MPM CAUTION: The MPM front panel Local Port switch enables the front RS-232 port or optional rear RS-232 port, fiber optic port or LAN port. The front port is for servicing purposes only. When the switch is lit, the front port is selected. Use the rear port for connecting to a permanent Local computer, Service computer, and on-site Central computer. Use the front port for using a computer for servicing; for example, if the MPM is not near the Local computer, you may need an on-site connection for calibration or troubleshooting.

BDS CAUTION: A BDS front panel switch can disable the rear RS-232 Local port or the fiber optic port. Select the Local position to use the front Local port. When the switch is lit, the front Local port is selected. Be sure to select the rear Local port after use to re-establish connection to the Local computer.

With a Local computer, the Data Manager can monitor a combination of up to 16 MPM or BDS monitors with the use of a Serial Port Multiplexer option. Refer to *Multiple Monitors on One Local Computer* in the *RS-232 Serial Port Multiplexer (MPM or BDS)* section. The BMDM software on a Local and Central computer is the same, except it is set up for Local rather than Central during initial setup to implement special data handling rules when connected to a monitor.

Select Local Computer when you want to:
Connect a computer to a monitor to continuously view monitor and battery status.

A Local computer can do the following:
Set up alarm parameters and test intervals.

Calibrate a monitor.

Collect data manually and automatically without permanently removing the data from monitor memory.

Report battery and monitor status automatically, and page personnel and fax a report upon an alarm occurrence.

Control no more than 16 monitors, unless a network is implemented.

NOTE: When no network is available, a serial multiplexer is required when using more than one monitor. Refer to *Multiple Monitors on One Local Computer* in the *RS-232 Serial Port Multiplexer (MPM or BDS)* section.

5.3. Service Computer

The Service computer can be a desktop or notebook computer temporarily connected to a monitor on-site to view battery information. The BMDM software on the Service computer is the same as that on a Central or Local computer, except it is set for Service during initial setup. A Service computer lets personnel call a site from a remote location and observe a situation without removing any data the Central computer might be waiting to extract.

Select Service Computer when you want to:
Connect a computer on-site or from a remote location to view battery data real time, or when you want to set up new monitors.

A Service computer can do the following:
Set up a new monitor, including alarm parameters and test intervals.
Calibrate a monitor.
Collect data manually without permanently removing the data from MPM memory.

5.4. Facility Monitor

You can connect the monitor to a facility monitor or any device that communicates using MODBUS ASCII protocol. Third-party vendors can access all information available to the Data Manager. Albércorp can supply the register map and application notes required for this implementation. A facility monitor can connect to a BDS or MPM system via RS-232 or network. Dry closure contacts are available for monitoring alarm status. Refer to *MPM MODBUS Application Notes* at www.alber.com for more details.

6. Understanding Polling and Extraction

This section explains the types of polling and extraction.

Polling - Polling is the process of having the BMDM program connect to the BDS or MPM and request present battery and monitor status. This can be done manually or automatically.

Manual Polling - To connect to a string, click the Connection button on the String Status screen.

Auto Polling - The computer automatically connects to one or more monitors, depending on user settings.

Auto Polling via Modem - Occurs a maximum of one time per day for each string.

Auto Polling Interval - This is selected on the System Setup|Link dialog box, and is available when connecting to a BDS or MPM via modem.

Auto Polling via RS-232 or LAN (Continuous Polling) - The computer continually polls each string in the database sequentially.

Disable Auto Polling / Auto Answering - Selected on the Communication Setup dialog box. To enable auto polling or auto answering, do not select the box.

Extraction of Data

Manual Extract - When connected to an MPM or BDS, data is transferred from the monitor memory to the database when the following are clicked: View Voltage, View Resistance, View Intercell, View Current Historical Alarms, View String Memo, and View Discharge. NOTE: If using a Central computer, the data is permanently removed from the monitor.

Auto Extraction - Selected in the Communication Setup dialog box. Select the box to enable. Data is automatically transferred from the monitor to the computer database during polling. NOTE: If using a Central computer, the data is permanently removed from the monitor.

Do not confuse status and data, with respect to polling:

Status - Status is a report of the normal and error conditions for the strings being monitored.

Data - Data is the alarms, discharges, and resistance and voltage values acquired through testing.

Auto Polling via Modem with a Central Computer - Polling is available for a Central computer no more than one time a day and starts at 12AM (midnight). This 12AM time is not adjustable. When Modem is selected on Setup|System|Link, the Polling Interval (Days) field becomes active. If you set the interval (days) to 0, polling is disabled. Auto polling via modem with a Local computer is not available, because this type cannot be connected via modem. Continuous polling is not available using a Central computer connected via modem. See *Continuous Polling* below.

Extracting Data with a Central Computer via Modem - A Central computer connected via modem can extract data. Select Auto Extract Data on the Setup|Communication dialog box. The Central computer polls the monitor status at midnight, copies monitor data to the Central computer database, and deletes the data from the monitor. Status is never deleted using Extract.

Continuous Polling - A Central, Local or Service computer connected to the monitor via RS-232 or network can be set for Continuous Polling. On Setup|Communication, clear the Disable Continuous Polling check box. Although a Service computer may be used, it is not recommended for continuous polling.

<u>Extracting Data with a Central or Local Computer via RS-232 or Network</u> - A Central or Local computer connected via RS-232 or network can extract data. A Service computer cannot extract data. Select Auto Extract Data on Setup|Communication. The Local computer polls the monitor status at 10PM, copies monitor data to the Local computer database, but does not delete the data from the monitor. The Central computer polls the monitor status at 12:00AM (midnight), copies monitor data to the Central computer database, and deletes the data from the monitor.

The following table summarizes polling and extraction for Central, Local, and Service computer types.

Computer Type	Connected Via	Auto Polling	Auto Extraction
Central	Modem	Begins at 12:00AM	Copy status; copy then delete data. Occurs when auto polled.
Central	RS-232	Continuous	Copy status; copy then delete data. Occurs during first auto poll after 12AM.
Central	LAN	Continuous	Copy status; copy then delete data. Occurs during first auto poll after 12AM.
Local	Modem	N/A	N/A
Local	RS-232	Continuous	Copy status; copy data. Occurs during first auto poll after 10PM.
Local	LAN	Continuous	Copy status; copy data. Occurs during first auto poll after 10PM.
Service N/R	Modem	N/A (Manual Only)	N/A
Service N/R	RS-232	Continuous	N/A
Service N/R	LAN	Continuous	N/A

Figure 4. Computer Types: Polling and Extraction Table

Pause Auto Polling - At the main menu on the String Status screen, you may select Setup|Pause Auto Polling to temporarily suspend continuous polling. This function is convenient if you are attempting to highlight and select other strings in the list. Selecting Pause Auto Polling does not change settings on the Communication Setup or Link dialog boxes.

7. Understanding System Installation Requirements

This section describes how to set up the BMDM program and put the MPM or BDS monitor into operation. To install the MPM or BDS, refer to the appropriate *Installation Instructions* manual, then read this section before placing the system into service.

The monitor is fully calibrated and requires only final parameter settings relevant to the installation. Albércorp recommends that you initially configure all monitor settings on-site through the front or rear panel RS-232 Local port during installation. You may change programmed settings via modem at a later time.

New monitors have the location, battery, and string names blank and the auto call-out and alarms disabled. This prevents nuisance alarms and unintentional communication during setup. The location, battery, and string names must be unique for each system and must be known to the user to allow system setup at a Central computer. These names must correspond between the monitor and the calling computer for a connection to occur.

NOTE: The MPM monitor temporarily loses communication with a locally-connected computer during modem handshaking when a monitor calls out. After connection is established, normal operation resumes.

7.1. Connecting Using a Local Computer

The following list describes how to set up an MPM or BDS monitor for use with a Local computer when a Central computer is being used off-site.

To set up the system . . .	If you need more help, refer to
1. Install the Data Manager as a Local computer.	Installing the Data Manager (BMDM) Software.
2. Set communication parameters for a direct connect.	Communication Port Settings.
3. Set up for a new system.	Setting Up a New MPM or BDS System.
4. Direct connect the monitor to the computer.	Local Port Connection for MPM or BDS.
5. Establish communication between the monitor and the computer.	Connecting via the RS-232 Local Port.
6. Perform battery setup and set alarm thresholds, test intervals, and options.	Programming Battery Setup for the MPM or BDS.
7. Synchronize the monitor to the Central computer.	Synchronizing Using the Check Settings.

The Local computer and monitor are now ready to operate.

7.2. Connecting Using a Central Computer

The following list describes how to set up an MPM or BDS monitor for use with a Central computer. NOTE: You may set up an on-site or laptop (portable) computer as a Central computer, but there must be only one Central computer per battery site.

- If the Central computer is an on-site computer:

To set up the system . . .	If you need more help, refer to
1. Install the Data Manager as a Central computer.	Installing the Data Manager (BMDM) Software.
2. Set communication parameters.	Communication Port Settings.
3. Set up for a new system.	Setting Up a New MPM or BDS System.
4. Direct connect the monitor to the computer.	Local Port Connection for MPM or BDS.
5. Establish communication between the monitor and the computer.	Connecting via the RS-232 Local Port.
6. Synchronize the monitor to the computer. (MPM only)	Synchronizing Using the Check Settings.
7. Perform battery setup, and set alarm thresholds, test intervals, and options.	Programming Battery Setup for the MPM or BDS.
8. Synchronize the monitor to the computer. (BDS only)	Synchronizing Using the Check Settings.

The Central computer and monitor are now ready to operate.

- If the Central computer is a remote (off-site) computer:

To set up the system . . .	If you need more help, refer to
1. Set up the monitor.	Service Computer or Local Computer.
2. Install the Data Manager as a Central computer.	Installing the Data Manager (BMDM) Software.
3. Set communication parameters.	Communication Port Settings.
4. Connect the computer modem to the telephone line.	
5. Set up for a new system.	Setting Up a New MPM or BDS System.
6. Establish communication between the monitor and computer.	Connecting via a Modem.
7. Synchronize the monitor to the computer.	Synchronizing Using the Check Settings.

The Central computer and monitor are now ready to operate.

7.3. Connecting Using a Service Computer

The following list describes how to set up a computer as a Service computer.

- If the Service computer is a direct connection (on-site) computer for setting up a new MPM or BDS monitor:
  (NOTE: This option is used only if a Local computer is not available.)

To set up the system . . .	If you need more help, refer to
1. Install the Data Manager as a Service computer on a laptop (portable) computer.	Installing the Data Manager (BMDM) Software.
2. Set communication parameters.	Communication Port Settings.
3. Set up for a new system.	Setting Up a New MPM or BDS System.
4. Direct connect the monitor to the computer.	Local Port Connection for MPM or BDS.
5. Establish communication between the monitor and computer.	Connecting via the RS-232 Local Port.
6. Perform battery setup, and set alarm thresholds, test intervals, and options.	Programming Battery Setup for the MPM or BDS.
7. Synchronize the monitor to the computer.	Synchronizing Using the Check Settings.

The Service computer and monitor are now ready to operate.

- If the Service computer is a direct connection (on-site) computer for viewing battery data, and a copy of the Central computer database is available:

To set up the system . . .	If you need more help, refer to
1. Install the Data Manager as a Service computer on a laptop (portable) computer.	Installing the Data Manager (BMDM) Software.
2. Copy the database from the Central computer to the Service computer.	Data Manager Database for file names.
3. Set communication parameters.	Communication Port Settings.
4. Direct connect the monitor to the computer.	Local Port Connection for MPM or BDS.
5. Establish communication via the site selected from the String Status.	Connecting via the RS-232 Local Port.

To view battery data, refer to *Viewing Battery and Monitor Status*.

- If the Service computer is a remote connection (off-site) computer for viewing battery data via telephone line, and a copy of the Central computer database is available:

To set up the system . . .	If you need more help, refer to
1. Install the Data Manager as a Service computer.	Installing the Data Manager (BMDM) Software.
2. Copy the database from the Central computer to the Service computer.	Data Manager Database for file names.
3. Set communication parameters.	Communication Port Settings.
4. Connect the computer modem to the telephone line.	
5. Establish communication via the site selected from the String Status.	Connecting via a Modem.

To view battery data, refer to *Viewing Battery and Monitor Status*.

- If the Service computer is a remote connection (off-site) computer for viewing battery data via telephone line, and a copy of the central database is not available:

To set up the system . . .	If you need more help, refer to
1. Install the Data Manager as a Service computer.	Installing the Data Manager (BMDM) Software.
3. Set communication parameters.	Communication Port Settings.
2. Connect the computer modem to the telephone line.	
4. Set the telephone number and the MUX ID number if required. (MPM only)	Setting Up a New MPM or BDS System.
5. Set the telephone number, the MUX ID number if required, the string number and the configuration to the BDS-256. (BDS only)	Setting Up a New MPM or BDS System.
6. Establish communication via the Service location.	Connecting via a Modem
7. Synchronize the monitor to the computer.	Synchronizing Using the Check Settings

To view battery data, refer to *Viewing Battery and Monitor Status*.

8. Understanding How Data is Stored

This section describes how the Battery Monitor Data Manager (BMDM or "Data Manager") processes data and how the MPM or BDS stores the data.

8.1. Data Manager Database

At installation, the BMDM creates an empty default database file **mpm-db3.mdb** under C:\Program Files\Alber\MPM Manager\Database. At any time, you may use File|Save As to save this file as a different name, or you may use File|New to create an empty database.

Data transferred from the MPM or BDS monitor is stored in a Microsoft Access™ compatible database file. Because the file may contain unrecoverable string and trend data, regularly back up the file to another computer or storage medium to prevent data loss in case of computer failure.

A backup of the working database is compressed as a WinZip® compatible file at midnight each day. The number 1 is appended to the file name and the extension becomes **.zip**. New backups are made for three days, each appended with 1, 2 or 3. On the fourth day, the oldest backup is overwritten. On the first day of the month, another backup is created, with a 0 appended to the file name. On subsequent first days of each month, this file is overwritten. To open a backup file, select File|Open Backup on the main menu. Refer to *Opening and Saving a Database and Backup*.

8.2. Data Storage in the MPM

Data in the MPM is stored in nonvolatile E^2 memory, which can retain data with power removed. All collected data is stored in this device until transferred to the Central or Local computer. Enough memory is available to hold a year's worth of typical data. This same memory stores setup and calibration information, which is backed up to the Central or Local computer during initial setup; this process is called synchronizing.

Flash nonvolatile memory stores uploads of new MPM firmware. You can upgrade the firmware in the field or via modem. Upgrades include a procedure for firmware installation.

The MPM stores these kinds of data:

Alarms - 100 records that show when a parameter went into alarm, came out of alarm, and the maximum alarm level. Older records in memory are overwritten with more recent events. (Older records uploaded to a computer are not overwritten.)

Discharge - 20.5kb of nonvolatile memory are allocated for discharge data. Because of memory size, stored data may consist of many short discharges or a few full discharges at maximum configuration of 60 cells.

Each data point requires ten bytes of memory. If the discharge storage threshold is 10mv, and a typical discharge for 24 cells was to discharge 1.875 volts per cell, and the cell voltage was to drop to 1.96 volts with load applied, you could calculate the memory required as:

20,500 bytes / ((((1.96-1.875) / 0.010 volts) x 10 bytes) x 24 cells) = 10 discharges

This is worst case and assumes all cells discharge to 1.875 volts. Increasing the discharge storage threshold can raise the number of discharges the monitor can store. Time stamped data allows a full analysis of battery performance during the event.

Resistance - 1.6kb of nonvolatile memory are allocated for resistance data. Again, memory limits the number of resistance tests stored. To calculate the number of resistance records available, use the formula:

1600 bytes / ((Number of cells x 2) + 10)

For a string of 24 cells, there is enough memory for 27 records.

Historical Data - With 1.65kb of nonvolatile memory available, historical readings of cell voltage, temperature, overall voltage, and current are taken at intervals set under Battery Setup. To calculate the number of historical records available, use the formula:

1650 bytes / ((Number of cells x 2) + 18)

For a string of 24 cells, there is enough memory for 25 records.

8.3. Data Storage in the BDS

Data in the BDS is stored in nonvolatile SRAM memory, which can retain data with power removed. All collected data is stored in this device until transferred to the Central or Local computer. Enough memory is available to hold a year's worth of typical data or six month's worth for large string configurations. This same memory stores setup and calibration information, which is backed up to the Central or Local computer during initial setup; this process is called synchronizing.

Flash nonvolatile memory stores uploads of new BDS firmware. You can upgrade the firmware in the field or via modem. Upgrades include a procedure for firmware installation.

The BDS stores these kinds of data:

Alarms - 100 records that show when a parameter went into alarm, came out of alarm, and the maximum alarm level. Older records in memory are overwritten with more recent events. (Older records uploaded to a computer are not overwritten.)

Discharge - 160kb of nonvolatile memory are allocated for discharge data. Memory size and the number of cells monitored limit the data stored, which may consist of many short or a few full discharges.

Each data point requires ten bytes of memory. The discharge storage threshold is 10mv. If a typical discharge for 192 cells was to discharge 1.65 volts per cell, and the cell voltage was to drop to 1.96 volts when load was applied, you could calculate the memory required as:

160,000 bytes / ((((1.96-1.65) / 0.010 volts) x 10 bytes) x 192 cells) = 2.7 discharges

This is worst case and assumes all cells will reach end voltage. Time stamped data allows a full analysis of battery performance during the event.

Resistance - 10.6kb of nonvolatile memory are allocated for resistance data. The number of cells monitored affects the number of resistance tests stored. To calculate the number of resistance records available, use the formula:

10,600 bytes / ((Number of cells x 4) + 30)

For a string of 192 cells, there is enough memory for 12 records.

Historical Data - With 32kb of nonvolatile memory available, historical readings of cell voltage, temperature, overall voltage, and current are taken at intervals set under Battery Setup. To calculate the number of historical records available, use the formula:

32,000 bytes / ((Number of cells x 2) + 38)

For a string of 192 cells, there is enough memory for 75 records.

9. Selecting Preferences

At any time, you may select the Setup|Preferences dialog box on the String Status screen to change program appearance or activate options.
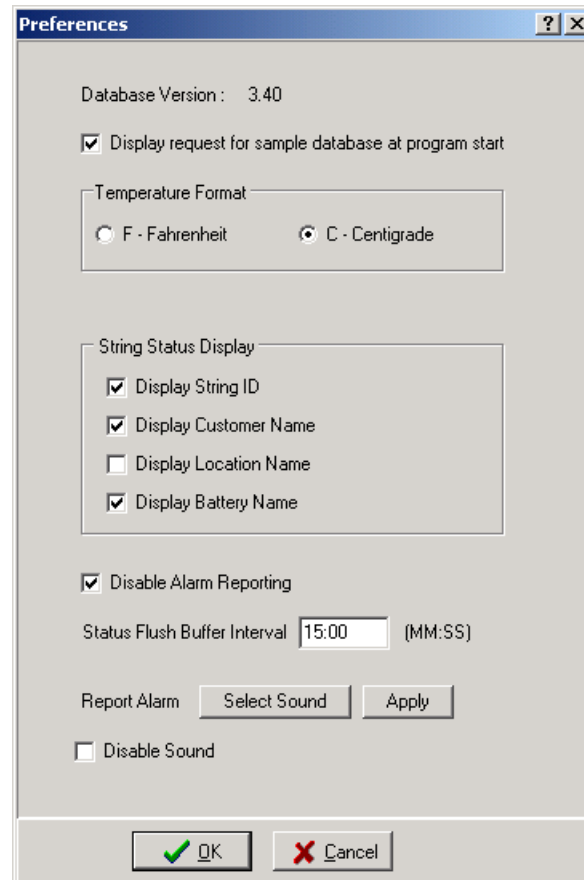

Figure 5. Preferences

The following items appear on the Preferences dialog box.

Database Version - This is the version of the database accessed by the program. Do not confuse the database version with the Data Manager program version under Help|About, or the firmware version under Diagnostics|Self Test.

Sample Database - When the Data Manager starts, the message appears, "Do you want to load a sample database?" If this message was disabled, you can display it again by selecting this box.

Temperature Format - Select a temperature format. The program automatically calculates between F (Fahrenheit) and C (Centigrade or Celsius). For example, if you select Centigrade (C) after taking Fahrenheit (F) readings, temperature readings convert from Fahrenheit to Centigrade. To minimize rounding errors, do not change temperature format, if possible, after taking readings.

CAUTION: Switching back and forth between Fahrenheit (F) and Centigrade (C) may cause rounding errors in the temperature readings.

String Status Display area - You can display or hide these four items:

Display String ID, **Display Customer Name**, **Display Location Name**, and **Display Battery Name** - Select these boxes to display the columns on the String Status screen.

Disable Alarm Reporting - Select this box to globally disable all alarm report functions. This selection overrides alarm settings on the Setup|System|Reporting dialog boxes, which apply to specific strings.

Status Flush Buffer Interval - Select an interval in minutes and seconds to have the polling status saved to the database. The default interval is 15 minutes.

Report Alarm - To select an alarm sound, click **Select Sound** and choose a sound from the list. Click Open then click **Apply** to hear the sound.

Disable Sound - Select this box to globally disable alarm sounds. To enable alarm sounds when an alarm event occurs, do not select this check box. You must also select the Sound Alarm check box on Setup|System|Reporting dialog boxes, which apply to specific strings. Refer to *Setting Up a New MPM or BDS System*.

10. Communication Port Settings

Setup Communication

From the String Status screen, select Setup|Communication or click the Setup Communication button to define communication settings.
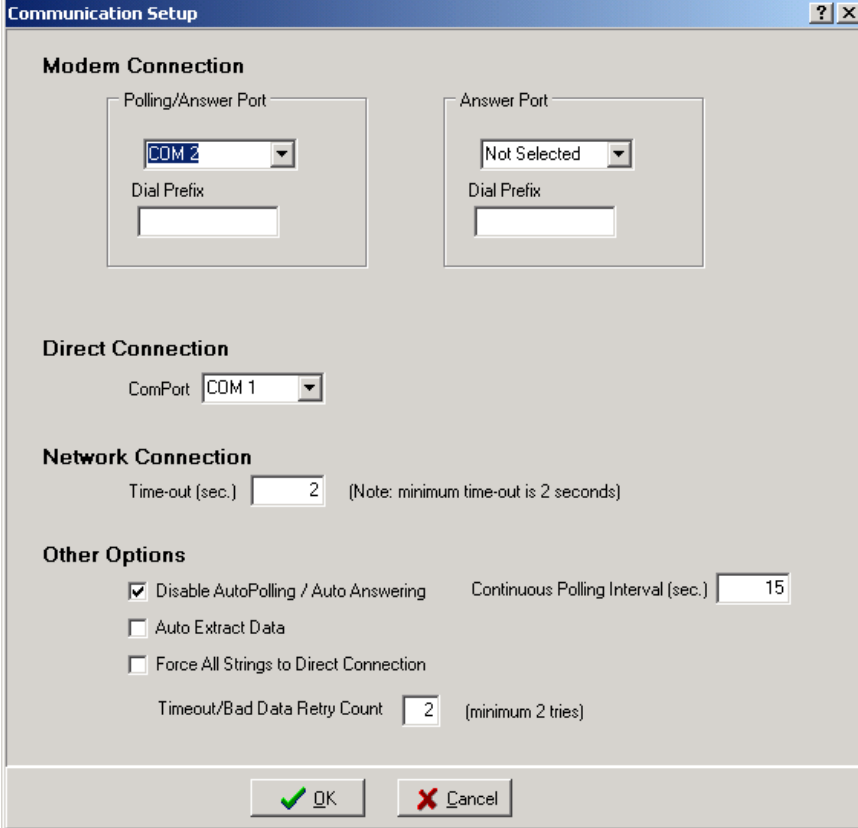

Figure 6. Communication Setup

Polling/Answer Port and **Answer Port** - You may define one or two modem COM ports for monitor communication. If you define two COM ports, one port calls and polls the monitors, and the other answers calls from the monitors. Define two ports using the drop-down lists under Polling/Answer Port and Answer Port. If you define only one port, it both polls and answers the monitors. Define one port from the Polling/Answer Port list and choose Not Selected under Answer Port. On larger systems, the use of two modems is recommended: Two modems can operate simultaneously for polling and remote reporting.

Dial Prefix - This is your company's internal telephone system numbers that you dial to get an outside line. Usually, this is a 9. Follow the number with at least two commas to introduce a time delay. Leave this field blank if the computer is directly connected to an outside line.

Direct Connection - Com Port - If you selected the Direct button under System Setup|Link, use this area to define the COM port being used.

Network Connection - Time Out - This setting determines the time allowed to attempt connecting to the network. The time is typically set to 2 seconds.

Disable Auto Polling / Auto Answering - For a computer connected to the monitor via RS-232 or the network, if you do not select this box, continuous polling is enabled. With continuous polling, the software polls the monitor string status at the time interval set in the Continuous Polling Interval box. Refer to *Understanding Polling and Extraction*.

Continuous Polling Interval (sec) - If Disable Auto Polling / Auto Answering is not selected, set the time interval in seconds that polling occurs. The software continually polls the monitor string status at the interval set in this box. The time is usually set to 15 seconds. Refer to *Understanding Polling and Extraction* for definitions of status and data.

Auto Extract Data - Automatic data extraction removes (Central computer) or copies (Local computer) data from monitor memory when polling each monitor. Normally, select Auto Extract Data for a Central computer; otherwise, you will have to manually call each site and extract data. Refer to *Understanding Polling and Extraction*.

Force All Strings to Direct Connection - Use with a Local or Service computer using a database that has modem or network connections. Select this box to connect to an MPM or BDS using the RS-232 direct connect port. This feature saves you from having to modify the Link connections in the database and is useful when using a Local or Service computer on a temporary basis.

Timeout / Bad Data Retry Count - This is the number of times the program attempts to poll data from a monitor if the previous attempt is unsuccessful.

11. Setting Up a New MPM or BDS System

BMDM setup involves defining what systems exist. Each system must have a setup that identifies customer, location, contact names, battery and string information, and other data.

Password - System Setup boxes are password protected. When you select Setup|System from the String Status screen, the Password box appears. Type the System Setup password and click OK. The default password is: alber (not case sensitive). This password times out after five minutes, or you may click the red Password Active text on the top left to disable the password. If the password is incorrect, the System Setup dialog boxes appear, but the New, Save and Delete buttons are inactive. NOTE: You can have different System Setup and Battery Setup passwords.

Setup System

First Time Setup The String Status screen appears at program start-up. The first time this screen is displayed, no status information exists. As you add new systems, they are listed with the status Unknown. To set up a new system, select Setup|System or click Setup System, click the New button, and complete the System Setup dialog boxes.

The New Button and Adding a New Customer Systems previously set up are listed on String Status. When you click Setup|System, the name highlighted in the list appears in the System Setup - Customer dialog box. Click New to add a new system (new customer).

CAUTION: If you fail to click the New button, you will overwrite the existing customer information in the file.

The New button is also on the Location, Battery, and String dialog boxes. Click New to add a new location under an existing customer, a new battery under an existing location, or a new string under an existing battery.

Changing Names and Information To change the customer name or information for a previously set up system, use the dialog box under Setup|System|Customer. You must not, however, change the location, battery or string name using Setup|System. To change these names after setting up the monitor, use Setup|Battery|General after connecting to the site with a Central or Local computer. This ensures the names in the database match the names in the monitor; if these names do not match, connection fails and an error message appears.

NOTE: Do not change the location, battery or string names using Setup|System. You must use Setup|Battery|General if the system has been set up. (See above.)

You may change certain text on the location, battery or string dialog boxes under Setup|System. For example, you may change the cell manufacturer's or contact person's name. If you make changes under Setup|System|(Location or Battery or String), be careful not to change any configuration information.

During system setup, if you close a dialog box before completing and saving the Customer, Location, Battery and String boxes, the Customer, Location, Battery and String names will not appear on the String Status screen. To resume editing, click Setup|System, select the Customer, Location, Battery or String tab, and select the required name from the drop-down list next to the Name box.

To display the String ID, Customer Name, Location Name and Battery Name columns on the String Status screen, select the boxes on Setup|Preferences.

The Delete Button Depending on which System Setup dialog box is visible when you click the Delete button, clicking Delete removes all information for the displayed customer, location, battery or string. All associated set up data will be permanently lost.

NOTE: All System Setup dialog boxes except System Setup|String are identical for both the MPM and BDS.

11.1. System Setup: Customer

The following items appear on the Setup|System|Customer dialog box. (* asterisk on item description indicates required field.)
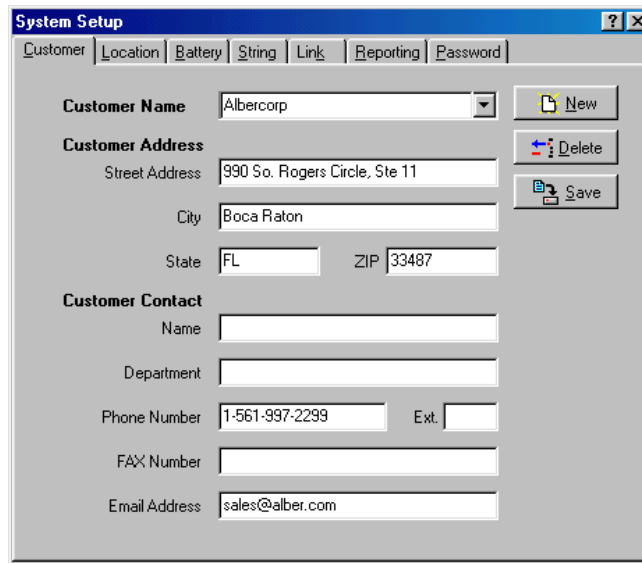
Figure 7. System Setup - Customer

Customer Name* - To add new customer information, select Setup|System|Customer, click New, and type the customer name. This may be different from the location name, which describes where the system is located and is entered under Setup|System|Location. If monitoring only one customer, you may use this area to identify a division, etc. At Address, type address details.

NOTE: You cannot have two identical customer names. Selecting different customers changes the available locations on the Location dialog box.

Customer Contact - Type the name and contact information of the person at the customer location who is responsible for the battery system. This name may be used for reports automatically faxed using Setup|System|Reporting.

When finished, click Save to save to the database or click the Location tab to continue setup.

CAUTION: Clicking the Delete button deletes all information for the displayed customer. All locations, batteries, and strings set up for the customer will be permanently lost.

11.2. System Setup: Location

The following items appear on the Setup|System|Location dialog box. (* indicates required field.)

Figure 8. System Setup - Location

Before configuring a location, confirm the correct customer is selected on the Customer dialog box.

Location Name* - Type the location name and address where the monitor is installed. Location, battery, and string names are used with each other to identify the strings and hardware to which the monitor is connected.

NOTE: To change the location name after monitor setup, use Setup|Battery|General after connecting to the site with a Central or Local computer. This ensures names in the database match names in the monitor; if these names do not match, connection fails and an error message appears. Blank spaces or hyphens can affect a name.

NOTE: You cannot have two identical location names under the same customer name. Selecting different locations changes the available batteries on the Battery dialog box.

Location Contact - Type the name and contact information of the person at the monitor location who is responsible for the battery system. This name may be used for reports automatically faxed using Setup|System|Reporting.

When finished, click Save or click the next (Battery) tab.

WARNING: Clicking the Delete button deletes all information for the displayed location. All batteries and strings set up for the location will be permanently lost.

11.3. System Setup: Battery

The following items appear on the Setup|System|Battery dialog box. (* indicates required field.)

Figure 9. System Setup - Battery

Before configuring a battery, confirm the correct customer and location are selected on the Customer and Location dialog boxes.

Select Setup|System|Battery to assign a battery name, cell and string parameters, and how results appear on the String View screen.

Battery Name* - Assign a unique name to the battery. Location, battery, and string names are used with each other to identify the strings and hardware to which the monitor is connected.

NOTE: To change the battery name after monitor setup, use Setup|Battery|General after connecting to the site with a Central or Local computer. This ensures names in the database match names in the monitor; if these names do not match, an error message appears. Blank spaces or hyphens can affect a name.

NOTE: You cannot have two identical battery names under the same location name. Selecting different batteries changes the available strings on the String dialog box.

Battery Capacity - Type the combined capacity of all parallel strings in the battery (in amp-hours). This is the Amp-hour rating of the battery specified at the eight hour rate.

Installation Date - Type the battery installation date.

NOTE: If this box does not accept the date format you type, change the format in Windows as follows:

1. Click Start|Settings|Control Panel, then click Regional Settings.
2. Click the Date tab, then select the date format from the Short Date Style drop-down menu.
3. Click OK and exit the Regional Settings dialog box.

Number of Strings* - Type the number of parallel strings within the battery.

Cells per String* - Type the number of cells or modules per string.

Start # of Cells Area - Select how the cells are numbered on the String View screen and in printed reports. Refer to the following two items.

Always Start From 1 - Click this button to number each group (string) of cells starting with 1 when displayed. Subsequent groups of cells displayed after the first group will also be numbered starting with 1. For example, four groups may be numbered 1 to 24, 1 to 24, 1 to 24, and 1 to 24.

Sequenced - Click this button to number each group of cells in a continuous sequence when displayed. The first group of cells displayed will be numbered starting with 1. The starting number of the subsequent group will be one more than the final number in the preceding group. For example, four groups may be numbered 1 to 24, 25 to 48, 49 to 72, and 73 to 96.

Multiple Strings Connected in Series - Select this check box when connecting more than one monitor across cells in the same string. For example, if using two monitors across a 1 x 120 configuration, connect the first monitor across cells 1 to 60 and the second across cells 61 to 120. In the Number of Strings box, type 1, and in the Cells per String box, type 60.

Cell # Label Start From - This allows the reverse numbering of cells. Select Most Negative Cell when the cells are numbered such that Cell 1 is the most negative.

When finished, click Save or click the next (String) tab.

CAUTION: Clicking the Delete button deletes all information for the displayed battery name. All strings set up for the battery will be permanently lost.

11.4. System Setup: String

The following items appear on the Setup|System|String dialog box. (* indicates required field.) NOTE: The Start Cell # box for MPM changes to String # when BDS-256 is selected. See description below.

Figure 10. System Setup - String (MPM shown)

Before configuring a string, confirm the correct customer, location, and battery are selected on the Customer, Location, and Battery dialog boxes.

Select Setup|System|String to assign a string name, configuration, model and manufacturer names, capacity, and MPM string names.

String Name* - Type a name for each MPM or names for each string if using a BDS. Location, battery, and string names are used with each other to identify the strings and hardware to which the monitor is connected.

NOTE: To change the string name after monitor setup, use Setup|Battery|General after connecting to the site with a Central or Local computer. This ensures names in the database match names in the monitor; if these names do not match, an error message appears. Blank spaces or hyphens can affect a name.

NOTE: You cannot have two identical string names under the same battery name. Selecting different strings changes the selections on the Link and Reporting dialog boxes.

Monitor Configuration* - Select a configuration from the drop-down list. For the MPM, determine hardware configuration by referencing the model number using the chart in the *MPM Configuration Options* section.

 Start Cell # (MPM only)* - Type the first cell number for the first string in the battery being monitored by the MPM.

String # (BDS only)* - Up to 16 DCM units can be assigned the same string number, and the BDS can control up to eight strings. Type the string number of the DCM units to which the information being entered applies.

Cell Model and **Cell Manufacturer** - Type the cell model number and manufacturer.

String Capacity - Type the capacity of the individual string (in amp-hours).

String Name of MPM (MPM only) - Assign individual string names within the MPM. The fields available depend upon the monitor configuration selected. If the MPM configuration has two or more strings, such as a 2 x 24, you may type names for each string. These names appear in reports wherever string names are used. The default names are String 1, 2, 3 and 4. This area is disabled when BDS is selected.

When finished, click Save or click the next (Link) tab.

WARNING: Clicking the Delete button deletes all information for the displayed string name. The string name and string data will be permanently lost.

11.5. System Setup: Link

The following items appear on the Setup|System|Link dialog box. (* indicates required field.)

Figure 11. System Setup - Link

Before configuring link fields, confirm the correct customer, location, battery and string are selected on the Customer, Location, Battery, and String dialog boxes.

Select Setup|System|Link to select the polling interval and how the computer connects to the monitor.

Direct* - Click this button when the monitor is directly connected to a computer serial port. On the Setup|Communication dialog box, define the COM Port in the Direct Connection area.

Modem* - Click this button when the monitor is connected to the computer via modem. In the **Phone Number** box, type the telephone number of the monitor that the Central computer calls (the number to which the monitor is connected). On Setup|Communication, define the COM Port in the Modem Connection area.

Network* - Click this button when the monitor is connected to the computer via network.

IP Address - (*Required if Network above is selected.) - Type the IP address of the monitor. NOTE: The IP Address is specific to the monitor (MPM or BDS Controller); it is not the IP address of the computer running the BMDM program.

Network Port* - In this box, type 502. The TCP/IP address is used when you click Send Network Configuration on the Setup|Battery|General dialog box.

Netmask - Type the monitor subnetmask number.

Gateway - Type the default gateway number used by the monitor.

NOTE: To transfer the IP, netmask, and gateway addresses to the MPM or BDS, click the Send Network Configuration button on Setup|Battery|General. This button is active and the addresses can only be transferred when connected via RS-232 or modem, not via network.

Polling - Enable or Disable - These buttons allow or stop polling on a per string basis. This avoids receiving error messages when a system is known to be off-line. Polling is the process of having a Central computer call via modem and request present battery and monitor status. Polling is enabled only if you also select Modem on the Link box. Select Enable to request monitor and battery status every 24 hours. Polling starts at 12:00 A.M. (midnight). During polling, if Auto Extract Data is selected on Communication Setup, data is copied to the Central computer database and deleted from monitor memory. Refer to *Understanding Polling and Extraction*.

MUX ID* – Possible entries are 0 to 16. A zero indicates the MPM or BDS is not connected to a multiplexer. Device 1 to 16 corresponds to the multiplexer rear panel connection ports. Refer to *Serial Port Multiplexer User's Guide*.

When finished, click Save or click the next (Reporting) tab.

11.6. System Setup: Reporting

The following items appear on the Setup|System|Reporting dialog box.

NOTE: A Service computer cannot access the Reporting screen.
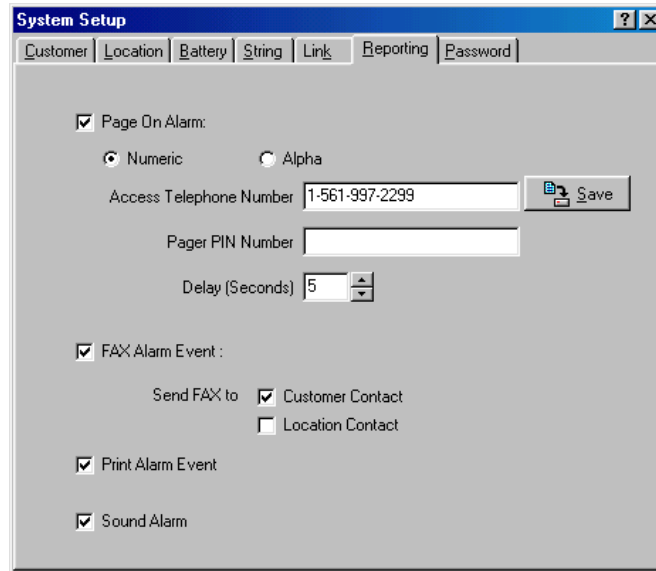
Figure 12. System Setup - Reporting

Before configuring reporting fields, confirm the correct customer, location, battery, and string are selected under the Customer, Location, Battery, and String dialog boxes.

Use Setup|System|Reporting to select the devices the Central or Local computer contacts when the monitor reports during continuous polling or calls in an event.

Page On Alarm - Select this box to have the Page Report Alarm Event dialog box appear on error and send alarm notification to a pager. Click a button for the kind of pager being used: numeric or alphanumeric.

With a numeric pager, a six digit code is sent:
    Digit 1: Report Type
          1 = Discharge
          2 = Alarm
          3 = Warning
    Digits 2 to 6: String ID
For example, to report an alarm in String ID 1, the pager would display 200001.

An alphanumeric pager displays the location, battery, and string names and alarm detail.

Access Telephone Number - Type the pager telephone number if numeric or the modem ID number if alphanumeric. If using an alphanumeric pager, you must use an access number that has a TAPI interface that lets you communicate using a modem instead of voice. For example, SkyPage's access number is (800) 759-6366.

Pager PIN Number - Type the pager private ID (PIN) number if needed.

Delay - If using a numeric pager, type the delay (in seconds) before the numeric message is sent.

Fax Alarm Event - Check this box to have the Fax Report Alarm Event dialog box appear on error and send alarm notification to a fax machine. Check a box to direct the report to the Customer Contact or Location Contact. The system dials the fax telephone number on the Setup|System|Customer or Location dialog box.

Print Alarm Event - Select this box to have the Print Report Alarm Event dialog box appear on error and send alarm notification to a printer. To select a default printer, at the String Status screen, click File|Printer Setup.
NOTE: If your system does not print alarms as they are received, change the printer Spool Data Format setting as follows: On Windows, click Start|Settings|Printers. Right click the icon for your printer, then click Properties|Details|Spool Settings. At Spool Data Format, select either EMF or RAW.

Sound Alarm - Select this box to enable an audible alarm for this string when an alarm event occurs. Select the alarm sound by clicking Select Sound under Setup|Preferences.

When finished, to save, click Save or close the dialog box and click Yes at the "Do you want to save changes?" message. Click the Password tab if you want to change the password.

IMPORTANT NOTE: To enable alarm reporting and alarm sounds, you must clear the global check boxes on the Preferences dialog box under Setup|Preferences.

11.7. System Setup: Password

The following items appear on the Setup|System|Password dialog box.
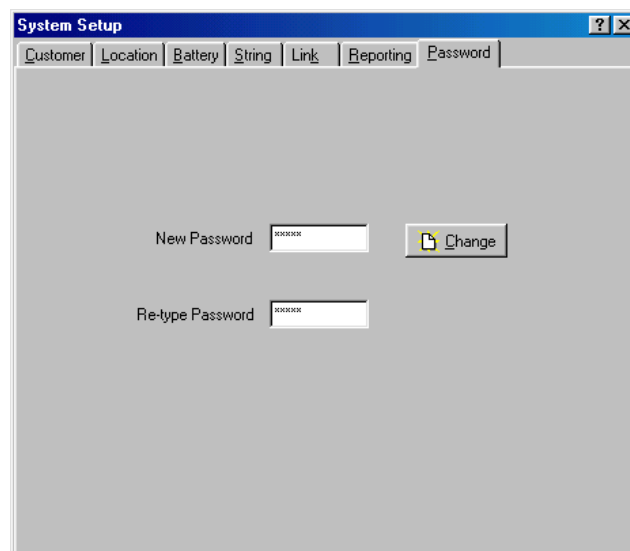
Figure 13. System Setup - Password

Select Setup|System|Password to change the System Setup password needed to access protected screens. If the password is incorrect, you can view protected screens but cannot change parameters.

New Password - To change the System Setup password, type the new password in the New Password and Re-type Password boxes. The password may be up to eight alphanumeric characters and is not case sensitive. The default password is: `alber`.
NOTE: You can have different System Setup and Battery Setup passwords.

Click Change. The new password is now in effect.

NOTE: Record the new password for reference. If the password is lost, you must contact the factory.

12.   Synchronizing Using the Check Settings

The location, battery, and string names are the key identification for letting any computer type (Central, Local or Service) connect to a monitor. All names must match or connection will fail. Typically, a Central computer assigns names into the monitor. Conversely, the Check Settings boxes upload to the computer any test times, alarm thresholds, and data settings put into the monitor during commissioning (installation). The process of uploading using Check Settings is called synchronizing, and it must be done using a Central computer connected to the monitor via RS-232, modem or network. If uploading a BDS, the upload must be done twice. After a system is synchronized, it can be placed into service. Refer to *Check Settings Screens* for screen shots.

NOTE: If a system fails to synchronize, you must complete the Battery Setup dialog boxes.

Read these descriptions of the Upload, Close, Recheck, and Send Time buttons on the Check Settings dialog boxes before synchronizing the system:

Upload Button - To transfer settings between the computer and monitor, click Upload on the Check Settings dialog box. The data transferred depends on the computer type (Central, Local or Service). A Central computer sends the location name, battery name, string name, string ID, current date and time to the monitor, and the monitor sends all other settings to the computer database. The password to enable Send Time and Upload is the Battery Setup password.

You only need to click Upload on one Check Settings dialog box, usually Check Settings|General. If you are uploading a BDS, repeat the Upload a second time.

Close Button - After you transfer settings using Upload, to close Check Settings, click Close on the Check Settings box.

Recheck - Clicking Recheck is equivalent to clicking Setup|Check Settings. Recheck reloads settings from the database and monitor into the Check Settings boxes.

Send Time - This button lets you send the date and time from the computer to the monitor without affecting any other settings.

Connection

Complete the Preferences, Communication Setup, and System Setup dialog boxes then, from the String Status screen, highlight the location name to synchronize and click the Connection button. The following conditions may result:

System Connects Normally - If connection is established, the names match, and no error messages appear, click Setup|Check Settings|General. After setup data appears in both the In Database and In Monitor columns, click Upload to transfer from the monitor to the computer database. After upload, click Close to return to the String View screen. All data has been transferred and the site is ready to go into service.

"String needs to be set up" Message - If the system connects, but "This string needs to be set up" appears, then the location, battery, and string names do not match. You must upload the monitor settings. Click OK at the message, select Setup|Check Settings|General, then click Upload as described in the previous *System Connects Normally* section.

Note on Network Settings - Network parameters do not upload using the Check Settings|General dialog box. If you need to change the IP Address, Netmask or Gateway, make the changes on Setup|System|Link. To send the existing or changed IP, Netmask or Gateway address to the MPM or BDS, click **Send Network Configuration** on Setup|Battery|General. This button is active and the addresses can only be sent when the computer is connected to the BDS or MPM via RS-232 or modem, not via network.

Note on using a Local or Service computer - If you use a Local or Service computer, the monitor transfers setup to the computer, but names, date and time are not sent to the monitor. "This string needs to be set up" will continue to appear until you synchronize with a Central computer.

System Does Not Connect (Error 0102) - When connecting, if the location, battery and string names do not match, an error message appears. Extra or missing blank spaces or hyphens can affect a name. Click OK to return to String Status or click Ignore to display Check Settings.
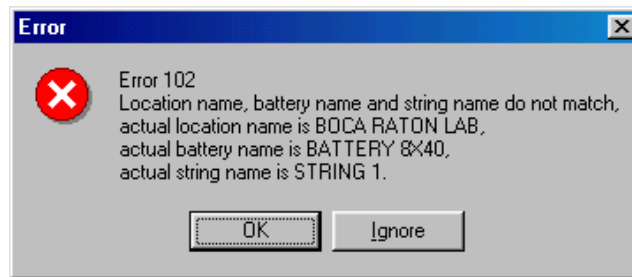
Figure 14. Connection Error Message

If the system does not connect and "Location name, battery name and string name do not match" appears, and names have been assigned in the monitor, either:

1. Use Setup|System to change the names in the computer database to match the names in the Error 0102 dialog box, or
2. Click Ignore and change the names in the monitor using Setup|Battery, or
3. If on-site with the equipment, clear the existing names in the monitor and enter new names as described below.
4. After you correct the problem, attempt to connect, then upload from the Check Settings dialog box.

   Clear Existing Names (On-site)

   MPM - To clear existing names in an MPM, press the MPM Alarm Reset switch while cycling power off then on. Release the switch after the MPM front panel LEDs sequence from left to right. This reset also disables the alarms and auto call-out function, resets the password to `alber`, and clears all data in the monitor, including active alarms.

BDS - To clear existing names in a BDS, press the BDS Controller Alarm Reset switch while cycling power off then on. Release the switch after the BDS front panel Status LED flashes rapidly. This reset also disables the alarms and auto call-out function and resets the password to `alber`.

12.1. Connecting Using a Service Computer

This section details how to connect to a monitor when site details are not known.

Connecting a Service Computer via Modem - Using a Service computer with a Service setup, enter the site telephone number and MUX ID (if a multiplexer is used) under Setup|System|Link. If using a BDS, also enter the String ID number and the BDS monitor configuration under Setup|System|String. Click the Connection button. The Check Settings|General dialog box appears. Click Upload to synchronize settings between the monitor and Service computer database, then click Close. String View displays all real time data.

Connecting a Service Computer via Network - Using a Service computer with a Service setup, enter an IP address under Setup|System|Link. If using a BDS, also enter the String ID number and the BDS monitor configuration under Setup|System|String. Click the Connection button. The Check Settings|General dialog box appears. Click Upload to synchronize settings between the monitor and Service computer database, then click Close. String View displays all real time data.

Connecting a Service Computer via RS-232 - Using a Service computer with a Service setup, click the Connection button. The Check Settings|General dialog box appears. Click Upload to synchronize settings between the monitor and Service computer database, then click Close. String View displays all real time data.

13. Check Settings Screens

The Check Settings dialog boxes display settings in the BMDM database and MPM or BDS nonvolatile memory. Use these screens when synchronizing a battery location.

On a Local, Central or Service computer, when String View is displayed (with an active connection or offline), you may click Setup|Check Settings to view Check Settings information, send the time and date, and upload settings. You cannot change settings using these boxes.

For item definitions, refer to *Synchronizing Using the Check Settings* and *Programming Battery Setup for the BDS* or *MPM*. When MPM and BDS screens are similar, only one screen is printed. To open Check Settings, at the String View screen, select Setup|Check Settings.

The Check Settings|General dialog box for MPM and BDS is shown below. Network parameters do not transfer from Check Settings. If you need to change the IP Address, Netmask or Gateway, refer to *Synchronizing Using the Check Settings*.

ITEMS	IN DATABASE	IN MONITOR
Location Name	BOCA RATON LAB	BOCA RATON LAB
Battery Name	BATTERY 1X24A	BATTERY 1X24A
String Name	STRING 9	STRING 9
Current Date	02/24/2003	02/24/2003
Current Time	14:49:02	14:47:00
Station Phone Number		
Total Cell Number	24	24
Shunt Value	1	1
Remote Reporting	Disable	Enable
Configuration #	26	26
Telco MUX	N/A	N/A
IP Address	192.168.1.130	192.168.1.130
Netmask	255.255.255.0	255.255.255.0
Gateway	64.168.1.1	192.168.1.1
Float Current Multiplier	1	1

String Status: Good   Communication Status: Response OK   Password: Unchecked

Figure 15. Check Settings - General (MPM / BDS)

The Check Settings|Parameters dialog boxes for the MPM and BDS are shown below.
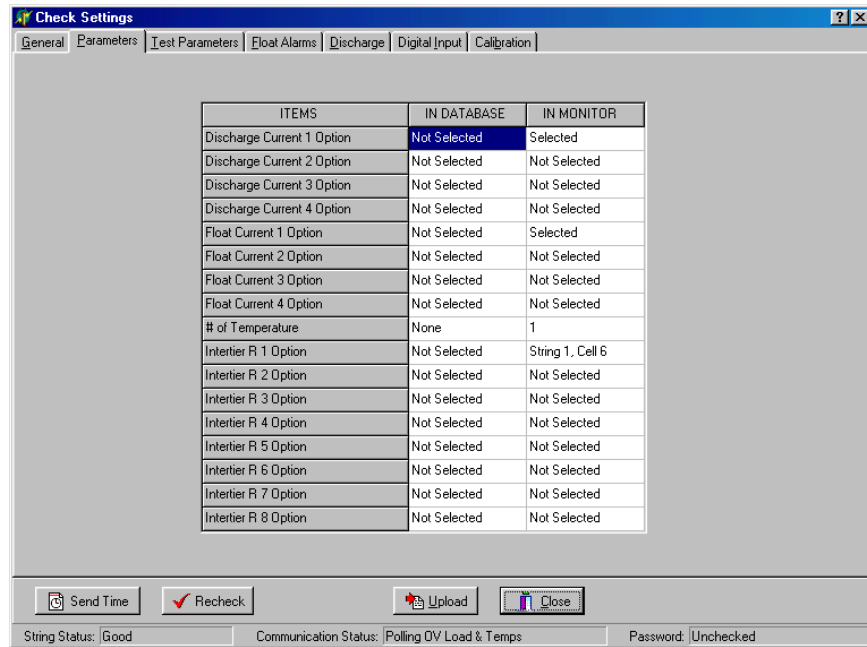
Figure 16. Check Settings - Parameters (MPM)
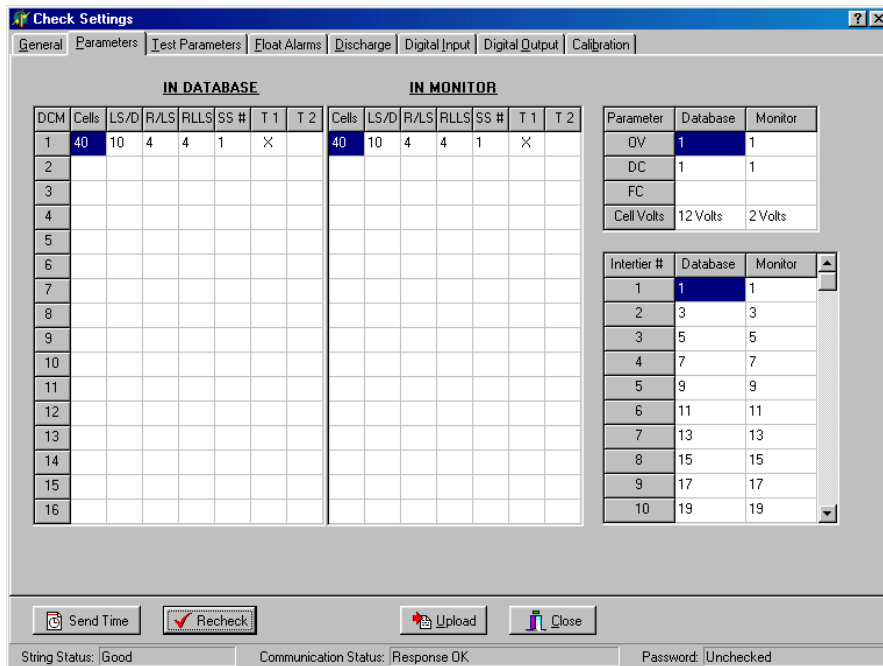
Figure 17. Check Settings - Parameters (BDS)

The Check Settings|Test Parameters dialog box for the MPM and BDS is shown below.
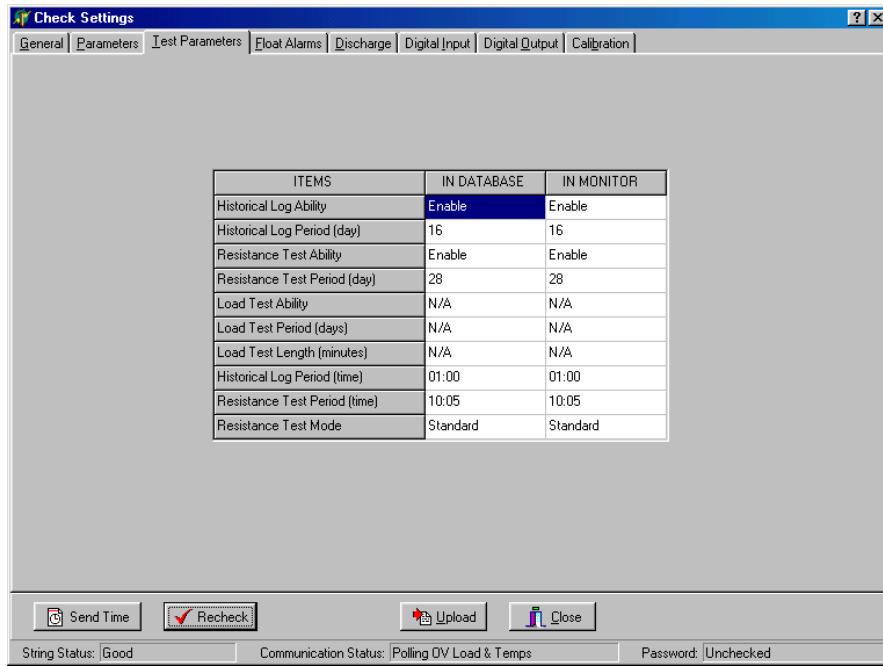
Figure 18. Check Settings - Test Parameters (MPM / BDS)

The Check Settings|Float Alarms dialog boxes for the MPM and BDS are shown below.
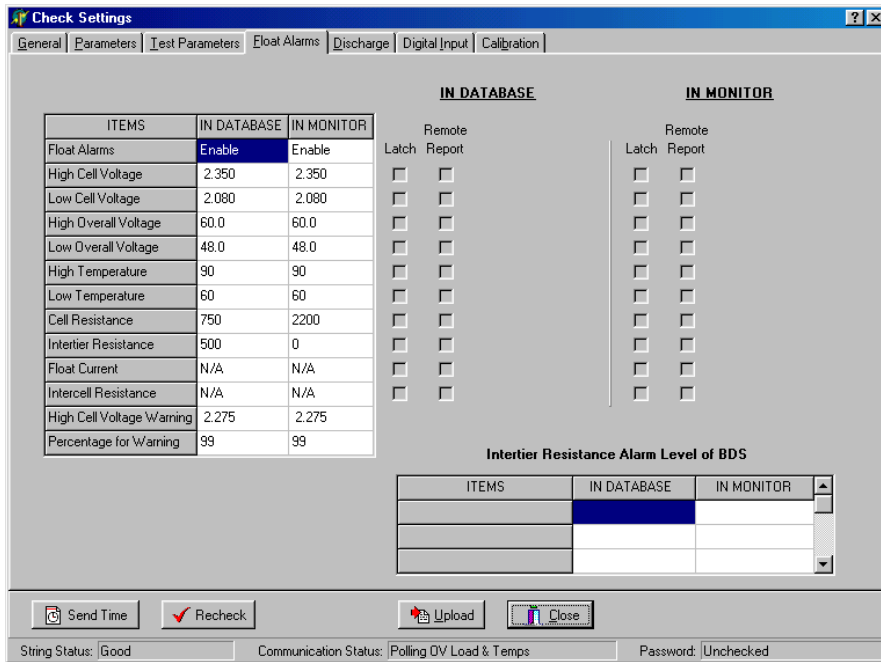
Figure 19. Check Settings - Float Alarms (MPM)
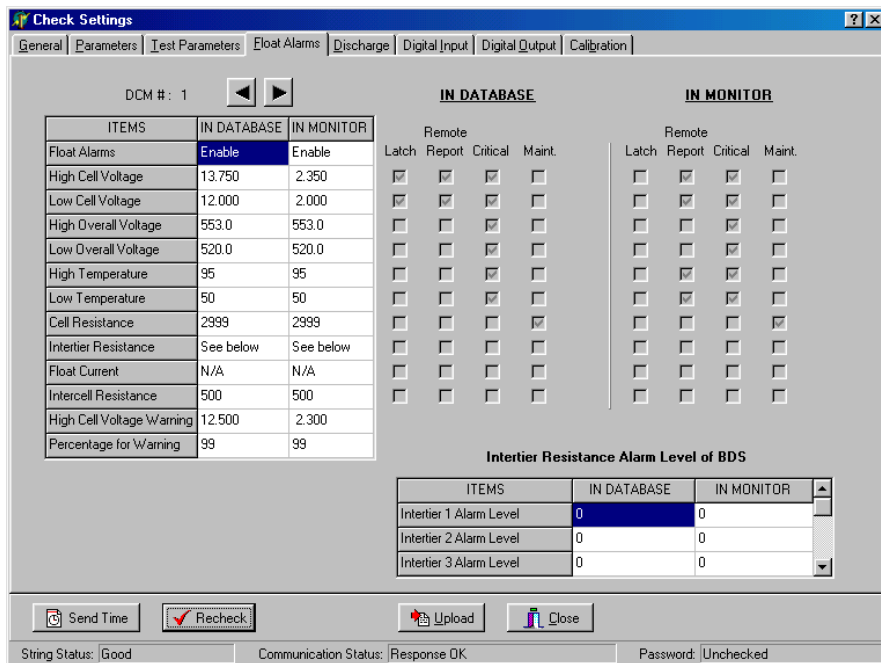
Figure 20. Check Settings - Float Alarms (BDS)

The Check Settings|Discharge dialog box for the MPM and BDS is shown below.

ITEMS	IN DATABASE	IN MONITOR
Discharge Latch	Selected	Selected
Remote Reporting	Disable	Disable
Critical Alarm	Selected	Selected
Maintenance Alarm	Not Selected	Not Selected
Print	N/A	N/A
Discharge Mode	Current Mode	Current Mode
Discharge Level	50.0	50.0
Report Option	Report All	Report All
Log Cell Voltage	N/A	N/A
Log Overall Voltage	N/A	N/A
Log Current	N/A	N/A
Low Cell Voltage	1.650	1.650
Low Overall Voltage	500.0	500.0
Maximum Discharge Time	1	1

String Status: Good   Communication Status: Response OK   Password: Unchecked

Figure 21. Check Settings - Discharge (MPM / BDS)

The Check Settings|Digital Input dialog boxes for the MPM and BDS are shown below. The BDS Digital Input tab and dialog box are available only for String 1 on a BDS. The tab disappears if a string other than 1 is selected.
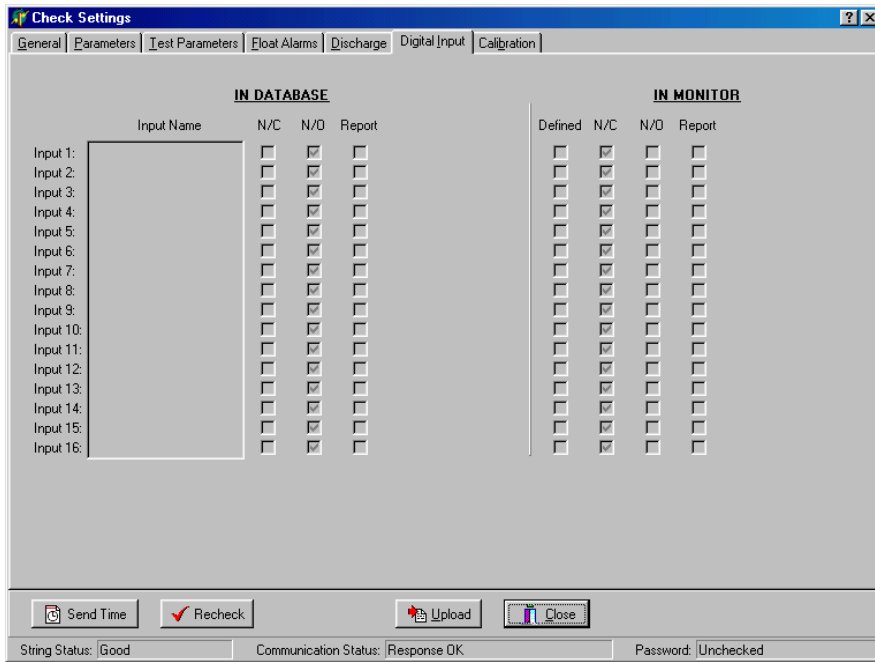
Figure 22. Check Settings - Digital Input (MPM)
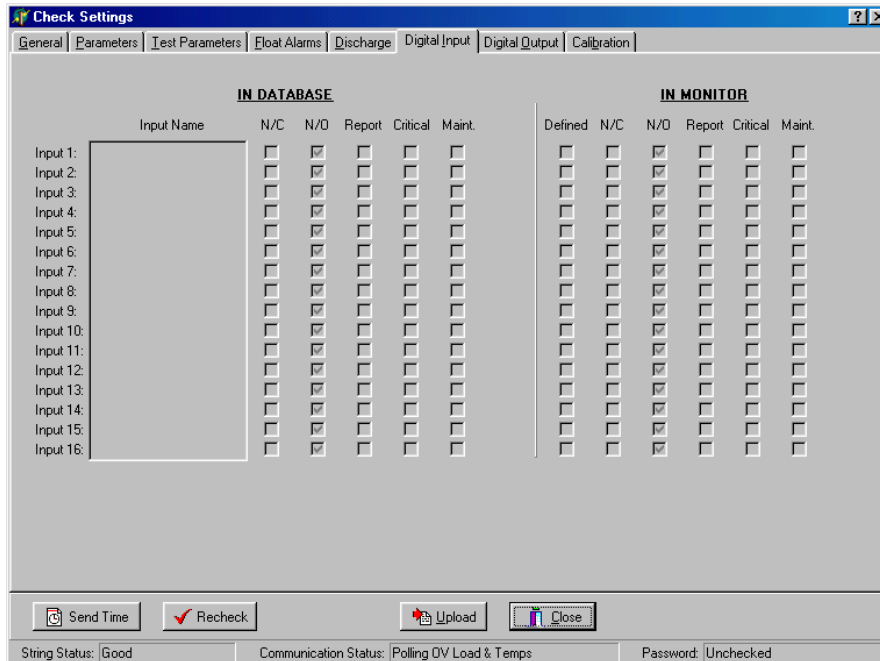
Figure 23. Check Settings - Digital Input (BDS)

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The Check Settings|Digital Output dialog box for the BDS is shown below. The BDS
Digital Output tab and dialog box are available only for a BDS. The tab disappears if an MPM is
selected.
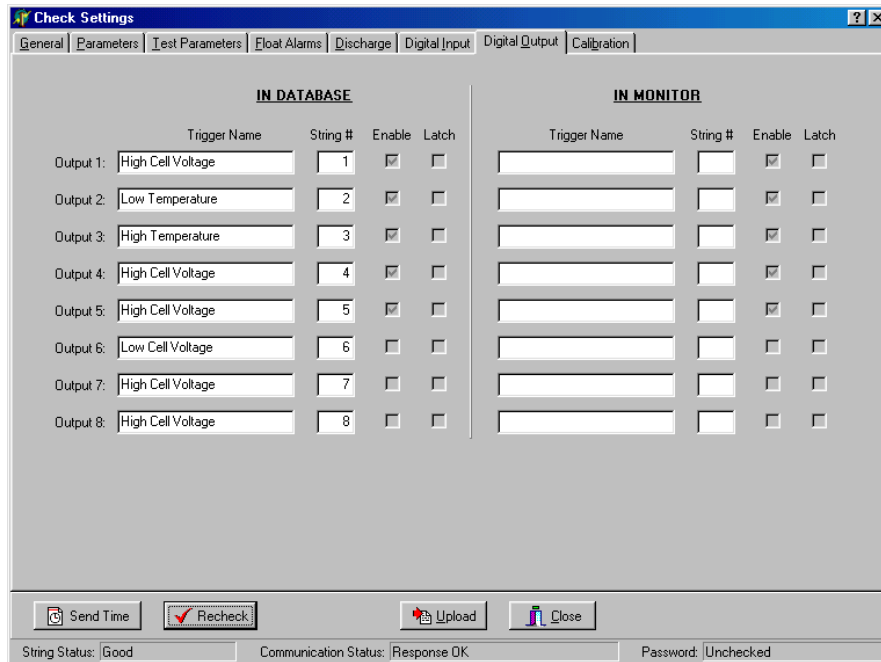
Figure 24. Check Settings - Digital Output (BDS)

The Check Settings|Calibration dialog boxes for the MPM and BDS are shown below. The BDS Calibration dialog box reports the Intercell Calibration Factor in addition to the other factors. The arrow buttons let you upload other DCM's.
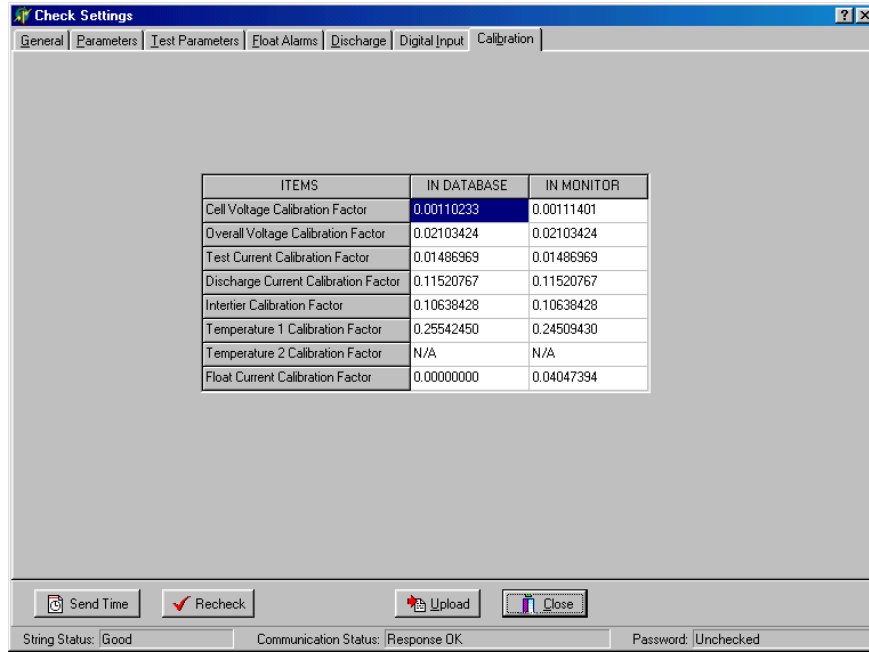
Figure 25. Check Settings - Calibration (MPM)
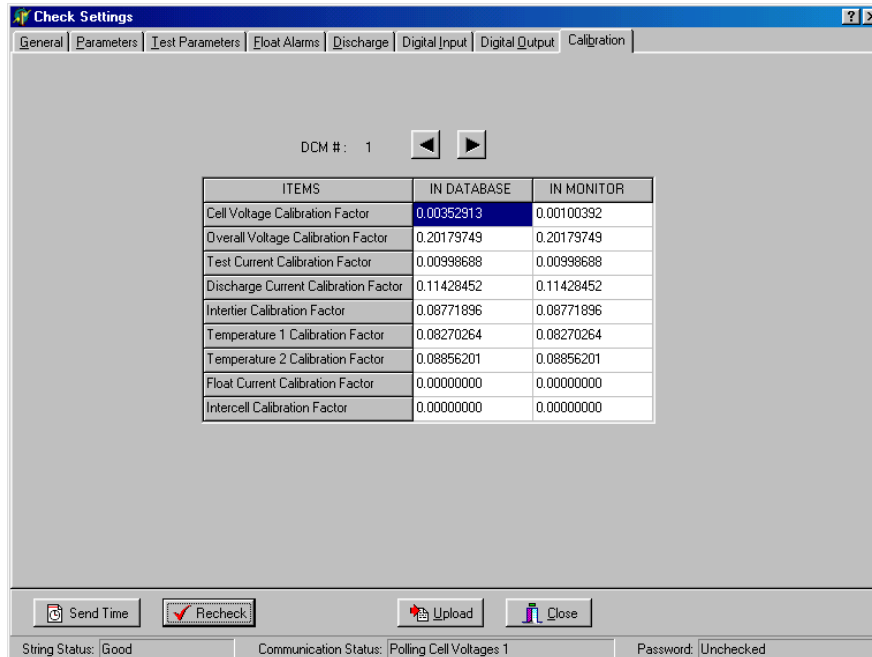
Figure 26. Check Settings - Calibration (BDS)

13.1. Check Settings Screens in Controller

A second series of Check Settings boxes, for use as a diagnostic tool, is available for the BDS. These Check Settings in Controller dialog boxes retrieve data from the BDS Controller instead of the DCM. To open Check Settings in Controller, at the String View screen, hold down the CTRL key while selecting Setup|Check Settings.

A typical screen, the Check Settings in Controller|Calibration dialog box for the BDS, is shown below. The BDS Check Settings in Controller option is available only for a BDS.
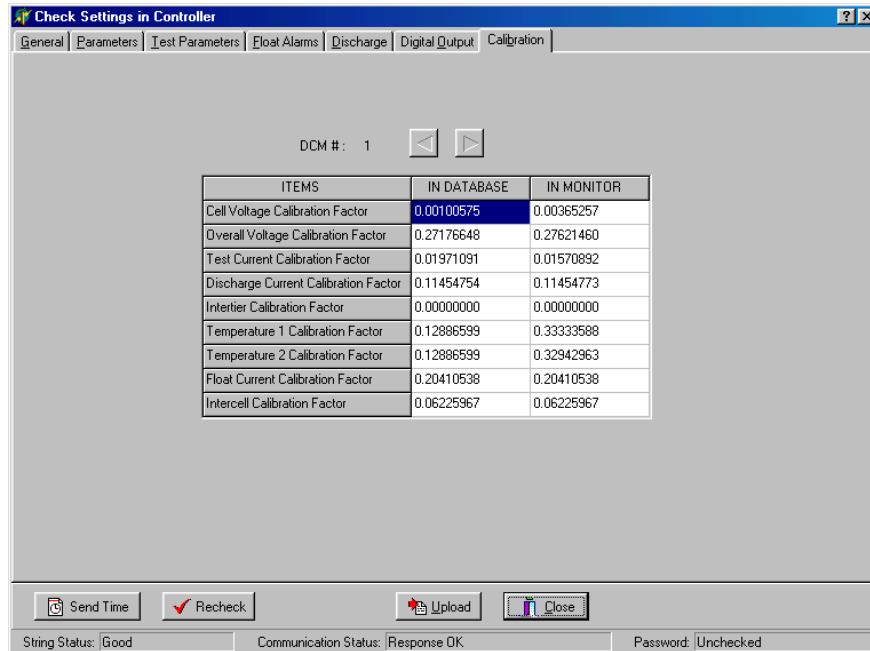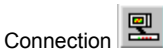
Figure 27. Check Settings in Controller - Typical Screen (BDS)

14. Programming Battery Setup for the MPM

Connection

If the system will not synchronize after you complete the Preferences, Communication Setup, System Setup, and Check Settings dialog boxes or if you want to change battery settings, complete the Battery Setup dialog boxes. From String Status, highlight the location name, then click the Connection button. After communication is established between the computer and battery monitor, the String View screen appears. Select Setup|Battery from the menu bar.

Password - Battery Setup boxes are password protected. When you select Setup|Battery, the Password box appears. Type the Battery Setup password and click OK. The default password is: `alber`. This password closes when monitor communication ends. If the password is incorrect, the Battery Setup boxes appear, but the Send button is inactive. NOTE: You can have different System Setup and Battery Setup passwords.

CAUTION: To change the location, battery or string names after the monitor is set up and communicating, do not use the System Setup boxes. Use Setup|Battery|General after connecting to the site with a Central or Local computer. This ensures the database and monitor names match.

Send Button and **Close Button** On the Battery Setup dialog boxes, the Send button transfers settings to the monitor. On Battery Setup|Test Parameters, the Historical Log, Resistance Test, and Load Test settings are sent only if changed. You may complete all dialog boxes before clicking Send. Clicking Send on any box transfers settings on all boxes. The Close button closes the dialog boxes. Changes are not saved or sent if you click Close.

14.1. Battery Setup: General (MPM)

The following items appear on the MPM Setup|Battery|General dialog box.
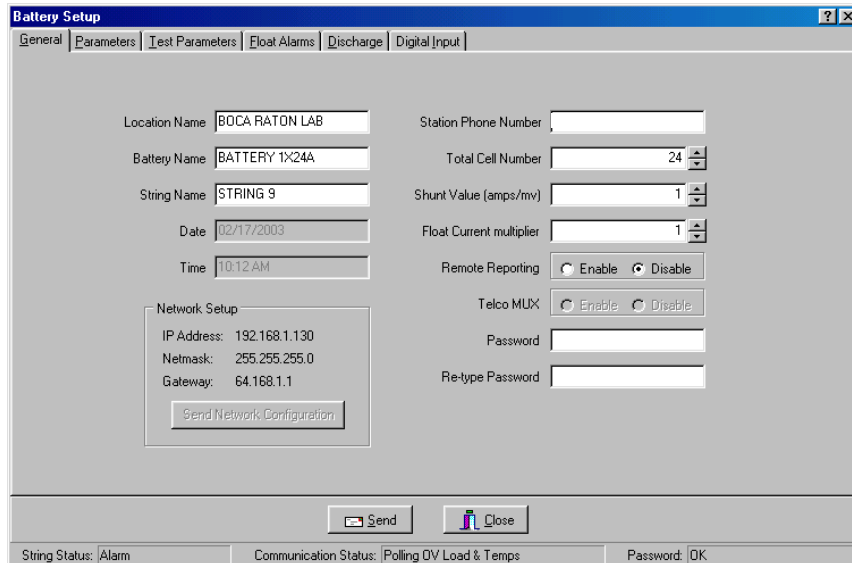
Figure 28. Battery Setup - General (MPM)

NOTE: Location, battery, and string names identify the strings and hardware to which the monitor is connected. These names can only be changed using a Central or Local computer. If you are using both types of computers, make sure both databases have the same names to ensure proper connection.

Location Name - Type the location name where the monitor is installed. There cannot be two identical location names under the same customer name. This location name must match the location name in the database of the connecting computer.

Battery Name - Assign a unique name to the battery. There cannot be two identical battery names under the same location name. This battery name must match the battery name in the database of the connecting computer.

String Name - Type a name for each MPM. There cannot be two identical string names under the same battery name. This string name must match the string name in the database of the connecting computer.

Date/Time - The date and time of the computer. When you send a new configuration to the monitor, it sends this date and time.

Station Phone Number - The telephone number of the Central computer the monitor calls when a system goes into alarm or discharge.

Total Cell Number - This is defined by Monitor Configuration on Setup|System|String. Normally, you will not change the Total Cell Number; however, you may change it for custom configurations if the configuration is not listed on System Setup|String. For example, if the battery configuration is a 1x60 and only 59 cells are used, set this value to 59 to configure the system for a 59 cell battery. This feature is available only when using one string. NOTE: Do not change the Total Cell Number for multi-string configurations. If you enter a lower cell number for a configuration of, for example, 2x24, only the total cell count for the second string changes.

Shunt Value - Type the shunt rating in amps per millivolt. For example, for a shunt of 600 amps/100mV, type 6. (600 amps/100mv = 6 amps/1mv.) This value must be an integer.

Remote Reporting Enable and **Disable** - Globally enable or disable the monitor call-out function upon alarm, and Alarm Detail reporting on the Historical Events screen when continuously polling. For a parameter to report on alarm, you must not select the global Disable Alarm Reporting on Setup|Preferences, and you must select Remote Reporting on Setup|Battery|Float Alarms or Setup|Battery|Discharge.

Telco MUX Enable and **Disable** - Not available for the MPM.

Password - To change the battery setup password, type the new password in the Password and Re-type Password boxes. The password may be up to five alphanumeric characters and is not case sensitive. The default password is: `alber`.

IP Address - Displays the IP address typed on Setup|System|Link.

Netmask - Displays the netmask typed on Setup|System|Link.

Gateway - Displays the gateway typed on Setup|System|Link.

Send Network Configuration - Click this button to send the IP address, netmask, and gateway to the MPM. The MPM must have the internal network option installed. This button transfers addresses only when MPM's are connected via RS-232 or modem, not network.

14.2. Battery Setup: Parameters (MPM)

The following items appear on the Setup|Battery|Parameters dialog box.
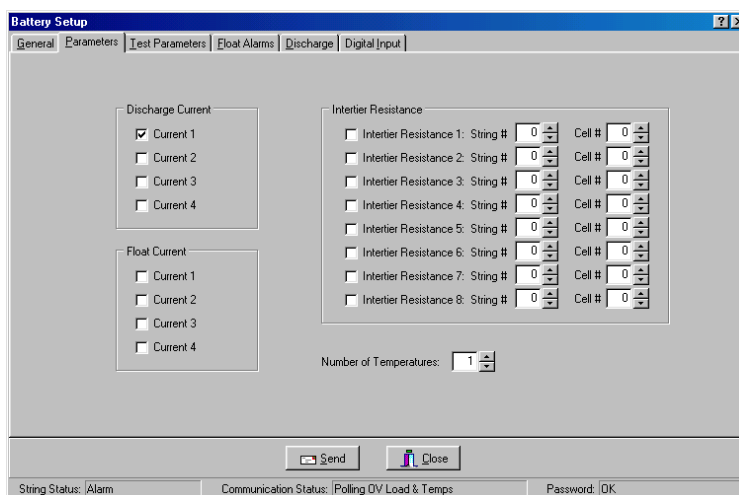
Figure 29. Battery Setup - Parameters (MPM)

On Battery Setup|Parameters, select the hardware and parameters that will be polled and displayed.

Discharge Current - You can define up to four discharge current channels, but only one current channel per string is allowed. If the configuration is one string, then only one current channel may be used. Only Current 1 can trigger the recording of a discharge if Current Mode is selected on Setup|Battery|Discharge.

Intertier Resistance - The MPM can monitor up to four strings. If selecting an Intertier Resistance option, at String #, type the number of the string that contains the intertier. At Cell #, type the number of the cell that is before the intertier.

Number of Temperatures - You may select up to eight probes to monitor ambient or electrolyte temperature.

Float Current - The MPM can monitor up to four float current values, displayed on the Cell Voltage dialog box. Set the value in the High Float Current field on Setup|Battery|Float Alarms. When actual current exceeds the set value, the value appears in red on the Cell Voltage dialog box and causes an alarm. Because of internal algorithms, the float charging current probe (FCCP) may need up to 25 minutes to stabilize after a power change. Refer to the Multitel, Inc. *Float Charging Current Probe User's Manual*.

14.3. Battery Setup: Test Parameters (MPM)

The following items appear on the Setup|Battery|Test Parameters dialog box.
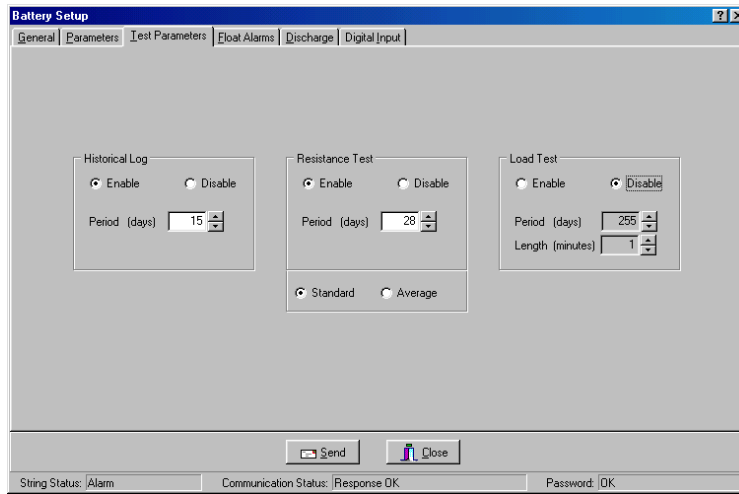
Figure 30. Battery Setup - Test Parameters (MPM)

Historical Log - Specify how often (in days) the voltages, currents, and temperatures are recorded in the history log.

Resistance Test - Specify the resistance test interval in days. If set to 30, resistance is tested every 30 days starting at 12:00 A.M. (midnight). NOTE: If you program the Load Test for the same interval as the Resistance Test, the Resistance Test is delayed three days.

Load Test - Specify load test interval in days and length of the load test in minutes. Load test activates a relay that shuts down the charger, if connected, and enables tracking of the discharge. If set to 30, load test is done every 30 days starting at 12:00 A.M. See note at Resistance Test (above).

Standard or **Average** - Normally select Standard. Some chargers, however, employ digital control of battery voltage, which causes voltage fluctuation. If the charger has this feature, select Average.

14.4. Battery Setup: Float Alarms (MPM)

The following items appear on the Setup|Battery|Float Alarms dialog box.
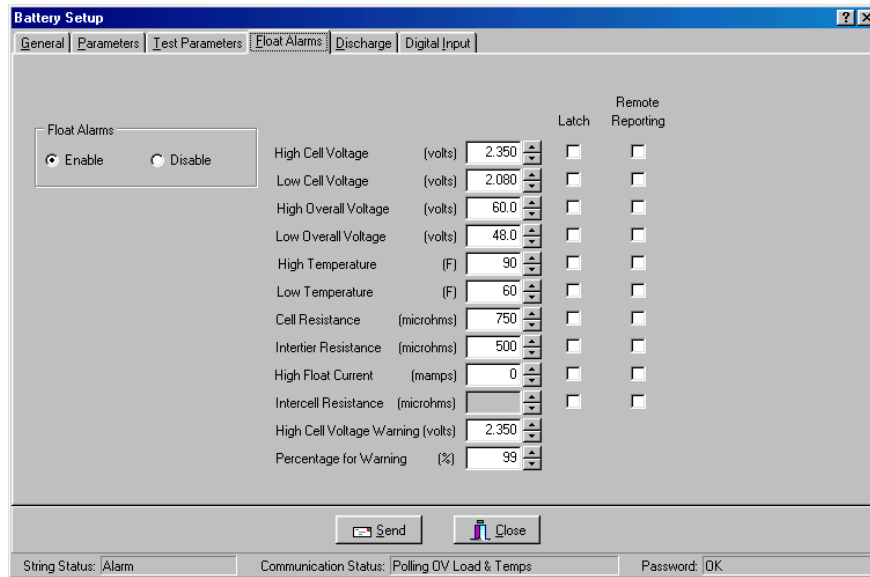
Figure 31. Battery Setup - Float Alarms (MPM)

Float Alarms Enable / Disable - Global enable or disable for all float alarms for local alarm status and alarm contact activation. Enable the call-out of float alarms and digital input alarms. When Disable is selected, the MPM Alarm Disable LED is lit, and the String Status column on String Status indicates Alarms Disabled.

Alarm Thresholds - For high and low cell voltage, overall voltage, temperature, resistance, and current, select violation threshold values that activate an alarm during a float condition. These thresholds are deactivated for 30 minutes following a resistance test. If a discharge occurs, the alarms are disabled until the overall voltage recovers to a value above the low threshold.

High Cell Voltage Warning (volts) - Type a value between the Low Cell Voltage and High Cell Voltage levels. This setting affects only the bar graph colors on the Cell Voltage String View screen. During normal float condition, the bar colors change as follows:

```
High Cell Volt.....................Red
High Cell Volt Warning.....Blue
Normal.............................Green
Low Cell Volt ....................Yellow
```

Percentage for Warning - Determines the violation threshold that causes a Warning battery status. The value entered is a percentage of the internal resistance alarm. For example, if the internal resistance alarm is set to 100 microhms and the percentage for warning is 75%, the system issues a warning when the internal resistance is between 75 and 100 microhms. When the value exceeds 100 microhms, the system issues an alarm. Warning status is displayed only on the String Status and Historical Events screens, not on the Alarms screen.

```
<-----Normal-----75%<-----Warning----->100%-----Alarm----->
```

Latch - When selected, the alarm contact stays energized until manually reset. If not selected, the alarm contact de-energizes when the alarm condition clears.

Remote Reporting - When selected, causes the monitor to report the alarm. When not selected, call-out is disabled for that parameter. You must select this option and Remote Reporting Enable under Setup|Battery|General to enable the call out function and to display Alarm Detail on the Historical Events screen during polling.

14.5. Battery Setup: Discharge (MPM)

The following items appear on the Setup|Battery|Discharge dialog box.
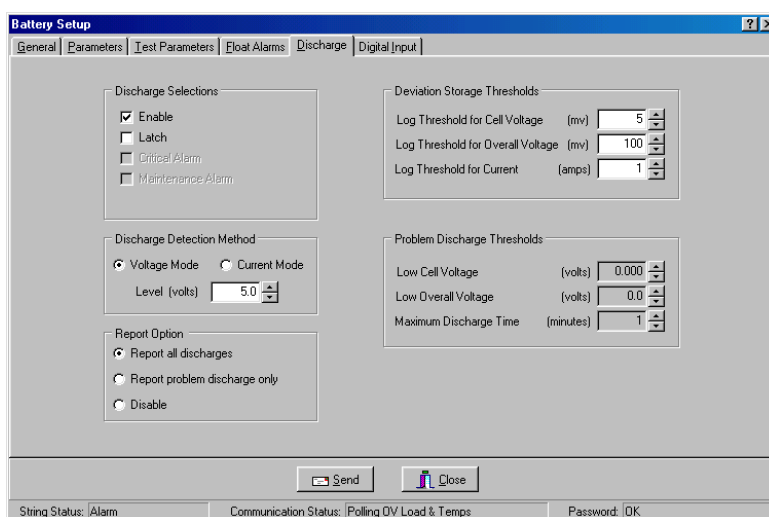
Figure 32. Battery Setup - Discharge (MPM)

Discharge Selections Area:

> **Enable -** Select to enable the monitor to capture and store discharge data. If not selected, the MPM does not log discharges.

> **Latch -** When selected, the alarm contact stays energized until manually reset. If not selected, the alarm contact de-energizes when the discharge condition clears.

> The Critical Alarm and Maintenance Alarm options do not apply to the MPM.

Discharge Detection Method Area:

> Select **Voltage Mode** or **Current Mode**, then set the threshold **Level** in volts or amps to activate data logging during a discharge. When the voltage goes below the set level or the current exceeds the set level, the monitor begins recording cell voltages, discharge current, and overall voltage, based on the Deviation Storage Thresholds (described later). Only one temperature sample is stored at the beginning of the discharge.

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Voltage Mode - (Threshold level in volts.) Voltage mode allows data recording during recharge, since data logging does not stop until the voltage goes above the threshold. If measuring discharge current, you should use Discharge Current Mode as a reliable source of trigger.

Current Mode - (Threshold level in amps.) In current mode, the monitor triggers only on Current Channel 1 selected on Setup|Battery|Parameters. To enable this mode, you must define the Current Channel on the Setup|Battery|Parameters dialog box.

Report All Discharges - If selected, the monitor reports all discharges to the Central PC. You must enable Remote Reporting on Setup|Battery|General.

Report Problem Discharge Only - If selected, the monitor reports only discharges that exceed voltage or time values set in Problem Discharge Thresholds (described later) to the Central PC.

Disable - If selected, stops the MPM from reporting a discharge.

Deviation Storage Thresholds Area:
Log Threshold for Cell Voltage, **Log Threshold for Overall Voltage**, and **Log Threshold for Current** - When the voltage or current changes by the amounts in these boxes, the event is recorded. For most applications, 10 mv for cell voltage, 100 mv for overall voltage, and 1 amp for discharge current are recommended. Smaller values could cause monitor memory problems.
CAUTION: Do not set these values to 0. If set to 0, no data will be logged during discharge. Refer to *Data Storage in the MPM*.

Problem Discharge Thresholds Area:
Low Cell Voltage, **Low Overall Voltage**, and **Maximum Discharge Time** - Select the voltage or time levels that trigger discharge reporting. These values are only enabled if you select Report Problem Discharge Only on this screen. This setting also affects the bar graph colors on the Cell Voltage String View screen. During a discharge, the bars change color as follows:

> Normal Condition..Green
> Problem Discharge Thresholds or Low Cell Voltage....................Yellow

14.6. Battery Setup: Digital Input (MPM)

The MPM has 16 digital inputs that may be connected to external dry contacts. You may set up these inputs to report an alarm when the external contacts are activated. The following items appear on the Setup|Battery|Digital Input dialog box.
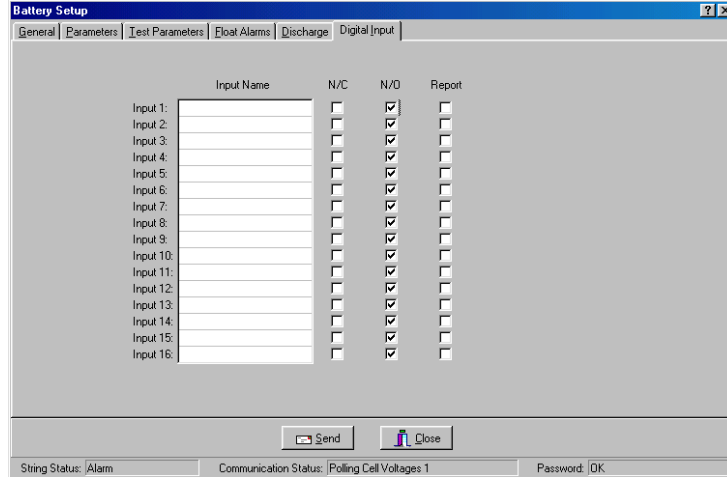
Figure 33. Battery Setup - Digital Input (MPM)

Input Name - Assign a name to the input connected to the external contacts and indicate if the contacts are normally open or normally closed. To disable an input, clear the input name.

N/C - Select the N/C box if the external contacts are normally closed.

N/O - Select the N/O box if the external contacts are normally open.

Report - Selecting this check box lets the monitor report a digital input alarm. When not selected, reporting is disabled for that input.

15. Programming Battery Setup for the BDS

Connection

If the system will not synchronize after you complete the Preferences, Communication Setup, System Setup, and Check Settings dialog boxes or if you want to change battery settings, complete the Battery Setup dialog boxes. From String Status, highlight the location name, then click the Connection button. After communication is established between the computer and battery monitor, the String View screen appears. Select Setup|Battery from the menu bar.

Password - Battery Setup boxes are password protected. When you select Setup|Battery, the Password box appears. Type the Battery Setup password and click OK. The default password is: `alber`. This password closes when monitor communication ends. If the password is incorrect, the Battery Setup boxes appear, but the Send button is inactive. NOTE: You can have different System Setup and Battery Setup passwords.

CAUTION: To change the location, battery or string names after the monitor is set up and communicating, do not use the System Setup boxes. Use Setup|Battery|General after connecting to the site with a Central or Local computer. This ensures the database and monitor names match.

Send Button and **Close Button** On the Battery Setup dialog boxes, the Send button transfers settings to the monitor. On Battery Setup|Test Parameters, the Historical Log, Resistance Test, and Load Test settings are sent only if changed. You may complete all dialog boxes before clicking Send. Clicking Send on any box transfers settings on all boxes. The Close button closes the dialog boxes. Changes are not saved or sent if you click Close.

15.1. Battery Setup: General (BDS)

The following items appear on the BDS Setup|Battery|General dialog box.
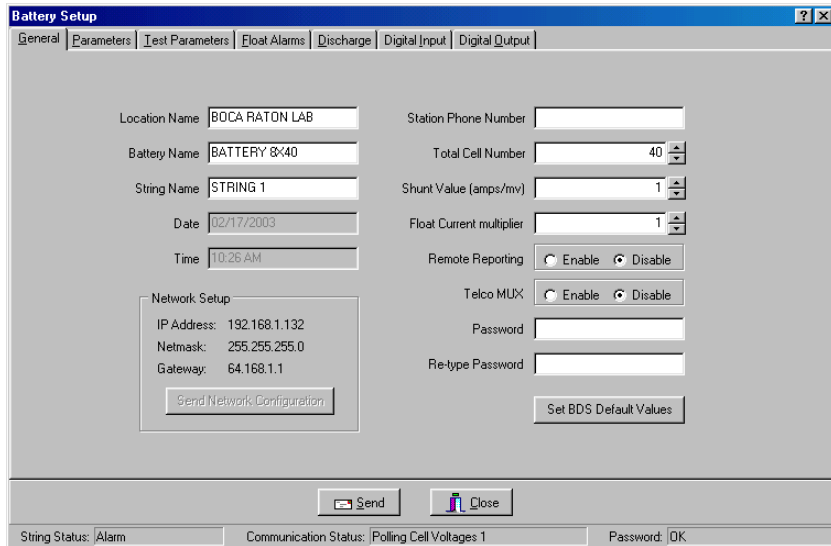
Figure 34. Battery Setup - General (BDS)

NOTE: Location, battery, and string names identify the strings and hardware to which the monitor is connected. These names can only be changed using a Central or Local computer. If you are using both types of computers, make sure both databases have the same name to ensure proper connection.

Location Name - Type the location name where the monitor is installed. There cannot be two identical location names under the same customer name. This location name must match the location name in the database of the connecting computer.

Battery Name - Assign a unique name to the battery. There cannot be two identical battery names under the same location name. This battery name must match the battery name in the database of the connecting computer.

String Name - Type a name for each string. There cannot be two identical string names under the same battery name. This string name must match the string name in the database of the connecting computer.

Date/Time - The date and time of the computer. When you send a new configuration to the monitor, it sends this date and time.

Station Phone Number - The telephone number of the Central computer the monitor calls when a system goes into alarm or discharge.

Total Cell Number - This is defined by Monitor Configuration on Setup|System|String. Normally, you will not change the Total Cell Number; however, you may change it for custom configurations if the configuration is not listed on System Setup|String. The Total Cell Number field lets you define the total number of cells.

Shunt Value - Type the shunt rating in amps per millivolt. For example, for a shunt of 600 amps/100mV, type 6. (600 amps/100mv = 6 amps/1mv.) This value must be an integer.

Remote Reporting Enable and **Disable** - Globally enable or disable the monitor remote reporting function. For a parameter to report on alarm, you must not select the global Disable Alarm Reporting on Setup|Preferences, and you must select Remote Reporting on Setup|Battery|Float Alarms or Setup|Battery|Discharge.

Telco MUX Enable and **Disable** - Select Enable when using a Telco multiplexer. This can only be set when the BDS Controller is connected to String 1.

Password - To change the battery setup password, type the new password in the Password and Re-type Password boxes. The password may be up to five alphanumeric characters and is not case sensitive. The default password is: `alber`.

IP Address - Displays the IP address typed on Setup|System|Link.

Netmask - Displays the netmask typed on Setup|System|Link.

Gateway - Displays the gateway typed on Setup|System|Link.

Send Network Configuration - Click this button to send the IP address, netmask, and gateway to the BDS. The BDS must have the internal network option installed. This button transfers address only when BDS's are connected via RS-232 or modem, not network.

Set BDS Default Values - Click to transfer parameters for the Monitor Configuration selected under System Setup|String to the Battery Setup|Parameters and Battery Setup|Float Alarms dialog boxes and to the Total Cell Number field.

15.2. Battery Setup: Parameters (BDS)

The following items appear on the Setup|Battery|Parameters dialog box.
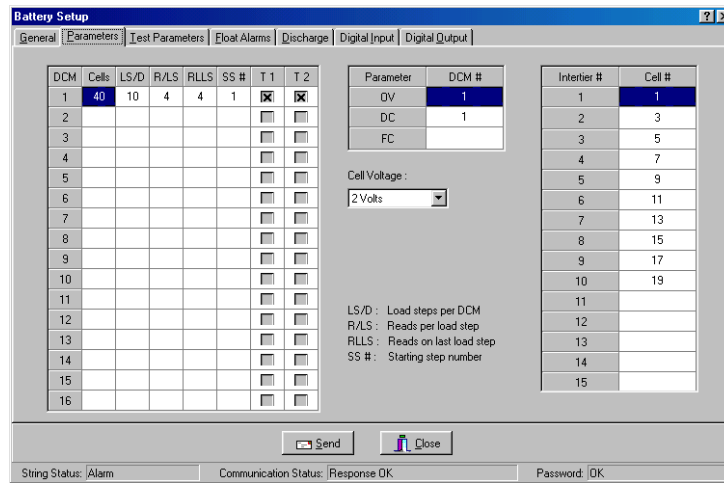
Figure 35. Battery Setup - Parameters (BDS)

DCM - For all DCM units 1 to 16 in use, configure the following items according to the configuration chart on the next pages.

Cells - Total number of cells monitored by the DCM.

LS/D - Load Steps per DCM.

R/LS - Reads per Load Step.

RLLS - Reads on Last Load Step.

SS# - Starting Step Number.

Config	DCM	Cells	LS/D	R/LS	RLLS	SS#
1x8x2V	1	8	-	-	-	-
1x108x2V	1	36	2	18	18	1
	2	36	2	18	18	3
	3	36	2	18	18	5
1x122x2V	1	48	4	12	12	1
	2	48	4	12	12	5
	3	26	4	12	14	9
1x180x2V	1	46	2	23	23	1
	2	46	2	23	23	3
	3	46	2	23	23	5
	4	42	2	23	19	7
1x182x2V	1	46	2	23	23	1
	2	46	2	23	23	3
	3	46	2	23	23	5
	4	44	2	23	21	7
1x188x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	44	2	24	20	7
1x192x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	48	2	24	24	7
1x210x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	48	2	24	24	7
	5	18	1	18	18	9
1x216x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	48	2	24	24	7
	5	24	1	24	24	9
1x232x2V	1	46	2	23	23	1
	2	46	2	23	23	3
	3	46	2	23	23	5
	4	46	2	23	23	7
	5	48	2	23	25	9
1x234x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	48	2	24	24	7
	5	42	2	24	18	9
1x238x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	48	2	24	24	7
	5	46	2	23	22	9
1x239x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	48	2	24	24	7
	5	47	2	24	23	9
1x240x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	48	2	24	24	7
	5	48	2	24	24	9
1x241x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	48	2	24	24	7
	5	24	1	24	24	9
	6	25	1	25	25	10

Figure 36. BDS Configuration Data for Setup Files

Config	DCM	Cells	LS/D	R/LS	RLLS	SS#
1x244x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	48	2	24	24	7
	5	24	1	24	24	9
	6	28	1	28	28	10
1x246x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	48	2	24	24	7
	5	24	1	24	24	9
	6	36	1	30	30	10
1x252x2V	1	48	2	24	24	1
	2	48	2	24	24	3
	3	48	2	24	24	5
	4	48	2	24	24	7
	5	24	1	24	24	9
	6	36	1	36	36	10
1x6x4V	1	6	1	6	6	1
1x90x4V	1	45	5	9	9	1
	2	45	5	9	9	6
1x120x4V	1	48	4	12	12	1
	2	48	4	12	12	5
	3	24	2	12	12	9
1x121x4V	1	48	4	12	12	1
	2	48	4	12	12	5
	3	25	2	12	13	9
1x122x4V	1	48	4	12	12	1
	2	48	4	12	12	5
	3	26	2	12	14	9
1x123x4V	1	48	4	12	12	1
	2	48	4	12	12	5
	3	27	2	12	15	9
1x60x6V	1	30	5	6	6	1
	2	30	5	6	6	6
1x78x6V	1	40	5	8	8	1
	2	38	5	8	6	6
1x80x6V	1	40	5	8	8	1
	2	40	5	8	8	6
1x81x6V	1	40	5	8	8	1
	2	41	5	8	9	6
1x60x8V	1	30	5	6	6	1
	2	30	5	6	6	6
1x61x8V	1	30	5	6	6	1
	2	31	5	6	7	6
1x30x12V	1	30	10	3	3	1
1x31x12V	1	31	10	3	4	1
1x32x12V	1	32	8	4	4	1
1x33x12V	1	33	10	3	6	1
1x36x12V	1	36	9	4	4	1
1x40x12V	1	40	10	4	4	1

Figure 37. BDS Configuration Data for Setup Files (continued)

T1 and **T2** columns - Temperature 1 and 2. Each DCM can monitor up to two temperatures. No more than ten temperatures may be monitored for the entire string.

Parameter / DCM # - For OV, DC and FC, assign a DCM:

OV - Overall Volts. Always assign this parameter to DCM #1.

DC - Discharge Current. Assign the number of the DCM to which the discharge current measuring device is connected.

FC - Float Current. This feature is supported only for DCM #1.

Cell Voltage - From the drop-down list, select the nominal voltage of the cell or jar being measured.

Intertier # / Cell # - For intertiers 1 to 15 in use, assign a cell number that relates to each intertier. The cell number is the lower of the two cell numbers across which the intertier is connected. For example, entering 16 assigns the intertier between cells 16 and 17. Each DCM can monitor up to ten intertiers. No more than 15 intertiers may be monitored for the entire string.

15.3. Battery Setup: Test Parameters (BDS)

The following items appear on the Setup|Battery|Test Parameters dialog box.
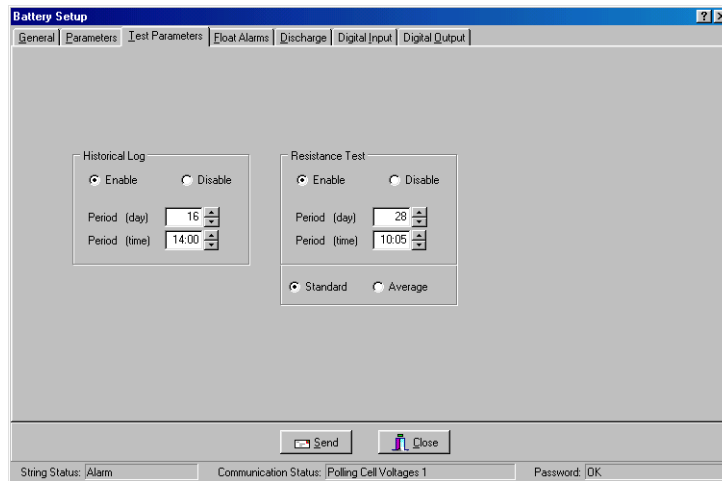
Figure 38. Battery Setup - Test Parameters (BDS)

Historical Log - Specify the day of the month, from 1 to 28 (29, 30 and 31 are not used), and the time of day voltages and temperatures are recorded in the history log. See note at Resistance Test below.

Resistance Test - Specify the day of the month, from 1 to 28, and the time of day a resistance test is performed. NOTE: When the monitor performs a resistance test, it creates a historical log entry. For this reason, you may want to select a resistance test 14 days away from a historical log entry.

Standard or **Average** - Normally select Standard. Some chargers, however, employ digital control of battery voltage, which causes voltage fluctuation. If the charger has this feature, select Average.

15.4. Battery Setup: Float Alarms (BDS)

The following items appear on the Setup|Battery|Float Alarms dialog box.
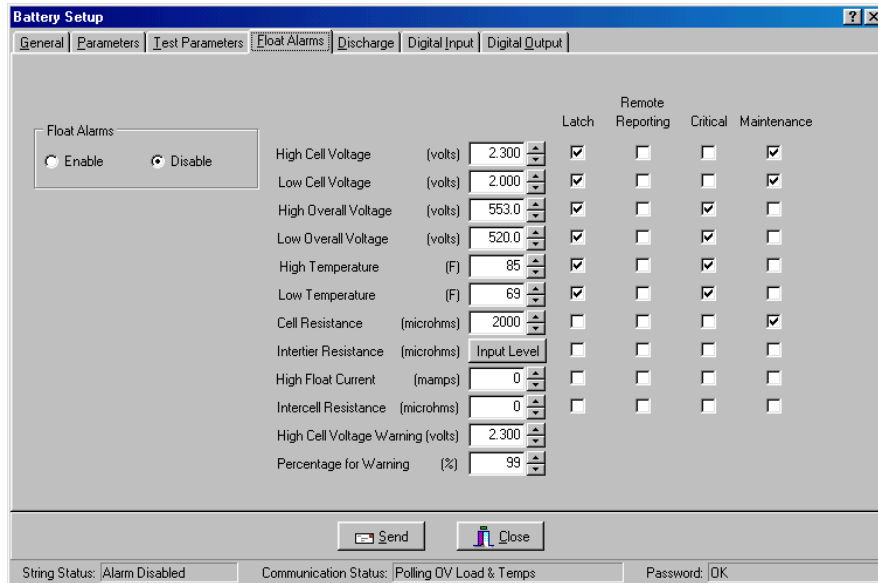
Figure 39. Battery Setup - Float Alarms (BDS)

Float Alarms Enable / Disable - Global enable or disable for all float alarms for local alarm status and alarm contact activation. Enable the call-out of float alarms and digital input alarms. When Disable is selected, the String Status column on the String Status screen indicates Alarms Disabled.

Alarm Thresholds - For high and low cell voltage, overall voltage, temperature, and resistance, select violation threshold values that activate an alarm during a float condition. These thresholds are deactivated for 30 minutes following a resistance test. If a discharge occurs, the alarms are disabled until the overall voltage recovers to a value above the low threshold.

High Cell Voltage Warning (volts) - Type a value between the Low Cell Voltage and High Cell Voltage levels. This setting affects only the bar graph colors on the Cell Voltage String View screen. During normal float condition, the bar colors change as follows:

> High Cell Volt.................... Red
> High Cell Volt Warning ..... Blue
> Normal .... Green
> Low Cell Volt .... Yellow

Intertier Resistance Input Level - Click Input Level to display the Input Alarm Level box. Type the resistance alarm level threshold (in microhms) for each intertier. The cell numbers in this box are the lower of the two cell numbers across which the intertier is connected. (These cell numbers are selected under Battery Setup|Parameters.)
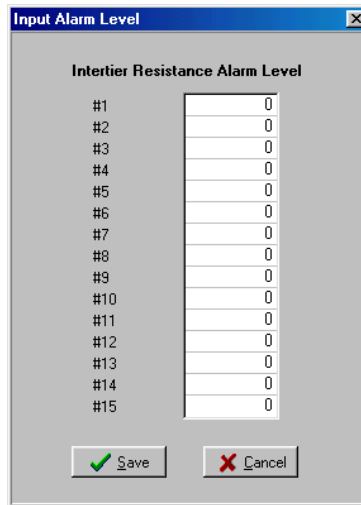
Figure 40. Input Alarm Level
(Intertier Resistance Alarm Level)

Percentage for Warning - Determines the violation threshold that causes a Warning battery status. The value entered is a percentage of the internal resistance alarm. For example, if the internal resistance alarm is set to 100 microhms and the percentage for warning is 75%, the system issues a warning when the internal resistance is between 75 and 100 microhms. When the value exceeds 100 microhms, the system issues an alarm. Warning status is displayed only on the String Status and Historical Events screens, not on the Alarms screen.

<-----Normal-----75%<-----Warning----->100%-----Alarm----->

Latch - When selected, the alarm contact stays energized until manually reset. If not selected, the alarm contact de-energizes when the alarm condition clears.

Remote Reporting - When selected, causes the monitor to report the alarm. When not selected, reporting is disabled for that parameter. You must select this option and Remote Reporting Enable under Setup|Battery|General to enable the call out function and to display Alarm Detail on the Historical Events screen during polling.

Critical and **Maintenance** - Two alarm contacts are available. Select Critical or Maintenance to define which contacts energize upon alarm. If neither is selected, the Remote Reporting check box clears and alarm reporting is disabled for that parameter. These settings do not affect the colors on the bar graph.

15.5. Battery Setup: Discharge (BDS)

The following items appear on the Setup|Battery|Discharge dialog box.
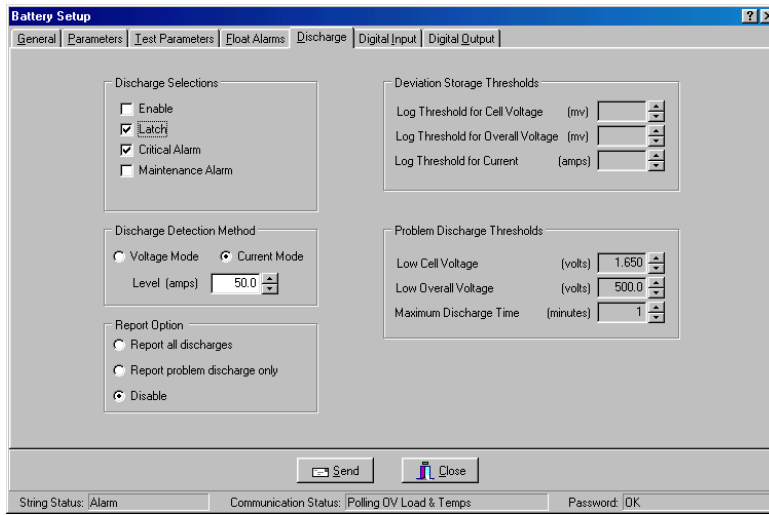
Figure 41. Battery Setup - Discharge (BDS)

Discharge Selections Area:

Enable - Select to enable the monitor to capture and store discharge data. If not selected, the BDS does not log discharges.

Latch - When selected, the alarm contact stays energized until manually reset. If not selected, the alarm contact de-energizes when the discharge condition clears.

Critical Alarm and **Maintenance Alarm** - Two alarm contacts are available. Select Critical Alarm or Maintenance Alarm to define which contacts energize upon alarm. If neither is selected, alarm reporting is disabled for discharge. These settings do not affect the colors on the bar graph.

Discharge Detection Method Area:

Select **Voltage Mode** or **Current Mode**, then set the threshold **Level** in volts or amps to activate data logging during a discharge. When the voltage goes below the set level or the current exceeds the set level, the monitor begins recording cell voltages, discharge current, and overall voltage. Only one temperature sample is stored at the beginning of the discharge.

Voltage Mode - (Threshold level in volts.) Voltage mode allows data recording during recharge, since data logging does not stop until the voltage goes above the threshold. If measuring discharge current, you should use Discharge Current Mode as a reliable source of trigger.

Current Mode - (Threshold level in amps.) To enable this mode, you must define the Current Channel on Setup|Battery|Parameters.

Report All Discharges - If selected, the monitor reports all discharges to the Central PC. You must enable Remote Reporting on Setup|Battery|General.

Report Problem Discharge Only - If selected, the monitor reports to the Central PC only discharges that exceed voltage or time values set in Problem Discharge Thresholds.

Disable - If selected, stops the BDS from calling out.

Deviation Storage Thresholds Area - This feature does not apply to the BDS.

Problem Discharge Thresholds Area:
Low Cell Voltage, **Low Overall Voltage**, and **Maximum Discharge Time** - Select the voltage or time levels that trigger discharge reporting. These values are only enabled if you select Report Problem Discharge Only on this screen. This setting also affects the bar graph colors on the Cell Voltage String View screen. During a discharge, the bars change color:

> Normal Condition...Green
> Problem Discharge Thresholds or Low Cell Voltage.....................Yellow

15.6. Battery Setup: Digital Input (BDS)

The Digital Input dialog box is available only when connected to String 1 of the BDS controller, as defined on Setup|System|String. The BDS has 16 digital inputs that may be connected to external dry contacts. You may set up these inputs to report an alarm when the external contacts are activated. An alarm can also activate the critical or maintenance relay on the BDS. The following items appear on the Setup|Battery|Digital Input dialog box.
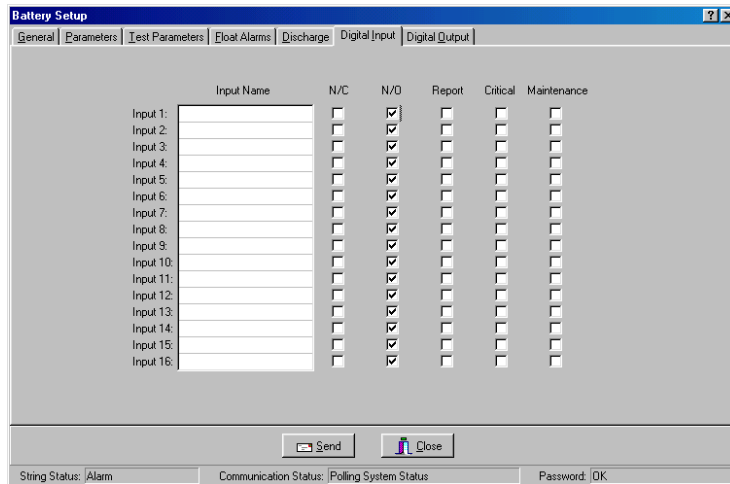
Figure 42. Battery Setup - Digital Input (BDS)

Input Name - Assign a name to the input connected to the external contacts and indicate if the contacts are normally open or normally closed. To disable an input, clear the input name.

N/C - Select the N/C box if the external contacts are normally closed.

N/O - Select the N/O box if the external contacts are normally open.

Report - Selecting this check box lets the monitor report a digital input alarm. When not selected, reporting is disabled for that input.

Critical and **Maintenance** - Two alarm contacts are available. Select Critical or Maintenance to define which contacts energize upon digital input alarm. If neither is selected, the Report check box clears and alarm reporting is disabled for that input. These settings do not affect the colors on the bar graph.

15.7. Battery Setup: Digital Output (BDS)

The Digital Output dialog box is available only when connected to String 1 of the BDS controller, as defined on Setup|System|String. The following items appear on the Setup|Battery|Digital Output dialog box.
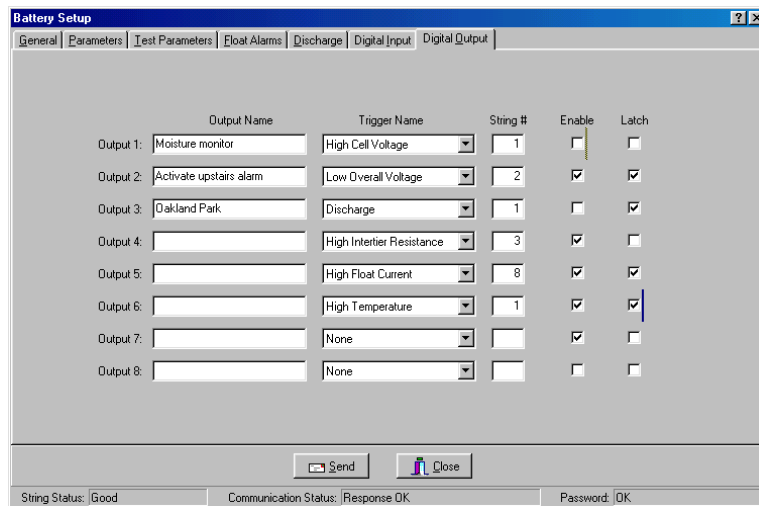
Figure 43. Battery Setup - Digital Output (BDS)

The BDS has eight optional relay contact control outputs you can define to trigger on an alarm event. After an Output Name and Trigger Name are defined, the associated digital output can change state on an alarm to control a user-selected device. If you select Latch, the output latches. The relay is a Form C contact that de-energizes when the alarm condition is reset.

Output Name - Type a name that describes the external device you are controlling.

Trigger Name - From the drop-down list, select a parameter that energizes the Control Output relay contact.

String # - The BDS Controller can have up to eight strings. In the String # box, type the number that corresponds to the string number on System Setup|String.

Enable - Select Enable to energize a rear panel Control Output contact on a trigger event.

Latch - When selected, the Control Output contact energizes until manually reset. If not selected, the Control Output de-energizes when the trigger event clears.

16. Connecting to a Battery Location

Connection

This section explains how to use the BMDM program to connect to a location. At this point, the computer and monitor should have been synchronized using the Check Settings dialog boxes. You may connect to a battery location site (MPM or BDS) via modem or network from a remote location or on-site using the network or RS-232 Local port. These connection methods let you check all battery parameters. If you cannot connect to a location, refer to the *Synchronizing Using the Check Settings* section of this manual. If you are using a Service computer, refer to the Service computer notes in the same section.

16.1. Connecting via a Modem

Confirm Setup|System|Link is configured for a modem connection. Select the string you want to connect to from the String Status screen, then click the Connection button to call the number specified under Setup|System|Link. Upon connection, String View displays all real time data.

16.2. Modem Hang Up

When connecting via modem, it may be necessary occasionally to disconnect the modem before the BMDM program connects to the string. To stop modem dial out after clicking the Connection button, click the Hang Up button at the top of the String Status screen. NOTE: If connection is completed and the String View screen appears, closing String View disconnects the modem.

16.3. Connecting via Network

Confirm Setup|System|Link is configured for a network connection. Select the string you want to connect to from the String Status screen, then click the Connection button to connect to the IP address specified under Setup|System|Link. Upon connection, String View displays all real time data.

16.4. Connecting via the RS-232 Local Port

Confirm Setup|System|Link is configured for a direct connection. Select the string you want to connect to from the String Status screen, then click the Connection button. If the site has been set up, String View displays all real time data. If the site was not set up, refer below for new systems that require setup.

17. Viewing Battery and Monitor Status

At BMDM program start, String Status displays a summary of all available monitor systems. The program can sound a **.wav** file alarm, contact a pager, send a fax, or print details of an alarm event. When a monitor reports an alarm, an alarm detail box is displayed until you acknowledge the alarm. The String Status column on the String Status screen lists the condition, and Update Date indicates when the alarm was reported. The Historical Events screen displays the history of all events and more details about the alarm. When there is a new entry, the Historical Events (alarm clock) button flashes. Click it to display the history. The following sections describe these screens.

There are two ways to view data from a battery: real-time and offline.

Viewing battery data in real time means having the computer connected to the monitor via modem, LAN, or an RS-232 cable. After communication is established, String View displays the readings in real time values.

Viewing data offline means viewing data removed from the monitor and stored in the computer database. To view data offline, highlight the site on String Status, then select View|Offline. String View displays data for the site. No voltages are displayed because the system is offline and not connected to the site.

17.1. Opening and Saving a Database and Backup

When the BMDM program starts, the program opens the database that was previously open. To open a different database, select File|Open from the main menu or click the Open button, highlight the desired database, and click Open. You do not need to close the currently open database before opening a new one.

The File|Open Backup selection works the same as File|Open. When the program opens a backup file, it converts the file from a **.zip** to an **.mdb** file.

To save a database as a normal **.mdb** database file, select File|Save As from the main menu. To save the file as a backup with a **.zip** extension, select File|Backup Database or click the Backup Database button. This selection converts the file from **.mdb** back to a **.zip**.

To close a database, select File|Close from the main menu or click the Close button. To create a new database, select File|New.

17.2. String Status

At start-up, the Data Manager displays the String Status screen. The first time the program is run, no strings are listed.
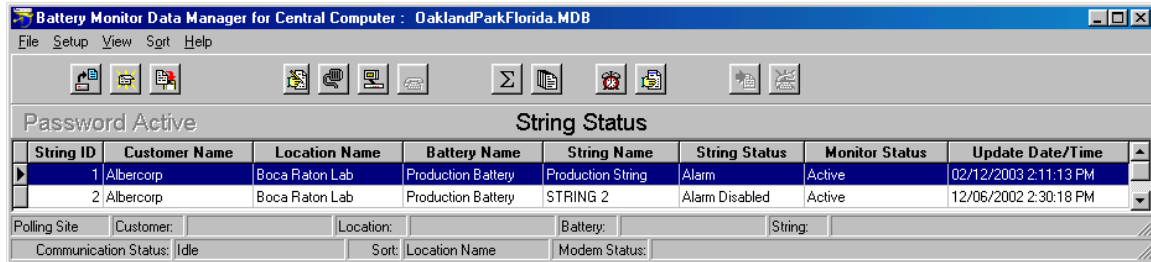
Figure 44. String Status

The communication and status areas on the lower portion of the String Status screen offer summarized information about the polling status, string and location names, connection status, and errors.

String Status has up to eight columns that indicate the status of each string: String ID, Customer Name, Location Name, Battery Name, String Name, String Status, Monitor Status, and Update Date/Time. The columns are updated every time the monitor reports status, you manually call a location, or during a polling sequence. You can hide the String ID, Customer Name, Location Name, and Battery Name columns using Setup|Preferences.

String ID - The string ID is needed only if using a pager. When a page is issued, the numeric message includes the string ID. This number references the string in alarm condition.

String Status - The String Status column can report six conditions on the Historical Events screen, no priority assigned, and eight on the String Status screen, each assigned a priority level. For example, if conditions Alarm and Warning must be reported, when the monitor calls, it reports only Alarm because Alarm has a higher priority than Warning. However, Warning is not lost. When you call to acknowledge and reset the alarm, the Warning status is updated when you disconnect.

Priority Level	Status	Meaning
1	Names do not match	Location, battery or strings names do not match between the hardware and the database.
2	Names need to be set up	The location, battery or strings names are not programmed into the hardware.
3*	DCM Com Error	Communication error between DCM and BDS Controller.
4	Discharging	The battery entered a discharge.
5*	Unknown	The system has not yet been called. (New string entry.)
6*	Discharge Occurred	
7*	Alarm	A battery parameter violated an alarm threshold.
8*	Warning	A resistance reading violated a warning threshold.
9*	Alarm Disabled	
10	Good	System is within normal parameters.

* indicates item also appears on Historical Events screen.

Monitor Status - The Monitor Status column can report ten conditions, which do not have priority ratings assigned.

Status	Meaning
Invalid Data	Data received from the monitor was corrupted.
Check Hardware	Monitor reported a hardware failure. The items checked are described in *Diagnostics – Self Test*.
Network Error	Cannot connect or cannot initialize.
No Dial Tone	No dial tone detected when calling.
Monitor Busy	Busy signal detected when calling.
Modem Error	Modem cannot be initialized.
Inactive	Monitor did not answer. This could, however, be hiding the real problem. With no response, the assumption is the monitor is inoperative. For no dial tone or a busy line, the system attempts to poll one more time.
Active	Monitor answered. Did not report any problems.
Data Corrupt	After connecting to the monitor, you must click Clear Data Memory on the Diagnostics|Memory dialog box.
Comm Error	During autopolling, if computer cannot establish communications after three attempts, this error message is displayed.
Line Busy	The telephone number the modem dialed is busy.
No Answer	The telephone number the modem dialed did not respond.

All the above conditions except Active produce an Unknown in the String Status column.

Update Date/Time - The date and time the status was delivered.

The String Status screen sorts on the String ID column, but may be sorted differently. Click a column header to sort column data in ascending or descending order. To move columns, click and drag a column header onto another column header, then release the mouse button. Optionally, right click the mouse to display the following pop-up menu.

Figure 45. String Status Viewing Selection

Click Strings in Alarm, Strings in Discharge or Strings in Inactive to display a list of a String Status category. The Strings in Inactive screen is shown below. The Strings in Alarm and Strings in Discharge screens are similar.
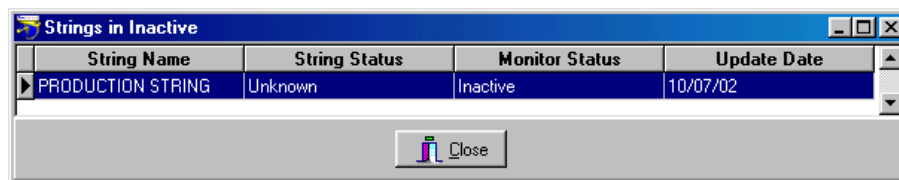
Figure 46. Strings in Inactive
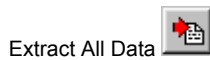
Extract All Data

Extract Data on the pop-up menu is available if Disable Auto Polling / Auto Answering is not checked and Auto Extract Data is checked under Setup|Communication. If you click this menu item, the computer extracts data for the string highlighted on String Status the next time the string is polled. The Extract All Data button on the top of the String Status screen is also enabled at this time. You may extract historic float data, resistance data, and discharge data for all strings listed on String Status by clicking this button.

Get String Status on the pop-up menu is available if any string is connected via modem. If you click this item, the computer calls the string highlighted on String Status and gets the status. Data is not extracted. The Call All Modem Strings button on the top of the String Status screen is also enabled at this time. You may get the present status and alarm events for all strings listed on String Status by clicking this button.

17.3. Report Alarm Event Screens

There are four dialog boxes that appear on String Status when an alarm event occurs: Report Alarm Event, Print Report Alarm Event, Fax Report Alarm Event, and Page Report Alarm Event. If there is an alarm condition, the Report Alarm Event box appears during polling.
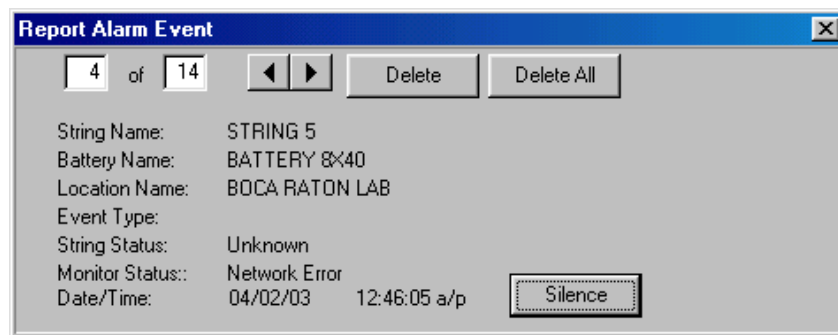
Figure 47. Report Alarm Event

The Print Report Alarm Event, Fax Report Alarm Event or Page Report Alarm Event boxes appear only if Print Alarm Event, Fax Alarm Event or Page On Alarm are checked on Setup|System|Reporting and Disable Alarm Reporting on Setup|Preferences is not checked. These boxes are similar to the Report Alarm Event box. To turn off the audible alarm if it is enabled, click Silence. Click Delete to remove the currently displayed alarm. Click Delete All to remove all displayed alarms. The print, fax, and page event boxes close after the alarm is received by the printer, fax machine or pager.

Show All Alarm Events

Clicking the Show All Alarm Events button at the top of the String Status screen displays the Report Alarm Event dialog boxes. You may view all events by clicking the left or right arrows on the box.

17.4. Summary Screen

Summary Σ

The Summary dialog box displays a status summary of the battery sites. Click the Summary button to display this screen.
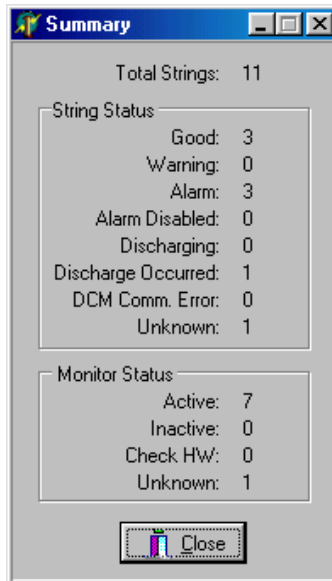
Figure 48. Summary

17.5. Historical Events

Historical Events   Note: View Alarm icon has a ringing clock

Select View|Historical Events or click the Historical Events button on String Status to display the Historical Events screen, which lists reported events and the history of one or all strings. When an event is added, the Historical Events button flashes to indicate a new entry.

Click the column header to sort column events in ascending or descending order. To view a single string, select View|Single String, then select a string name. To move columns, click and drag a column header onto another column header, then release the mouse button. You can hide the String ID, Customer Name, Location Name, and Battery Name columns using Setup|Preferences.

String ID	Customer Name	Location Name	Battery Name	String Name	String Status	Alarm Detail	Monitor Status	Date/Time
2	ALBERCORP	BOCA RATON LAB	BATTERY 8X40	STRING 2	Unknown		Inactive	02/24/2003 3:22:48 PM
2	ALBERCORP	BOCA RATON LAB	BATTERY 8X40	STRING 2	Unknown		Inactive	02/24/2003 3:18:08 PM
8	ALBERCORP	BOCA RATON LAB	BATTERY 8X40	STRING 8	Desconocido		Error de Network	02/25/2002 1:47:47 PM
8	ALBERCORP	BOCA RATON LAB	BATTERY 8X40	STRING 8	Desconocido		Inactivo	02/25/2002 1:47:49 PM
8	ALBERCORP	BOCA RATON LAB	BATTERY 8X40	STRING 8	Desconocido		Error de Network	02/25/2002 1:47:43 PM
8	ALBERCORP	BOCA RATON LAB	BATTERY 8X40	STRING 8	Desconocido		Error de Network	02/25/2002 1:47:45 PM
9	ALBERCORP	BOCA RATON LAB	BATTERY 1X24A	STRING 9	Unknown		Network Error	02/21/2002 3:35:46 PM

View: All Strings   Sort: String Name (A)

Figure 49. Historical Events

Alarm Detail - A computer polling or receiving an alarm call from a monitor receives and displays this information if:

> Remote Reporting options are enabled under Setup|Battery|Float Alarms,
> Remote Reporting is enabled on Setup|Battery|General,
> Report Option is not disabled on Setup|Battery|Discharge, and
> Disable Alarm Reporting is not checked on Setup|Preferences.

The Alarm Detail column can report the following conditions, which do not have priority ratings assigned.

High Cell Voltage at String *n*, Cell *n*	High Intertier Resistance *n*
Low Cell Voltage at String *n*, Cell *n*	Discharge
High Resistance at String *n*, Cell *n*	Digital Input *n*
High Intercell Resistance at String *n*, Cell *n*	UPS Low Voltage
High Overall Voltage	UPS Line Fail
Low Overall Voltage	Pager Busy
High Float Current	Pager Error
Warning at String *n*, Cell *n*	Pager Fail
High Temperature *n*	Unknown
Low Temperature *n*	Inactive

17.6. String View Screens

String View appears after you connect to a site. The following sections describe features common among the voltage, resistance, and intercell resistance screens.

To access another voltage, resistance or intercell resistance screen from a String View screen, click the Cell Voltage (V), Cell Resistance, or Intercell Resistance tab near the top left of the screen. The Intercell Resistance tab appears for a BDS only after you request a resistance test.

To open a different string, click a string on the drop-down menu near the top of the screen. Only MPM and BDS strings that have the same telephone number, including spaces and commas, appear in the list. MPM strings with a MUX setting of zero do not appear in the list.

The String View top title bar displays S: B: and L: for string, battery, and location names.

To read the actual level of an individual cell, refer to *Cell Voltage Box*. To perform a trend analysis, refer to *Trend Analysis*. You may zoom in on the bar graph by placing the cursor over the bars and dragging a rectangle over the area of interest while holding the left mouse button. To restore the graph to the original size, type Ctrl-U or click View|Undo Zoom.

17.7. Cell Voltage (String View Screen)

The String View - Cell Voltages screen displays bar graphs that indicate the voltage of each cell or module within the battery. A summary of the readings appears at the bottom of the screen. The cells with the minimum and maximum readings are indicated with a number (*n*) in parentheses. If the optional current channel and temperature transducers are installed, readings from these also appear. If you click on a cell, the voltage value for the cell appears in the box near the top left of the screen.
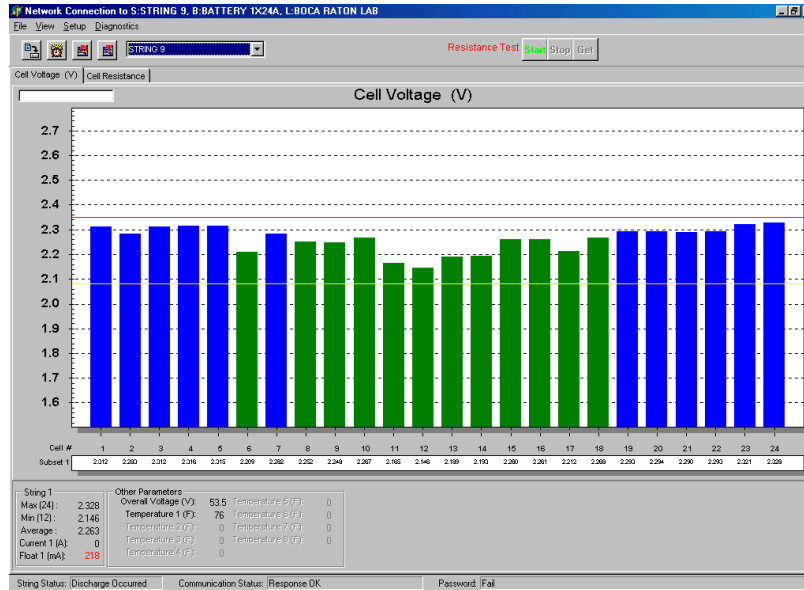
Figure 50. String View - Cell Voltages (MPM shown)

You may be able to click some of the text in the lower portion of the String View screen to display detailed screens specific to the item clicked. For example, clicking Other Parameters - Overall Voltage results in the following screen appearing.
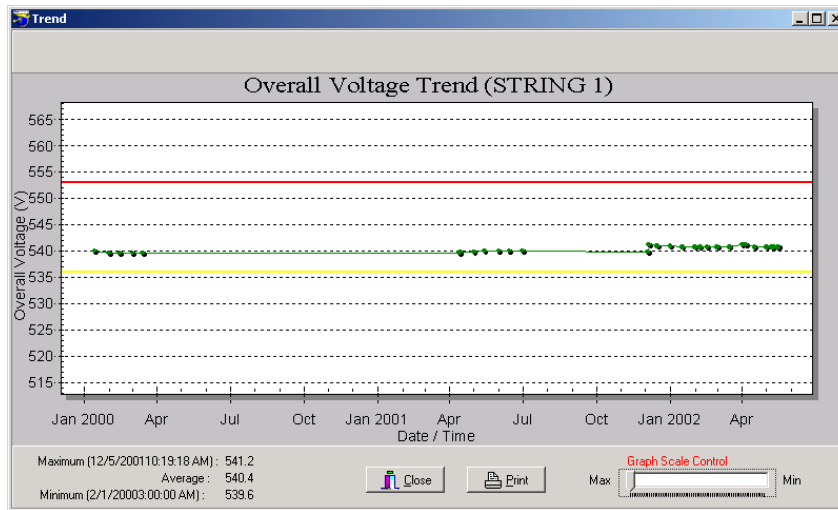
Figure 51. Overall Voltage Trend

The above screen is typical of those that appear when clicking linked text on the lower portion of the String View screen.

Save History Record

Saving - At any time, you can save (store) a history record with the values currently displayed. Click the Save History Record button or select File|Save History Record to capture the readings, stamped with the date and time taken.

The String Status box on the bottom left of the String View screen can report nine conditions.

Priority Level	Status	Meaning
1	DCM Com Error	Communication error between DCM and BDS Controller.
2	Discharging	The battery entered a discharge.
3	R-Test in Progress	Resistance test in progress.
4	Calibration in Progress	
5	Check Hardware	Monitor reported a hardware failure. The items checked are described in *Diagnostics – Self Test*.
6	Discharge Occurred	
7	Alarm	A battery parameter violated an alarm threshold.
8	Warning	A resistance reading violated a warning threshold.
9	Good	System is within normal parameters.

17.8. Cell Resistance and Intercell Resistance (String View Screen)

You may read internal cell resistance and intercell resistance by having a timer under Setup|Battery|Test Parameters run the test automatically, or you may start the test from the String View - Cell Resistance screen. The BMDM program reads cell and intercell resistance at the same time. The Cell Resistance and Intercell Resistance screens display the bar graphs. The Intercell Resistance tab (BDS only) appears after the BMDM performs a resistance test. An intercell reading option is required in the BDS.

Click the String View - Cell Resistance tab to transfer resistance readings from the monitor to the computer. It may take a moment before the bar graphs appear. If no readings exist, a message indicates this. If readings are available, the Data Manager displays the latest set and saves them to the database, with the date and time taken.
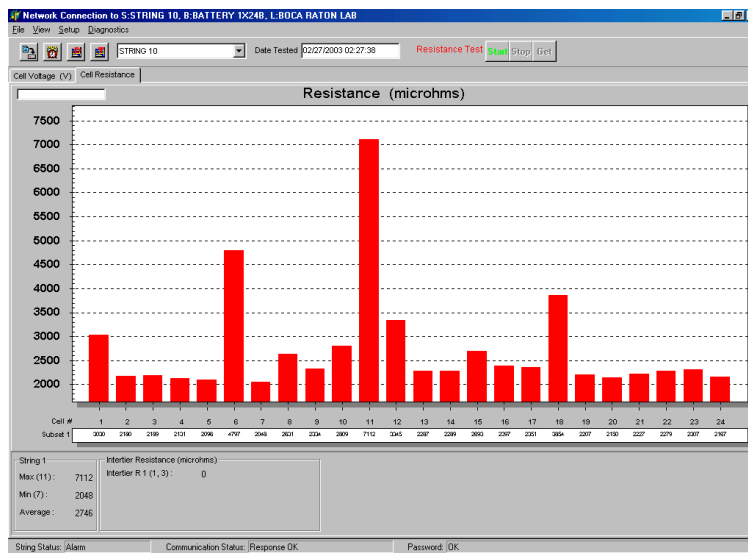
Figure 52. String View - Cell Resistance (MPM shown)

Start, Stop and Get **Start** Stop Get

To start a resistance test and capture new readings, click Start. After a few minutes, the 'test in progress' message disappears, the monitor Resistance Test LED goes out, and the Get button becomes active. Click Get to display the readings and transfer them to the computer. The bottom of the screen displays a summary of the resistance and intertier values. To stop the test before completion, click Stop.
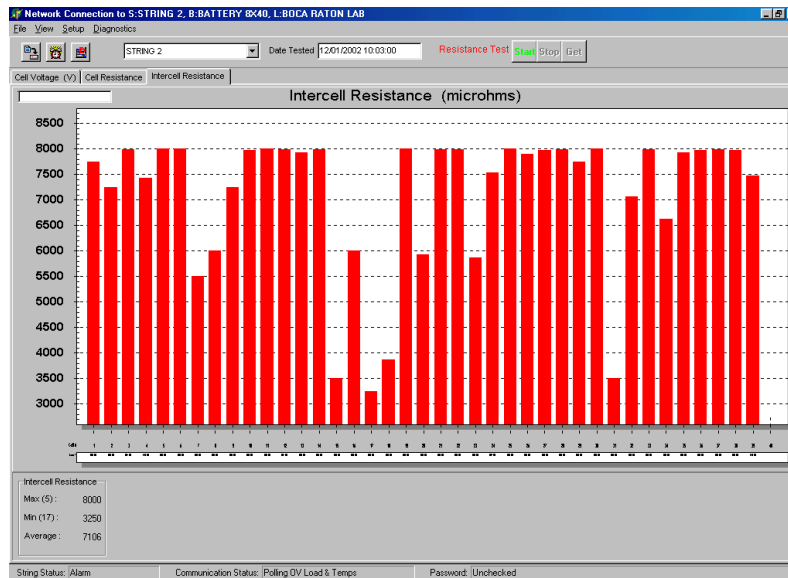
Figure 53. String View - Intercell Resistances (BDS)

The view the Intercell Resistance bar graph, click the Intercell Resistance tab.

NOTE: Clicking Start when using a BDS selects all DCM's for testing. For troubleshooting, you may select Diagnostics|R-Test in a DCM and choose which DCM's to resistance test. See *Resistance Testing Multiple DCM Units*.

17.9. Cell Voltage Box

To display the numerical value of an individual cell on the String View - Cell Voltage screen, click a bar graph. The value appears in an area at the top left of the bar graph. To display the Cell Voltage box, hold the Alt key while clicking on a bar graph. The Cell Voltage box appears to the right of the bar graph.
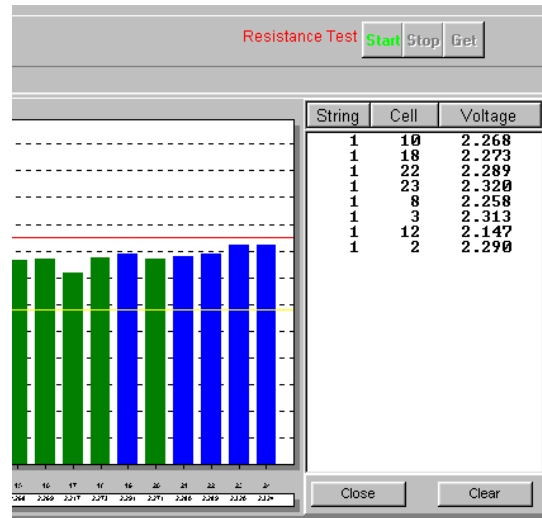
Figure 54. Cell Voltage Box

You may create a list of cells in the Cell Voltage box and monitor the voltages, which are continually updated. This is convenient when monitoring a discharge. To add cells to the list, hold the Alt key and click a cell bar graph. To sort the list, click the String, Cell or Voltage column header.

17.10. *Trend Analysis*

To perform a voltage, resistance or intercell resistance trend analysis for a cell, click a bar graph of interest on String View to change it to gray, then right click the selected bar to display a pop-up menu.
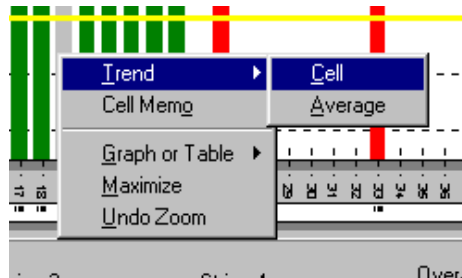
Figure 55. Trend Menu

On this menu, click Trend then Cell or Average to display the trend analysis graph. If the trend analysis dialog box has active **Previous Parameter** or **Next Parameter** arrows, you may click them to view other cells. All trend analysis screens have a Print button that allows printing of the graph.
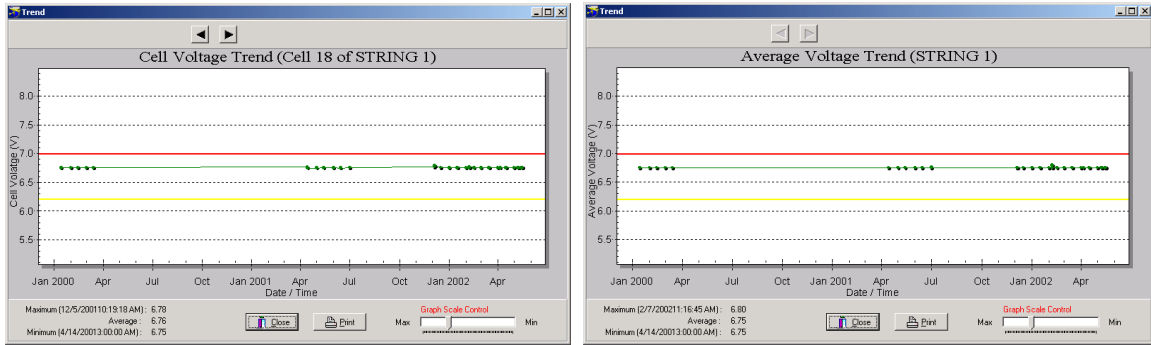
Figure 56. Trend - Cell Voltage / Average Voltage

The trend analysis dialog boxes for resistance are shown below.
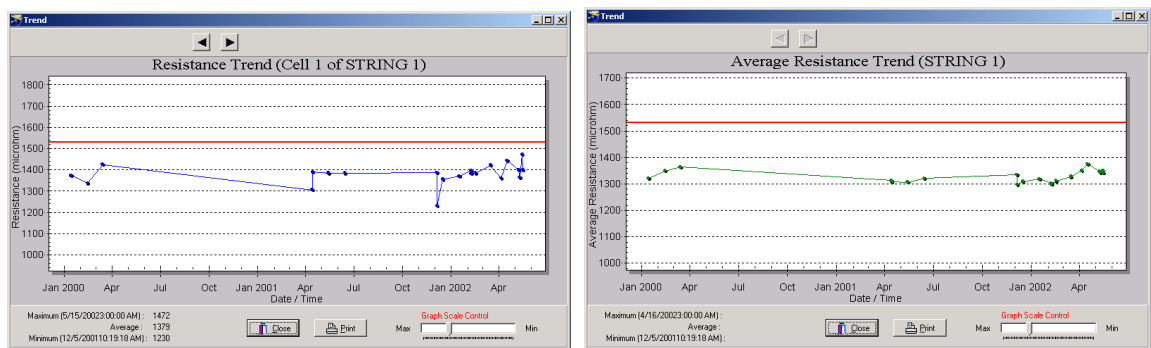
Figure 57. Trend - Cell Resistance / Average Resistance

The trend analysis dialog boxes for intercell resistance are shown below.
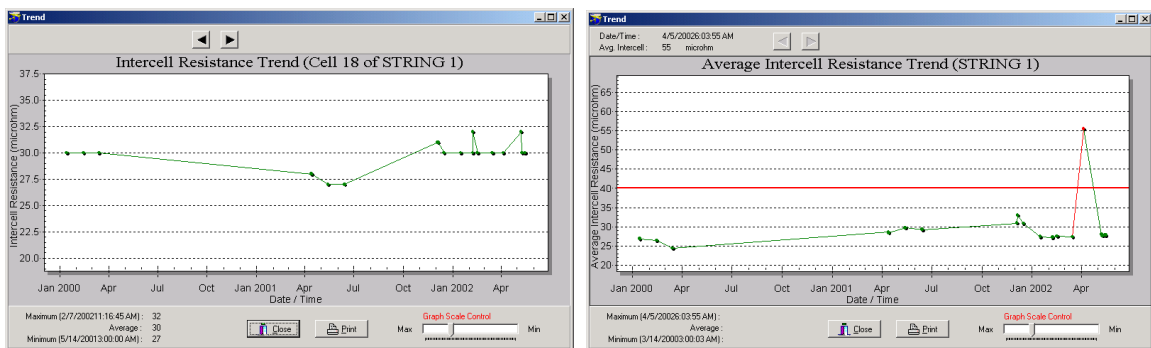
Figure 58. Trend - Intercell Resistance / Average Resistance

Use the Graph Scale Control on the Trend screens to vary the y-axis scale on the graph.

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To display date, time, and voltage or resistance data for a point on the trend analysis graph, click on a dot on the graph. The data point value is useful when you must determine a numerical value (in volts or ohms) and date and time for a particular event on the graph. Right click on a graph to change display features, such as font size, graph shadows, numeric precision, grid lines, etc.

17.11. Alarm Data

View Alarm   Get Current Alarms   Get Current Historical Alarms

Reset Alarm   View Historical Alarms   Select Historical Alarms

The MPM or BDS monitor constantly checks user-programmed threshold values set under Battery Setup. As long as alarms are enabled, the monitor creates a record of thresholds violated. Click View Alarm to check for active alarms. When the Alarm screen is active, the Get Current Alarms, Reset Alarm, Get Current Historical Alarms, and View Historical Alarms buttons on the Current Alarm screen are enabled.

Current Alarms - The Current Alarm screen displays the Active or Latched state of the alarm contacts. **Active** indicates a parameter is presently violating a threshold. The screen displays the alarm name and time the alarm event started. **Latched** indicates the parameter returned back to normal, but the alarm relay remains energized until reset. The end time indicates when the alarm event changed to a latched state. Peak value indicates the highest or lowest value reached during the event. For the latch function to work, you must select latch enable under Battery Setup for each parameter. If latch is not selected, the alarm contact de-energizes when the parameter returns to normal. A record of a present alarm is saved as a Current Historical Alarm.

Current Historical Alarms - The Current Historical Alarm screen displays alarms that returned to normal values and were not set to latch. The status of this alarm is Normal, indicating it returned to a valid value on its own. No reset date or time is displayed. If a current alarm exists and it is reset, an entry is created in Current Historical Alarms at the reset time, and a new current alarm is created because the alarm condition still exists. Reset means a latched alarm was reset. The reset date and time column indicates when the reset occurred. Peak Value indicates the highest or lowest value the parameter reached during the event. When you access Current History, data is transferred from the monitor to the database and saved under Historical Alarms. If you access Current History using a Central computer, the Current History data is permanently removed from the monitor.

Historical Alarms - The Historical Alarm screen shows a history of alarms transferred to the computer database using the Current History command.

Figure 59. Current Alarm List

If you click Get Current Alarms or select View|Current Alarm, active or latched alarms in the monitor are retrieved. These alarms stay active until the condition clears or you click Reset Alarm. However, if you click Reset Alarm and the violation still exists, the alarm reappears in the Current Alarm list.

The Get Current Historical Alarms button or View|Current Historical Alarm retrieves a list of alarms that may have been reset or cleared on their own but are still in monitor memory. The View Historical Alarms button or View|Historical Alarm displays a list of alarm events that pertain to the battery and are saved in the database.

Figure 60. Historical Alarm List

If any alarm records exist, you may click the Select Historical Alarms button or select View|Selection to display the Historical Alarm Selection dialog box, then choose alarm filters, such as All Dates or Selected Types, so only alarms of interest appear.

To delete alarms from the database, from the main menu, select File|Delete or File|Delete All. NOTE: If the Historical Alarm list is filtered using the Historical Alarm Selection box, selecting File|Delete All will delete all alarms in the database, not just those in the list on the screen.
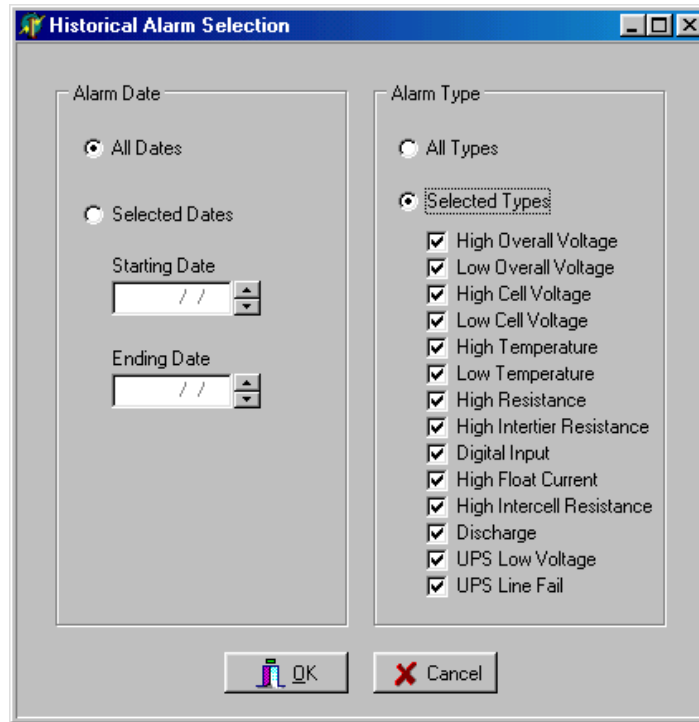
Figure 61. Historical Alarm Selection

17.12.   *Discharge Data*

View Discharge   View Load Test   Discharge Replay   Discharge Curve

From String View, click View|Load Test (MPM only) or View|Discharge (MPM or BDS) to display the All Load Tests or All Discharges screen, which lists records for the connected string. View Load Test displays discharges detected by user-programmed tests. View Discharge displays automatically detected discharges.

NOTE: If System Status on the bottom left of the String View screen indicates *Discharging*, *Logging Discharge Data* or *R-test in Progress*, the View Discharge and View Load Test buttons and menu selections are disabled.
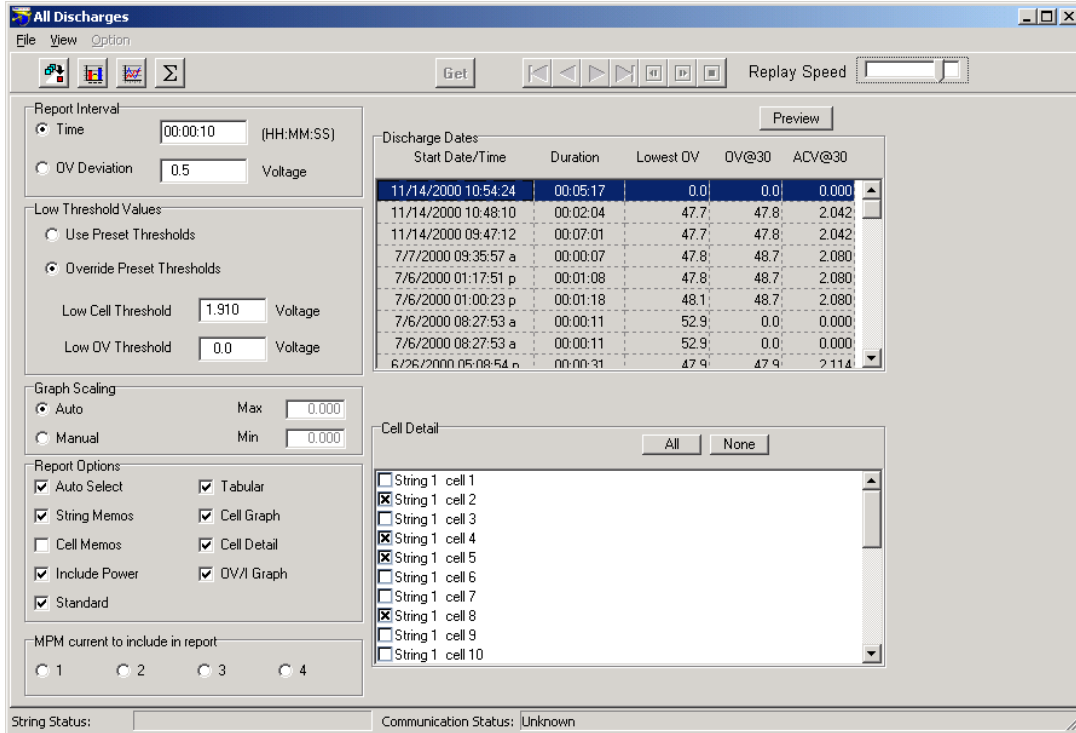
Figure 62. All Discharges List (MPM shown)

The BDS and MPM All Discharges dialog boxes are identical, except the MPM screen has the MPM Current to Include in Report selection described below. The following items are on the All Discharges dialog box.

Time and **OV Deviation** - Click the Time or OV Deviation button in the Report Interval area and type a value in the box. The Report Interval determines the frequency of report sampling. If Time is selected, replay time advances in selectable increments measured against real-time. For example, if 00:10 is selected, playback advances 10 seconds every second. If Overall Voltage is selected, playback advances each time the selected voltage changes. For example, if 0.1 is selected, playback advances each time a 100 mv deviation in overall voltage occurs. Specify time in hours, minutes, and seconds (10 second minimum) or OV (overall voltage) deviation in volts (0.2 volt minimum).

Use Preset Thresholds - Click this button to use values set in the BMDM program when the test was run.

Override Preset Thresholds - To ignore BMDM program thresholds, click this button and type values in the Low Cell Threshold and Low OV Threshold boxes to identify cells that exceed critical levels. Any measurement below these values will be in violation.

Graph Scaling - Click Auto to default to automatic graph scaling, or click Manual and type maximum and minimum graph scale values. Manual scaling is useful when you want to maintain scaling to make it easier to compare several graphs.

Auto Select - Select this box to automatically select cells (listed on the right side of the screen) that violate the threshold values. If you change the cell or OV threshold values, cells that meet the new criteria are selected. You may add cells to the report by selecting additional check boxes in the list.

String Memos and **Cell Memos** - Select this box to include string memos and cell memos.

Include Power - Select Include Power to list power in reports, in addition to voltage and current.

General - General report. Cells are listed by string, and strings are listed by time in a Cell = Value format.

Tabular - Tabular general report. Contains the same information as a general report, but in a spreadsheet format, with Cells vs. Time.

Cell Graph - Click to create a report that includes a cell graph.

Cell Text - Click to create a report that includes cell text.

OV/I Graph - Click to create a report that includes Overall Voltage and Load Current graphs.

MPM Current to Include in Report (MPM only) - Choose up to four current channels **Current 1** to **Current 4** to view simultaneously if they are connected.

Discharge Dates - This area lists the start date and time, duration, lowest OV, OV@30, and ACV@30 of all discharges. The Lowest OV column lists the lowest value reached during the discharge. OV@30 lists the overall voltage 30 seconds into the discharge, and ACV@30 lists the average cell voltage 30 seconds into the discharge. Click on the discharge for which the report will be generated. Only one discharge date can be selected for a report.

Cell Detail - To manually select cells, click the cells in the list to include in the report, or click All to select all items. If Auto Select is selected, cells that violate thresholds are already selected. To clear all selected items, click None. If more than one subdirectory of cell data is available, tabs for each subdirectory appear above the list of cell names.

Preview - Click the Preview button to create a report and display it on the Preview screen. Refer to the *Preview Screen* section.

Replay Speed - Adjust this slider to have a replay run faster or slower. You may do this while the replay is in process.

Options selected on the All Discharge screen are saved by the battery name.

After selecting a discharge from the list by clicking it, you can perform two types of analysis. Click Discharge Replay to play back the discharge. Click Discharge Curve to display line graphs of up to three specified parameters.

17.12.1.   Discharge Replay

Click the Discharge Replay button to display the Discharge Replay screen.
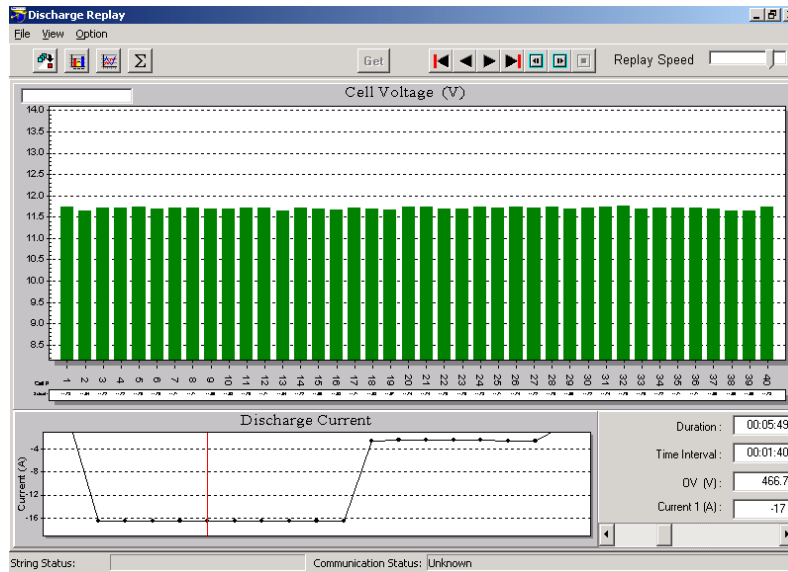
Figure 63. Discharge Replay

Show First, Show Previous, Show Next, Show Last, Replay Backward, Replay Forward, and Stop

The play buttons are at the top of the Discharge Replay screen. Click Replay Forward to play the discharge. The display advances either by time or voltage at the rate selected. A Replay Speed slider is at the upper right of the screen.

The Change Elapsed Time slider at the lower right of the screen causes the bar graph to display the cell voltages for the time selected. The Duration, Time Interval, Overall Voltage, and Current are indicated above the slider.

17.12.2.   Discharge Curve

Click the Discharge Curve button to display the Discharge Curve dialog box. The play buttons are at the top of the Discharge Curve screen. Click Replay Forward to play the discharge. The display advances either by time or voltage at the rate selected. A Replay Speed slider is at the upper right of the screen. The Change Time slider at the bottom causes the values on the right to indicate levels for the time selected.
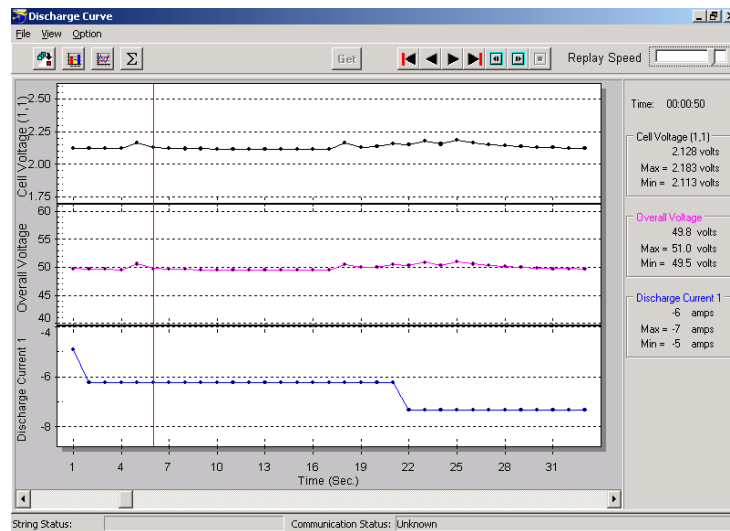
Figure 64. Discharge Curve

From the Main Menu, select Option|Curve Option to display the Curve Option box, which lets you select up to three parameters for viewing.
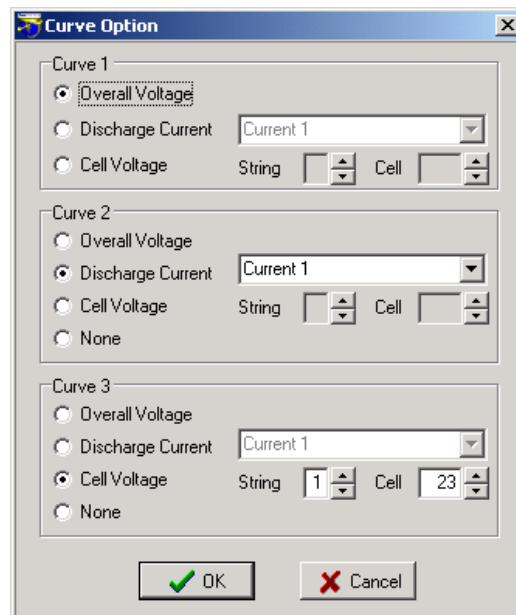
Figure 65. Curve Option

In the Curve 1, 2 or 3 areas, select Overall Voltage, Discharge Current or Cell Voltage curves. If Discharge Current is selected, choose a Current (for string) 1, 2, 3 or 4 from the drop-down list. NOTE: The MPM has strings 1 to 4 available; the BDS has only string 1.

If Cell Voltage is selected, choose a string and cell number. If you select an invalid current, string or cell number, the area appears on the Discharge Curve dialog box, but no curve is displayed. If you select None in Subset 2 or 3, the area does not appear.

17.13. Cell Memo / String Memo

You may use a Cell Memo or String Memo to save notes for a cell or string to the database using a Local, Central or Service computer.

NOTE: A Service computer can store a string memo in the monitor, but not a cell memo. The Service computer saves the string memo in the its database and monitor memory; the memo is removed from monitor memory if manually imported or the Central computer performs an automatic data extraction.

To create a cell memo, at String View, click a cell then right click the cell. On the pop-up menu, click Cell Memo. The Cell Memo dialog box appears. Click the New button and type the data and memo. To have the installation date, model, and serial number apply to all cells in the string, check Entire String. To save the memo, click Save. If Entire String was checked, when you select Cell Memo and click New for any other cell, the installation date, model number, and serial number data appears.
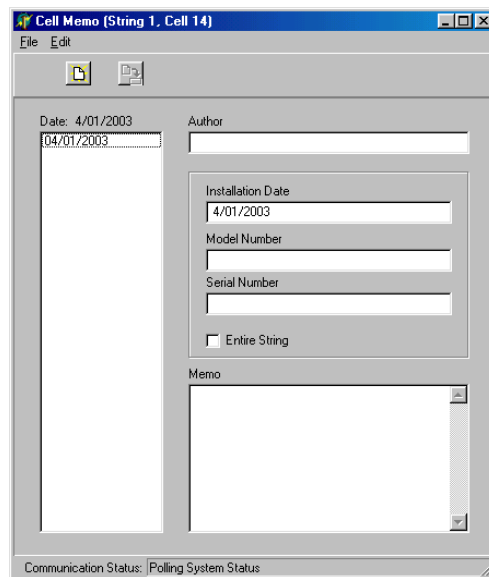
Figure 66. Cell Memo

To create a string memo, on String View, click View|String Memo. After the String Memo dialog box appears, type a global memo that applies to the entire string. To save the memo, click Save.
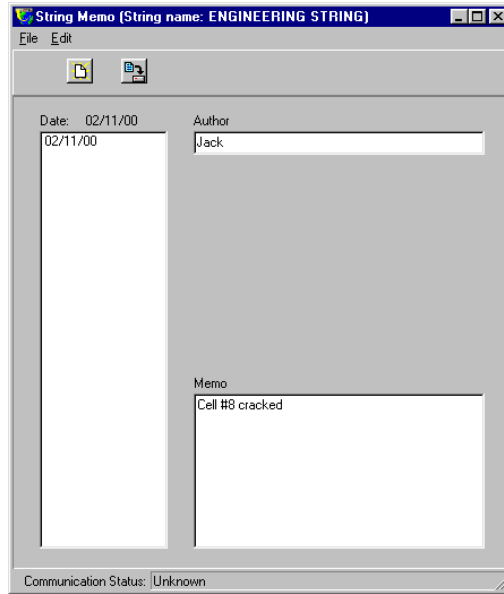
Figure 67. String Memo

To import a string memo into the Central computer database that was entered into the monitor using a Service computer, on the String Memo dialog box, select File|Import. This removes the memo from monitor memory.

18. *Using the Report Generator*

The Battery Monitor Data Manager (BMDM) Report Generator reads data files generated by the BMDM program and creates customized reports. After a BMDM-controlled system reads voltage or resistance, the data is saved to a file, and it is this data, presented in report format, that battery monitoring personnel rely on to analyze battery system performance. The Report Generator displays and prints pages of text and graphs and saves reports in an archive (**.ZRF**)format that protects against changes and ensures the integrity of the information. You may also view and print ZRF files using the Archive Reader program.

From String View, use View|Reports on the menu bar to access nine Report Generator setup dialog boxes: Detail Cell Voltage Setup, Detail Cell Resistance Setup, Trend Cell Voltage Setup, Trend Cell Resistance Setup, Trend Overall Voltage Setup, Trend Temperature Setup, Discharge Setup, Alarms Setup, and Summary Setup. Use these dialog boxes to create Detail and Trend reports. Choose a Detail report to generate a report on an entire string by date. Choose a Trend report to generate a report on an individual cell or cells, temperature, or overall voltage over a range of dates.

18.1. *Detail Cell Voltage Report*

To create a Detail Cell Voltage report, from the String View screen, click View|Reports|Detail|Cell Voltage. The Detail Cell Voltage Setup dialog box appears.
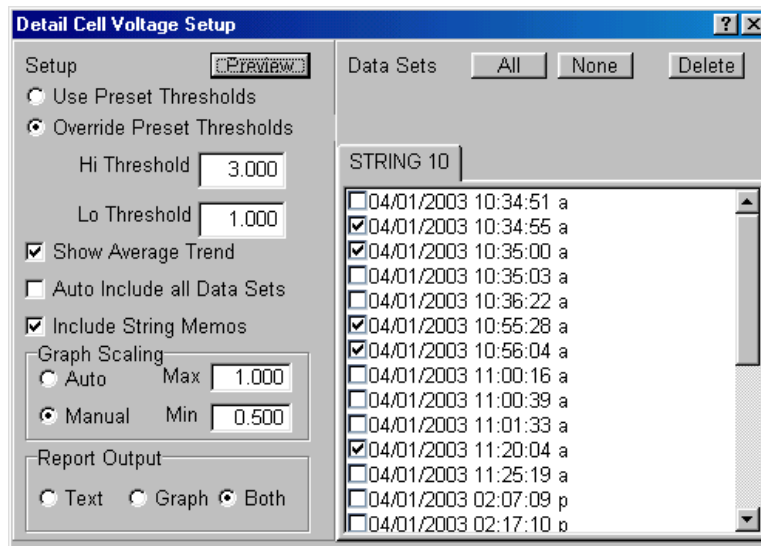
Figure 68. Detail Cell Voltage Setup

The following items are on the Detail Cell Voltage Setup dialog box.

Use Preset Thresholds - Click this button to use values set in the BMDM program when the test was run.

Override Preset Thresholds - To ignore BMDM program thresholds, click this button and type values in the Hi Threshold and Lo Threshold boxes.

Show Average Trend - Select this box to generate a graph that shows the average voltage of all the cells in the string for each date selected.

Auto Include All Data Sets - Select this box to automatically select string data sets (listed on the right side of the screen) that violate high or low threshold values. If you change the threshold values, data sets that meet the new criteria are selected. You may add data sets to the report by selecting additional check boxes in the list.

Include String Memos - Select this box to include string memos.

Graph Scaling - Click Auto to default to automatic graph scaling, or click Manual and type the maximum and minimum graph scale values. Manual scaling is useful when you want to maintain scaling to make it easier to compare several graphs.

Report Output - Click Text to create a report with text only. Click Graph to create a report with graphs only. Click Both to include both text and graphs in the report.

Data Sets - All, None or **Delete** - To manually select string data sets, click the data sets in the list to include in the report, or click All to select all items. If Auto Include All Data Sets is selected, strings that violate thresholds are already selected. To clear all selected items, click None. To delete all selected items from the database, click Delete. NOTE: If the selected range contains no data, no dates appear in the Data Sets area.

Preview - Click the Preview button to create a report and display it on the Preview screen. Refer to the *Preview Screen* section.

18.2. Detail Cell Resistance Report

To create a Detail Cell Resistance report, click View|Reports|Detail|Cell Resistance. The Detail Cell Resistance Setup dialog box appears.
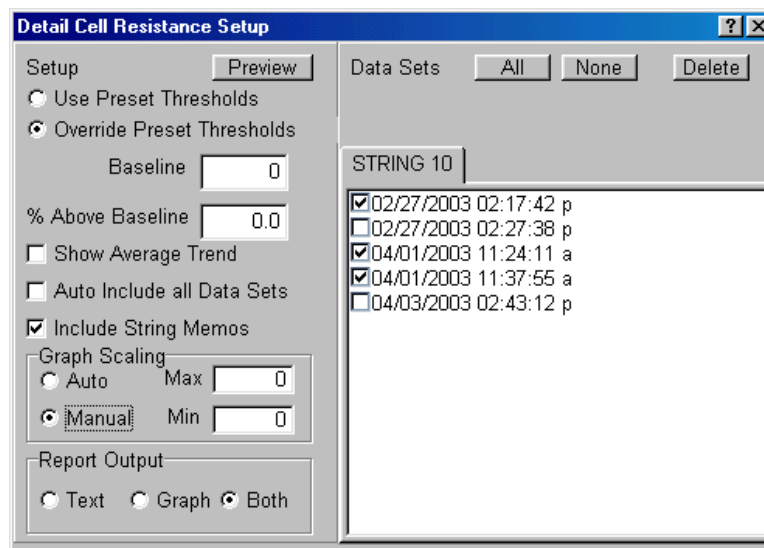
Figure 69. Detail Cell Resistance Setup

The items on the Detail Cell Resistance Setup dialog box are the same as those described in the *Detail Cell Voltage Report* section, with the following exceptions:

Override Preset Thresholds, **Baseline** and **% Above Baseline** - To ignore BMDM program thresholds, click Override Preset Thresholds. In the Baseline box, type the resistance value in microhms. In the % Above Baseline box, type the percentage above which a measurement will be in violation. For example, if the baseline resistance is 300 microhms and the percentage is 10%, any data above 330 microhms violates threshold.

Show Average Trend - Select this box to generate a graph that shows the average resistance of all the cells in the string for each date selected.

After all options are selected, click the Preview button to create a report and display it on the Preview screen. Refer to the *Preview Screen* section.

18.3. Trend Cell Voltage Report

To create a Trend Cell Voltage report, click View|Reports|Trend|Cell Voltage. The Trend Cell Voltage Setup dialog box appears.
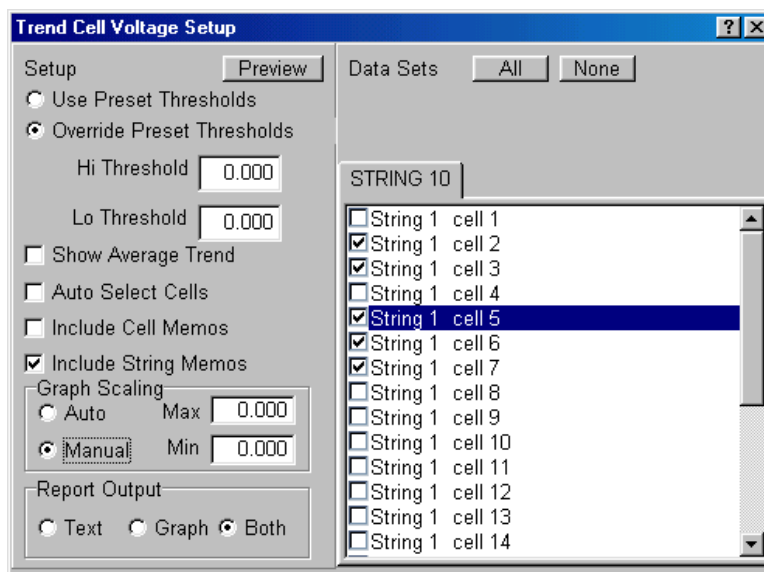
Figure 70. Trend Cell Voltage Setup

The following items are on the Trend Cell Voltage Setup dialog box.

Use Preset Thresholds - Click this button to use values set in the BMDM program when the test was run.

Override Preset Thresholds - To ignore BMDM program thresholds, click this button and type values in the Hi Threshold and Lo Threshold boxes.

Show Average Trend - Select this box to generate a graph that shows the average cell voltage over the range of dates.

Auto Select Cells - Select this box to automatically select cells (listed on the right side of the screen) that violate high or low threshold values. If you change the threshold values, cells that meet the new criteria are selected. You may add cells to the report by selecting additional check boxes in the list.

Include Cell Memos and **Include String Memos** - Select these boxes to include cell and string memos.

Graph Scaling - Click Auto to default to automatic graph scaling, or click Manual and type maximum and minimum graph scale values. Manual scaling is useful when you want to maintain scaling to make it easier to compare several graphs.

Report Output - Click Text to create a report with text only. Click Graph to create a report with graphs only. Click Both to include both text and graphs in the report.

Data Sets - All, None or **Delete** - To manually select cells, click the cells in the list to include in the report, or click All to select all items. If Auto Select Cells is selected, cells that violate thresholds are already selected. To clear all selected items, click None. If the BMDM program was used with an MPM monitor, the list shows string and cell. If a BDS monitor was used, the list shows cell only. To delete all selected items from the database, click Delete. NOTE: If the selected range contains no data, no cells appear in the Data Sets area.

Preview - Click the Preview button to create a report and display it on the Preview screen. Refer to the *Preview Screen* section.

18.4. Trend Cell Resistance Report

To create a Trend Cell Resistance report, click View|Reports|Trend|Cell Resistance. The Trend Cell Resistance Setup dialog box appears.
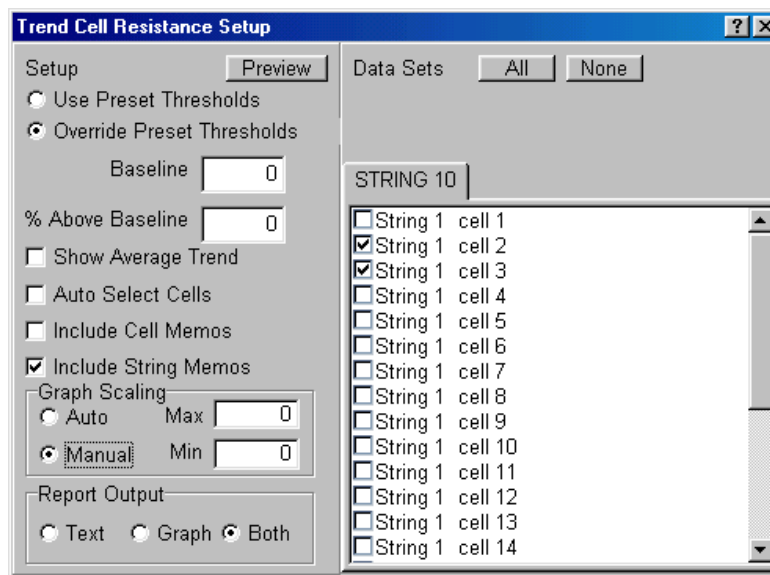
Figure 71. Trend Cell Resistance Setup

The items on the Trend Cell Resistance Setup dialog box are the same as those described in the *Trend Cell Voltage Report* section, with the following exceptions:

Override Preset Thresholds - To ignore BMDM program thresholds, click Override Preset Thresholds. In the Baseline box, type the resistance value in microhms. In the % Above Baseline box, type the percentage above which a measurement will be in violation. For example, if the baseline resistance is 300 microhms and the percentage is 10%, any data above 330 microhms violates threshold.

Show Average Trend - Select this box to generate a graph that shows the average cell resistance over the range of dates.

After all options are selected, click the Preview button to create a report and display it on the Preview screen. Refer to the *Preview Screen* section.

18.5. Trend Overall Voltage Report

To create a Trend Overall Voltage report, click View|Reports|Trend|Overall Voltage. The Trend Overall Voltage Setup dialog box appears.
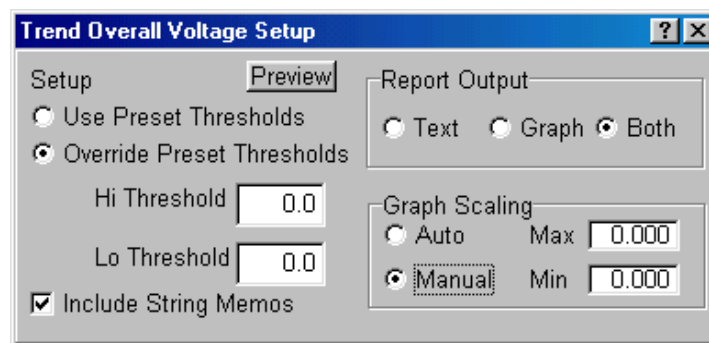
Figure 72. Trend Overall Voltage Setup

The following items are on the Trend Overall Voltage Setup dialog box.

Use Preset Thresholds - Click this button to use values set in the BMDM program when the test was run.

Override Preset Thresholds - To ignore BMDM program thresholds, click this button and type values in the Hi Threshold and Lo Threshold boxes.

Include String Memos - Select this box to include string memos.

Report Output - Click Text to create a report with text only. Click Graph to create a report with graphs only. Click Both to include both text and graphs in the report.

Graph Scaling - Click Auto to default to automatic graph scaling, or click Manual and type maximum and minimum graph scale values. Manual scaling is useful when you want to maintain scaling to make it easier to compare several graphs.

Preview - Click the Preview button to create a report and display it on the Preview screen. Refer to the *Preview Screen* section.

18.6. Trend Temperature Report

To create a Trend Temperature report, click View|Reports|Trend|Temperature. The Trend Temperature Setup dialog box appears.
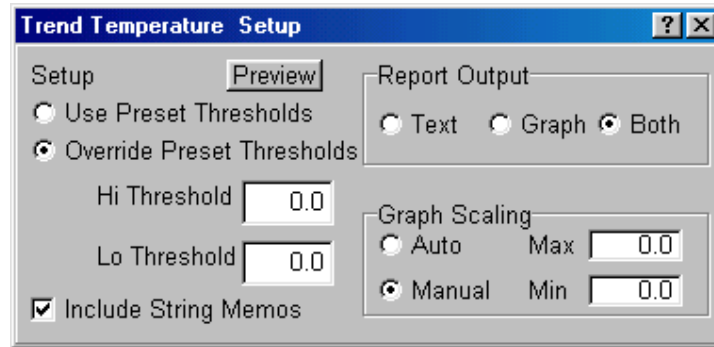
Figure 73. Trend Temperature Setup

The items on the Trend Temperature Setup dialog box are the same as those described in the *Trend Overall Voltage Report* section.

18.7. Discharge Report

To create a Discharge report, click View|Reports|Discharge. The Discharge Setup dialog box appears.
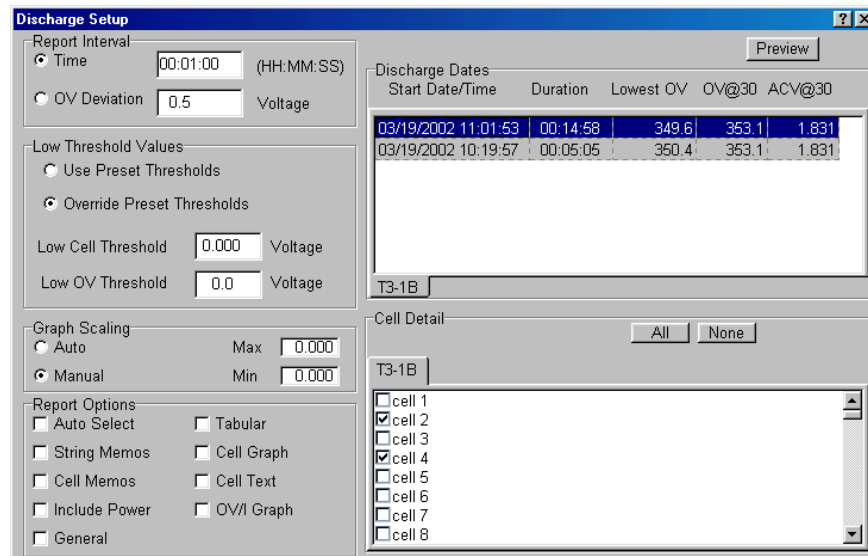
Figure 74. Discharge Setup

The following items are on the Discharge Setup dialog box.

Time and **OV Deviation** - Click the Time or OV Deviation button in the Report Interval area and type a value in the box. The Report Interval determines the frequency of report sampling. Specify time in hours, minutes, and seconds (10 second minimum) or OV (overall voltage) deviation in volts (0.2 volt minimum).

Use Preset Thresholds - Click this button to use values set in the BMDM program when the test was run.

Override Preset Thresholds - To ignore BMDM program thresholds, click this button and type values in the Low Cell Threshold and Low OV Threshold boxes. Any measurement below these values will be in violation.

Graph Scaling - Click Auto to default to automatic graph scaling, or click Manual and type maximum and minimum graph scale values. Manual scaling is useful when you want to maintain scaling to make it easier to compare several graphs.

Auto Select - Select this box to automatically select cells (listed on the right side of the screen) that violate the threshold values. If you change the cell or OV threshold values, cells that meet the new criteria are selected. You may add cells to the report by selecting additional check boxes in the list.

String Memos and **Cell Memos** - Select this box to include string memos and cell memos.

Include Power - Select Include Power to list power in reports, in addition to voltage and current.

General - General report. Cells are listed by string, and strings are listed by time in a Cell = Value format.

Tabular - Tabular general report. Contains the same information as a general report, but in a spreadsheet format, with Cells vs. Time.

Cell Graph - Click to create a report that includes a cell graph.

Cell Text - Click to create a report that includes cell text.

OV/I Graph - Click to create a report that includes Overall Voltage and Load Current graphs.

Discharge Dates - This area lists the start date and time, duration, lowest OV, OV@30, and ACV@30 of all discharges. The Lowest OV column lists the lowest value reached during the discharge. OV@30 lists the overall voltage 30 seconds into the discharge, and ACV@30 lists the average cell voltage 30 seconds into the discharge. Click on the discharge for which the report will be generated. Only one discharge date can be selected for a report.

Cell Detail - To manually select cells, click the cells in the list to include in the report, or click All to select all items. If Auto Select is selected, cells that violate thresholds are already selected. To clear all selected items, click None. If more than one subdirectory of cell data is available, tabs for each subdirectory appear above the list of cell names.

Preview - Click the Preview button to create a report and display it on the Preview screen. Refer to the *Preview Screen* section.

Options selected on Discharge Setup are saved by the battery name.

18.8. Alarm Report

To create an Alarm report, click View|Reports|Alarm. The Alarms Setup dialog box appears.
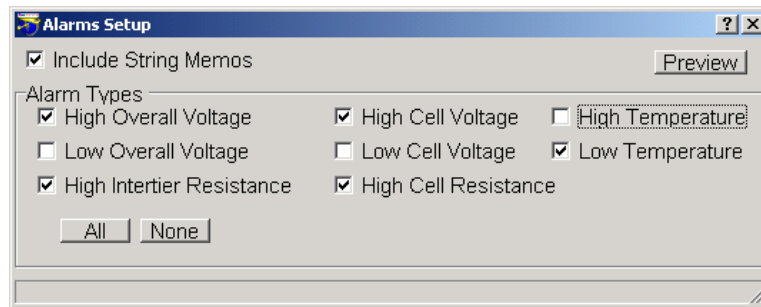
Figure 75. Alarms Setup

The following items are on the Alarms Setup dialog box.

Include String Memos - Select this box to include string memos in the report.

Alarm Types - Alarm types that you may include in the report are high and low overall voltage, high intertier resistance, high and low cell voltage, high cell resistance, and high and low temperature. Select these items to include full details of each alarm, not just a summary.

Preview - Click the Preview button to create a report and display it on the Preview screen. Refer to the *Preview Screen* section.

Options selected on Alarm Setup are saved by the battery name.

18.9. Summary Report

To create a Summary report, click View|Reports|Summary. The Summary Setup dialog box appears.
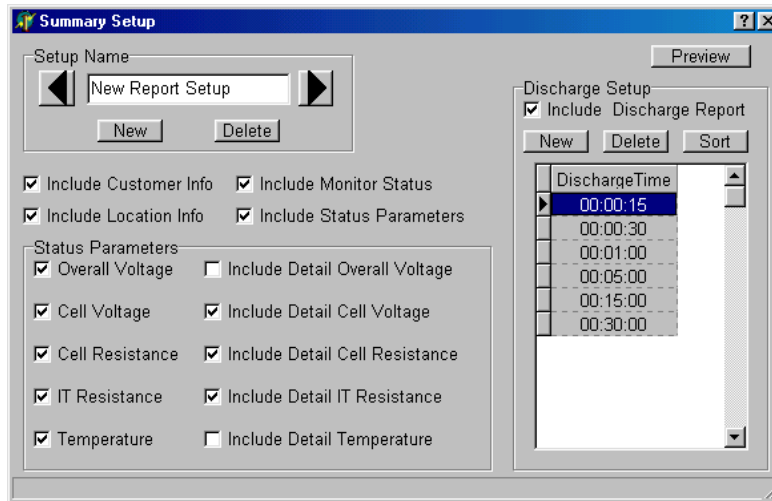
Figure 76. Summary Setup

Summary Report

A Summary report created using View|Reports|Summary includes data only for the string to which the system is currently attached. To create a Summary report for all the strings in the system, use the Summary Report button on the top of the String Status screen. The setup screen using this button is identical to the one using View|Reports|Summary. The following items are on the Summary Setup dialog box.

Setup Name - You can save the options and discharge times you select as a template, so you do not have to choose them each time you generate a report. After choosing the options, type a name in the Setup Name box and click New in the Setup Name area to save the template. To view existing templates, click the arrows. To delete a template, display it and click Delete in the Setup Name area. NOTE: Although the same name can be used for different templates, you may want to use a unique name for each template.

Include Customer Info - Include the customer name, address, and contact information.

Include Location Info - Include the location name, address, and contact information.

Include Monitor Status - Include the last known monitor status.

Include Status Parameters - Select this option to enable items in the Status Parameters area.

Overall Voltage and **Include Detail Overall Voltage** - Select Overall Voltage to include status, date and time, and overall voltage in the report. Overall Voltage must be enabled to select Include Detail Overall Voltage, which displays a graph of all values that violate threshold levels.

Cell Voltage and **Include Detail Cell Voltage** - Select Cell Voltage to include status, date and time, and average cell voltage in the report. Cell Voltage must be enabled to select Include Detail Cell Voltage, which displays a graph of all values that violate threshold levels.

Cell Resistance and **Include Detail Cell Resistance** - Select Cell Resistance to include status, date and time, and average cell resistance in the report. Cell Resistance must be enabled to select Include Detail Cell Resistance, which displays a graph of all values that violate threshold levels.

IT Resistance and **Include Detail IT Resistance** - Select IT (Intertier) Resistance to include status, date and time, and highest intertier resistance reading in the report. IT Resistance must be enabled to select Include Detail IT Resistance, which displays a graph of all values that violate threshold levels.

Temperature and **Include Detail Temperature** - Select Temperature to include status, date and time, and average temperature reading in the report. Temperature must be enabled to select Include Detail Temperature, which displays a graph of all values that violate threshold levels.

Include Discharge Report - Select Include Discharge Report to include a list of discharges with cumulative time. Refer to the *Discharge Time* item below.

New, **Delete** and **Sort** - In the Discharge Setup area, click New to add a new time, then double-click on the time to change it. To delete a time, click on it then click Delete. To sort the times in the list, click Sort.

Discharge Time - In this area, type discharge times. These times determine test intervals. Any discharges that occur between these intervals are listed on the report. A pie chart on the report displays the percentage of discharge duration between the intervals.

Preview - Click the Preview button to create a report and display it on the Preview screen. Refer to the *Preview Screen* section.

18.10. Summary Report for All Strings

Summary Report

A Summary report created using View|Reports|Summary includes data only for the string to which the system is currently attached. To create a Summary report for all the strings in the system, click the Summary Report button on the upper portion of the String Status screen. The setup dialog box is identical to the one using View|Reports|Summary and is described in the *Summary Report* section. NOTE: A report generated using this feature may be more than 100 printed pages long.

18.11. Preview Screen

After all report parameters are selected, to view the report on the screen, click Preview. To change the size of the page display, click Page, Width or Full. To view different pages, click the first, previous, next or last page arrows on the toolbar.
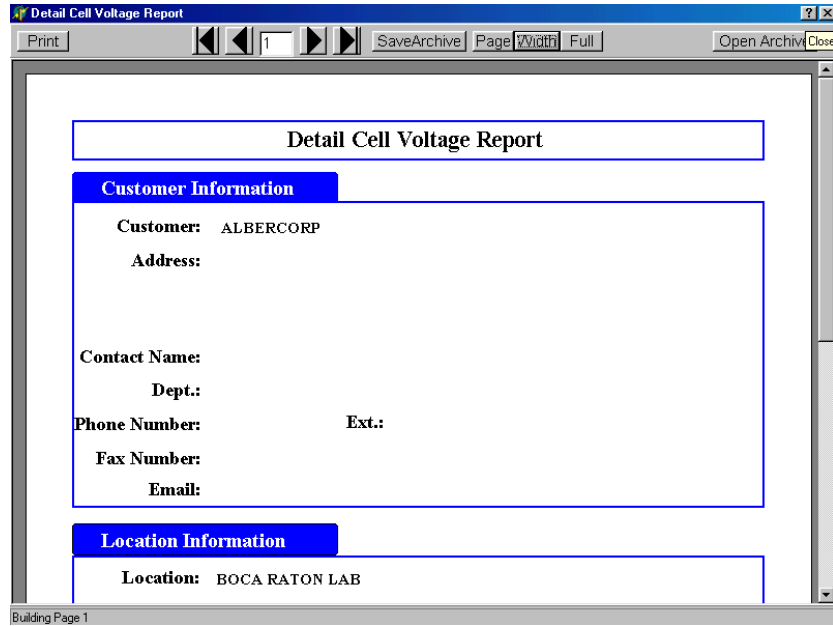
Figure 77. Preview (Typical Screen)

The Discharge Report preview screen is different from the other preview screens. This screen has tabs along the top that let you select different sections of the report. These tabs are labeled Battery Info, Cell Summary, Standard, Cell Detail, Tabular, Detail Graph, and Battery Graph.
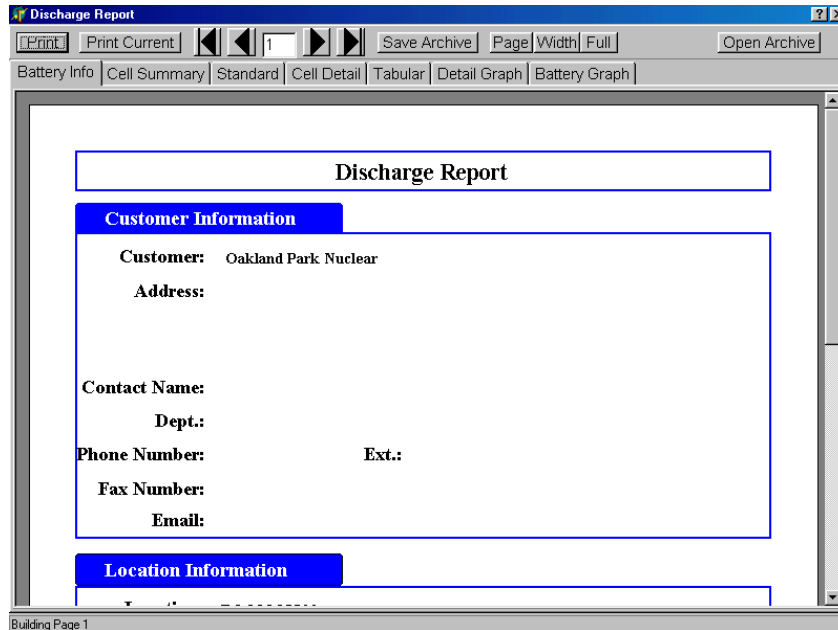
Figure 78. Preview (Discharge Report)

To view a section of the report, click a tab. To view different pages in one section, click the first, previous, next or last page arrows on the toolbar.

18.12. Saving a Report in Archive (.ZRF) Format

The Report Generator can save a report as an archive (.ZRF) file, which cannot be changed after it is saved. Archive format lets you distribute the report file while ensuring the integrity of the data. The file can be opened by the Report Generator or the Archive Reader and viewed or printed. To save a report in archive format from the Preview dialog box, click Save Archive. In the Save Archive dialog box, select the subdirectory, type the file name, then click Save. Reports are saved by default in the folder last opened, unless a different folder is selected.

18.13. Printing a Report

To print the report displayed, click Print from the Preview screen. In reports with more than one section, to print only the currently selected tab, click Print Current or, to print the entire report, click Print. When the Print dialog box appears, select the pages to print, the number of copies, and the printer setup. NOTE: To print a single page, do not select Print Current Page. Instead, select Pages and type the page number in the box.

18.14. Opening an Archive File

You can open an archive (.ZRF) file to compare data before saving a currently open report. To open and display an archive file, click Open Archive from the Preview screen, select the subdirectory and file name, then click Open. Use the toolbar buttons to change the page size and view different pages. To print the report, click Print. To close the file, click the Close button. Archive files cannot be changed.

18.15. Archive Reader Program

The Archive Reader is distributed with the Report Generator and is used to view and print ZRF format archive files when the Report Generator program is not available. The Archive Reader is typically distributed with archive files when these files are sent to locations that do not have the Report Generator program. You may freely copy and distribute the Archive Reader with archive files when required. NOTE: The Report Generator is a licensed product and may not be duplicated for multiple site use.

You can download the Archive Reader from the software download section of the Albércorp Web site at www.alber.com. You may copy the Archive Reader to a 3.5"-inch disk for distribution with .ZRF files.

19. Calibration

To ensure reliability of readings, Albércorp recommends that a qualified technician check MPM or BDS monitor calibration annually. Perform calibration using a computer directly connected via the RS-232 port. The Calibration dialog box displays all the parameters the unit monitors. To display this screen, select Setup|Calibration from the String View screen.
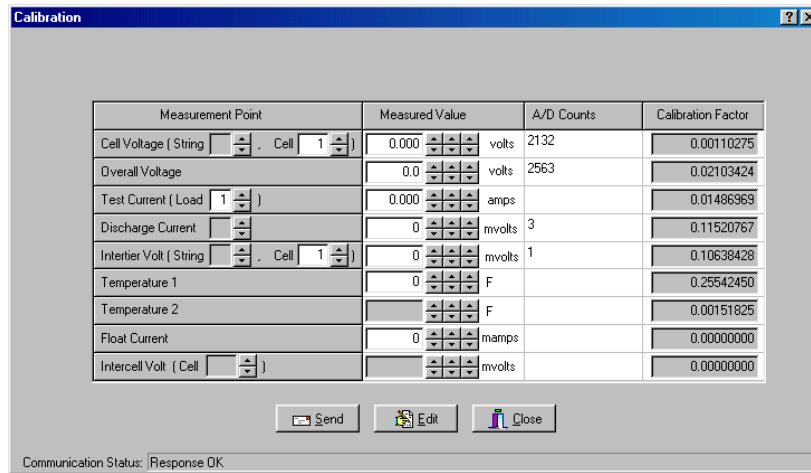
Figure 79. Calibration Setup (MPM)

The BDS Calibration dialog box differs slightly. It has arrows to select other DCM's and does not have a Test Current cell selector.
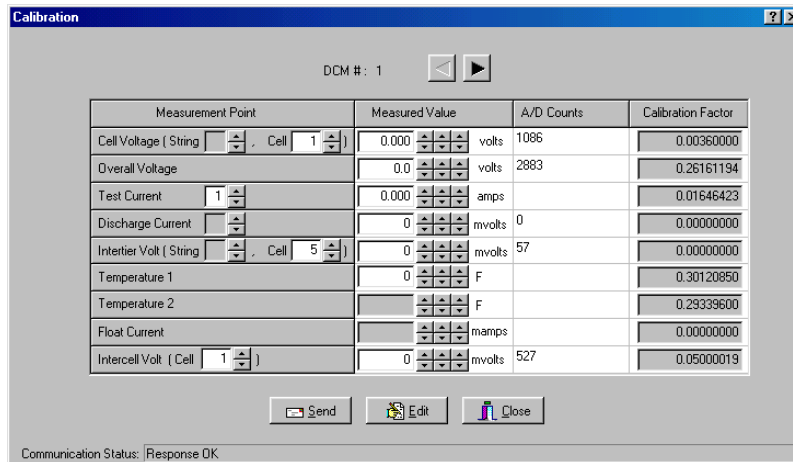
Figure 80. Calibration Setup (BDS)

There are four columns on the Calibration dialog box: Measurement Point, Measured Value, A/D Counts, and Calibration Factor.

Measurement Point – Allows selection of input channels when calibrating. Usually, the parameters selected never need to be changed. The Measurement Point also serves as a diagnostic tool that can lock in on a channel for troubleshooting.

Measured Value – Type measured values in this column. The MPM uses only Temperature 1; the BDS uses two temperature channels per DCM.

A/D Counts – The value from the A/D (Analog to Digital) converter before any calibration (Calibration Factor) is applied. Also referred to as Raw Counts.

Calibration Factor – The correction factor required to obtain a value that can be displayed on the String View screen.

Required Test Equipment:
> 4-1/2 digit DVM – Fluke 87 or equivalent.
> 100 millivolt and 10 millivolt source.
> Clamp-on current meter. A 0.1% shunt is recommended.
> Temperature probe.

The calibration procedures are available to qualified personnel trained by Albércorp in the calibration of this equipment.

20. MPM Diagnostics

The diagnostics are primarily used for production testing, but may assist in troubleshooting a hardware failure in the field. Select Diagnostics from String View. The computer must be connected to an MPM and Communication Status at screen bottom must show Response OK.

20.1. Rebooting the MPM

To reboot the MPM from the Data Manager, at String View, select Setup|Reboot Firmware. This does a "warm reset" of the MPM.

20.2. Power-Up Diagnostics (MPM)

At power-up, the unit performs diagnostics that take about two minutes. If the unit fails any tests other than failure to detect a dial tone, the Error LED blinks. Identify the failing parameters by using the *Self Test* diagnostics described below.

20.3. Self Test (MPM)

Self Test reads an MPM status register and displays the parameter status on the Self Test Diagnostics dialog box. These parameters are tested only at MPM power-up. If an update is needed, cycle the power to the MPM or reboot by selecting Setup|Reboot Firmware. To open Self Test Diagnostics, select Diagnostics|Self Test from String View.
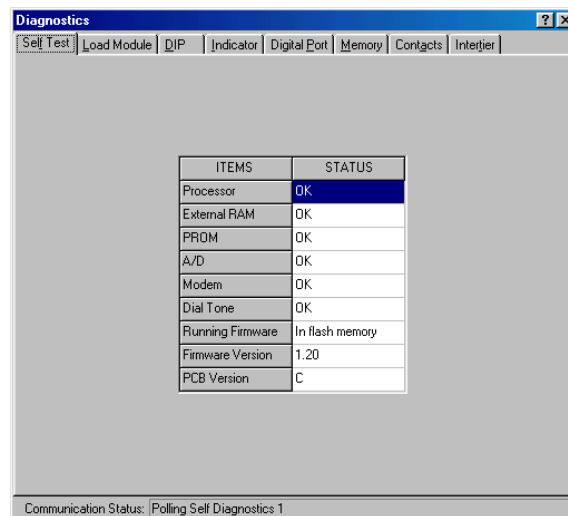
Figure 81. Self Test Diagnostic (MPM)

Items on the Self Test Diagnostics dialog box are described below.

Processor - Checks processor internal registers and timers.

External RAM - Writes and reads to each RAM location to verify accessibility.

PROM - Calculates and verifies the program checksum in the PROM.

A/D - Reads and confirms the A/D converter reference voltage is within specification.

Modem - Verifies the modem echoes commands.

Dial Tone - Confirms the telephone is connected.

Running Firmware - Displays the memory type from which the firmware is running. Typically, this is the PROM, but the system can upload a new version to Flash memory.

Firmware Version - Displays the version of firmware running.

20.4. Load Module (MPM)

The Load Module diagnostic tests each load connection to the battery. This diagnostic tests the connections, load cable fuses, load relays and load module, and can confirm actual load current. Refer to the left side of the load connections drawing in the installation manual to determine the load steps used for each configuration. Refer to *MPM or BDS Configuration Options* for configuration descriptions.

To open Load Module Diagnostics, select Diagnostics|Load Module from the String View screen. Using the Load Module Configuration chart above, identify the configuration that applies to the installation. You can turn on each load step and confirm the current for that step. Each load step must be from 17 to 23 amps when energized.

WARNING: When testing, do not leave the load module on for long periods of time. The load module can overheat and cause permanent hardware damage if not allowed to cool down between tests (about 10 seconds).
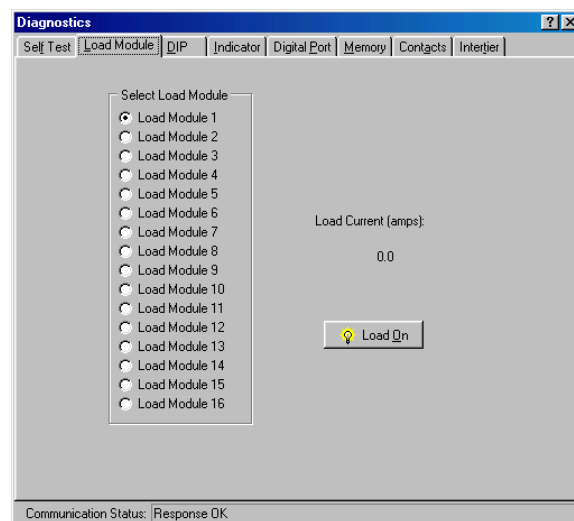
Figure 82. Load Module Diagnostic (MPM)

In the Select Load Module area, select a load module, then click Load On. To stop the test, click Load Off.

20.5. DIP Switch (MPM)

The DIP Switch diagnostic confirms each position of the DIP switch inside the MPM. Although not all switch positions are used, every position is checked during manufacturing. This diagnostic allows remote checking of switch settings, possibly saving a trip to the site. To open DIP Switch Diagnostics, select Diagnostics|DIP Switch from String View. The screen indicates each switch position as it is changed.

CAUTION: Exit this diagnostic with the switch in the same positions it was in when the diagnostic was entered.
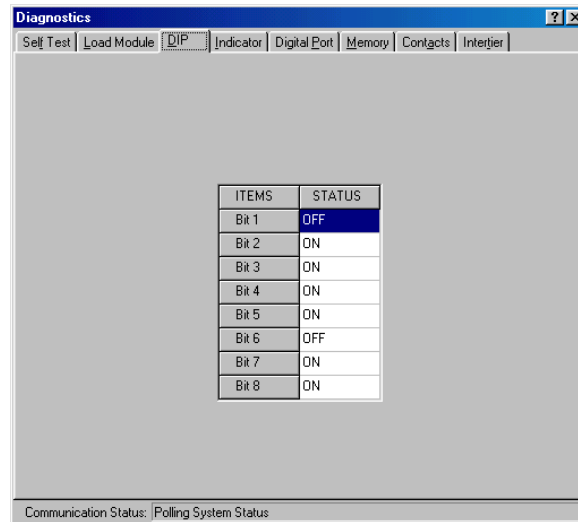
Figure 83. DIP Switch Diagnostic (MPM)

20.6. Indicator (MPM)

This diagnostic tests MPM front panel LED operation. To open Indicator Diagnostics, select Diagnostics|Indicator from String View. To activate an LED, click an LED name then On.
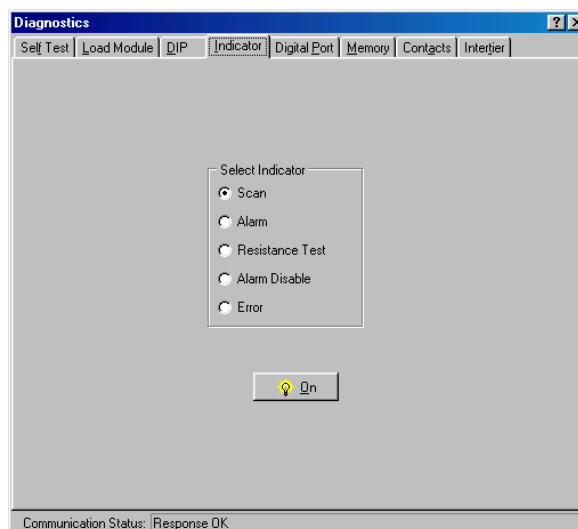
Figure 84. Indicator Diagnostic (MPM)

20.7. Digital Port (MPM)

The Digital Port diagnostic checks the status of the digital inputs. If the system is connected to external contacts, this diagnostic is useful for checking each contact. To open Digital Port Diagnostics, select Diagnostics|Digital Port from the String View screen. The screen displays the status of the inputs. An ON status means a contact is closed.
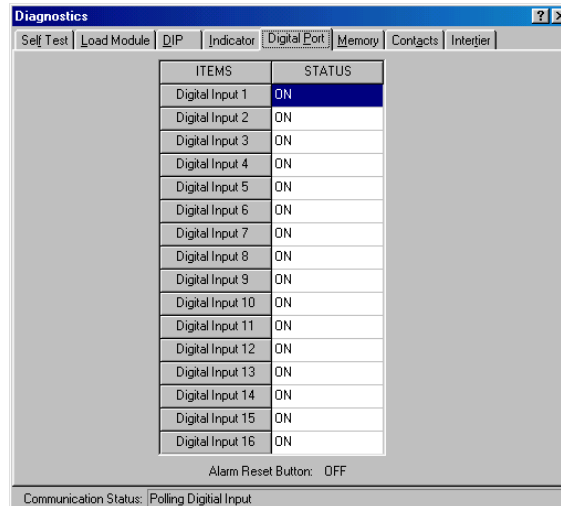
Figure 85. Digital Port Diagnostic (MPM)

20.8. Memory (MPM)

This diagnostic checks both types of nonvolatile monitor memory: E^2 (electrically erasable) and Flash. E^2 memory stores calibration and setup information and actual data, such as Discharge, Alarm and Resistance test data. Flash memory is used for uploads of MPM firmware, which can be upgraded in the field or from a remote location via modem. Refer to the *Upgrades* section. To open Memory Diagnostics, select Diagnostics|Memory from String View.
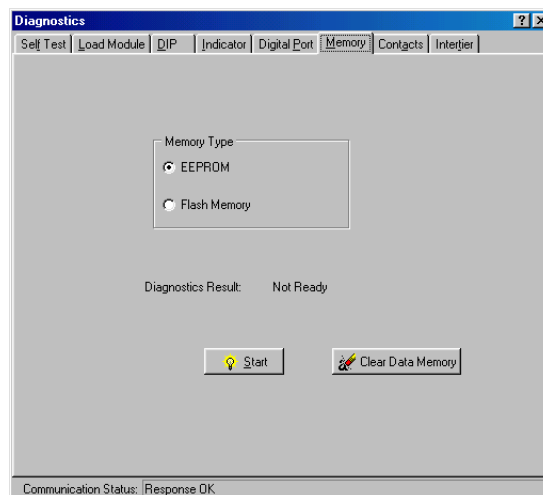
Figure 86. Memory Diagnostic (MPM)

To test memory, in the Memory Type area select EEPROM or Flash Memory, then click Start. During the EEPROM test, communication is briefly lost, then a status result indicates pass or fail. During the Flash memory diagnostics, the integrity of the upgraded firmware file is checked. After starting this test, select a file to compare to the contents in Flash memory. This test takes several minutes to complete.

To clear all measured data stored in E^2 memory, click Clear Data Memory.

20.9. Contacts (MPM)

This diagnostic checks the external alarm contact and charger contacts for proper connection. To open Alarm Contacts Diagnostics, select Diagnostics|Contacts from String View. In the Select Contact area, click Parameter Alarm or Charger Control, then click On.

CAUTION: The charger contact turns the charger off until it is re-energized or until the diagnostic is exited.
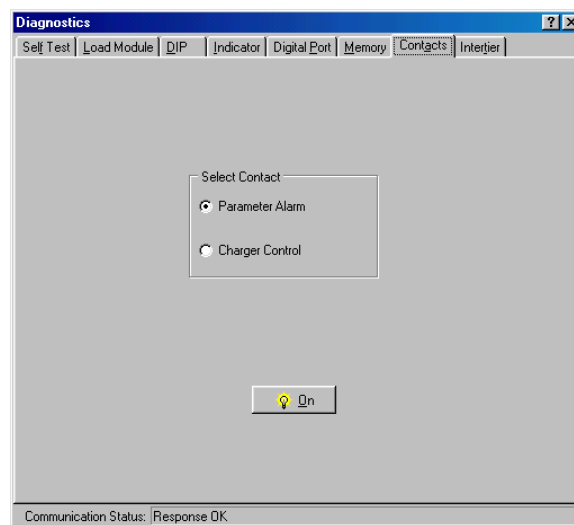
Figure 87. Alarm Contacts Diagnostic (MPM)

20.10. Intertier (MPM)

The Intertier diagnostic monitors the signal on each intertier input. Use this diagnostic for verifying the calibration of these input channels or troubleshooting. To open Intertier Diagnostics, select Diagnostics|Intertier from String View.

Figure 88. Intertier Diagnostic (MPM)

Up to eight intertiers for the MPM may be defined on the Battery Setup|Parameters dialog box, but Intertiers 2 through 4 are active only when expansion ports J3, J4, J6 and J7 are installed on the MPM.

Intertier Voltage (mvolts) - This column indicates the voltages being sent. This screen displays up to eight intertiers for the MPM and is used to confirm calibration accuracy. The cell number is the lower of the two cell numbers across which the intertier is connected (selected on MPM Setup|Battery|Parameters).

21. BDS Diagnostics

The diagnostics are primarily used for production testing, but may assist in troubleshooting a hardware failure in the field. Select Diagnostics from the String View screen. The computer must be connected to a BDS and Communication Status at screen bottom must show Response OK.

21.1. Rebooting the BDS

To reboot the BDS from the Data Manager, at the String View screen, select Setup|Reboot Firmware. This does a "warm reset" of the BDS.

21.2. Power-Up Diagnostics (BDS)

At power-up, the unit performs some comprehensive diagnostics that take about two minutes. If a failure occurs, identify the parameters that failed by using the *Self Test* diagnostics described below.

21.3. Self Test (BDS)

Self Test reads status registers in the BDS and DCM units and displays the parameter status on the Self Test Diagnostics dialog box. These parameters are tested only at BDS power-up. If an update is needed, cycle the power to the BDS or reboot by selecting Setup|Reboot Firmware. To open Self Test Diagnostics, select Diagnostics|Self Test from String View.
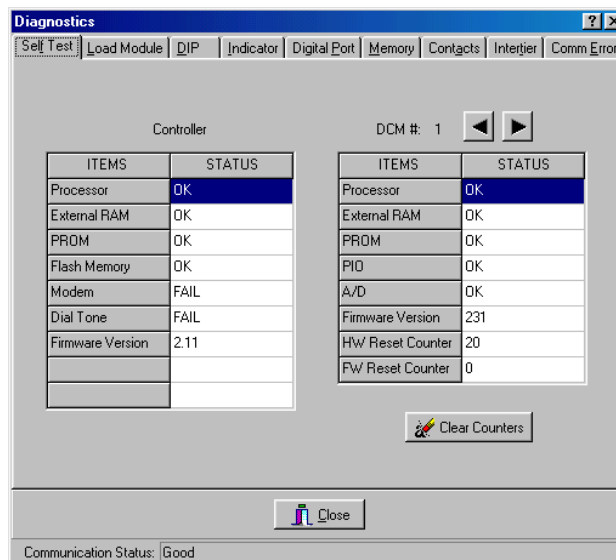
Figure 89. Self Test Diagnostic (BDS)

Items in the Self Test Diagnostics box are described below. Click the left or right arrows to view settings for other DCM units.

Processor (BDS Controller and DCM) - Checks processor internal registers and timers.

External RAM (BDS Controller and DCM) **-** Writes and reads to each RAM location to verify accessibility.

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PROM (BDS Controller and DCM) - Calculates and verifies the program checksum in the PROM.

Flash Memory (BDS Controller) - Calculates and verifies the program checksum in Flash memory.

Firmware Version (BDS Controller and DCM) - Displays the version of firmware running.

PIO (DCM) - Checks the read/write functions of the parallel input/output device.

A/D (DCM only) - Reads and confirms the A/D converter reference voltage is within specification.

HW Reset Counter (DCM) - Indicates how many times power is cycled or the DCM performs a hardware self-reset.

FW Reset Counter (DCM) - At boot up, the DCM runs diagnostics. If an error is found, the DCM reboots to retest. When this happens, this counter is incremented.

Modem - Verifies the modem echoes commands.

Dial Tone - Confirms the telephone is connected. If connected via a multiplexer, this field indicates *Failed* as a normal condition.

Clear Counters - This button resets the HW (hardware) and FW (firmware) counters to zero.

21.4.   Load Module (BDS)

The Load Module diagnostic tests each load connection to the battery. This diagnostic tests the connections, load cable fuses, load relays and load module, and can confirm actual load current. Depending how the system is set up, only the load module for the selected DCM is enabled. Typically, all ten load steps are used and are distributed across multiple DCM units.

To open Load Module Diagnostics, select Diagnostics|Load Module from String View. Select the DCM for the desired load module. You can turn on each load step and confirm the current for that step.

WARNING: When testing, do not leave the load module on for long periods of time. The load module can overheat and cause permanent hardware damage if not allowed to cool down between tests (about 10 seconds).
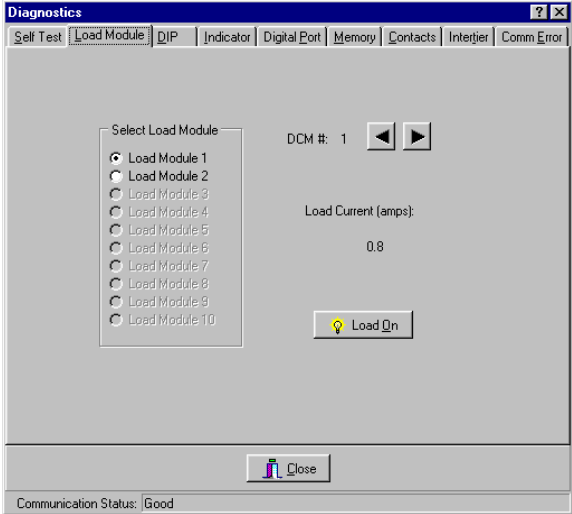
Figure 90. Load Module Diagnostic (BDS)

In the Select Load Module area, select a load module, then click Load On. To stop the test, click Load Off. Click the left or right arrows to select other DCM units.

21.5. DIP Switch (BDS)

The DIP Switch diagnostic confirms each position of the DIP switches inside the BDS and DCM. This diagnostic also allows remote checking of switch settings, possibly saving a trip to the site. To open DIP Switch Diagnostics, select Diagnostics|DIP Switch from String View. The diagnostic indicates each switch position. Click the left or right arrows to select other DCM units.

NOTE: The DIP switches are set at the factory before shipping and are not usually changed by the user.
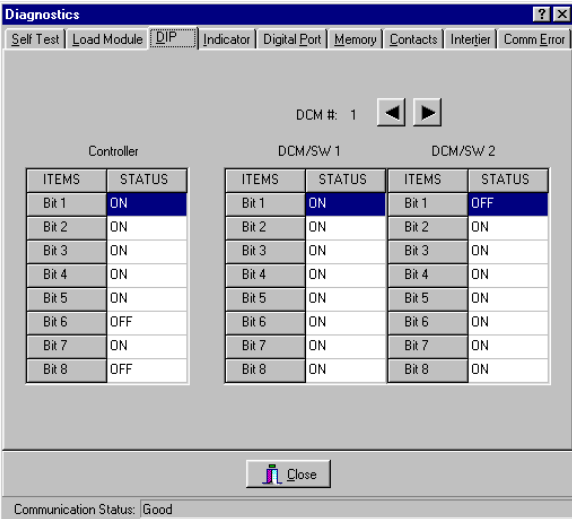
Figure 91. DIP Switch Diagnostic (BDS)

21.6. Indicator (BDS)

This diagnostic confirms BDS front panel LED operation. To open Indicator Diagnostics, select Diagnostics|Indicator from String View. To activate an LED, click an LED name then click On.
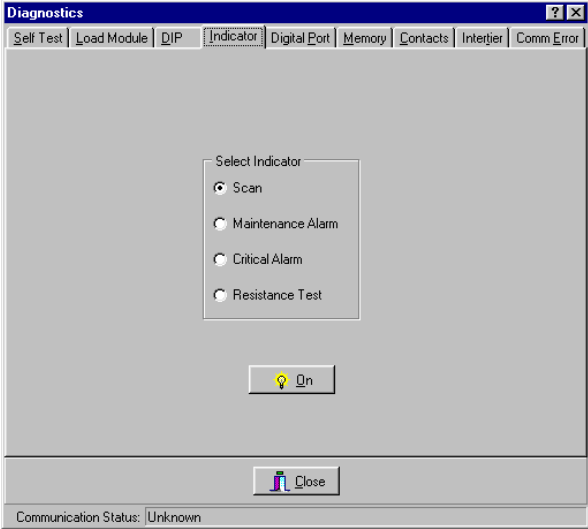
Figure 92. Indicator Diagnostic (BDS)

21.7. Digital Port (BDS)

The Digital Port diagnostic checks the status of the digital inputs. If the system is connected to external contacts, this diagnostic is useful for checking each contact. To open Digital Port Diagnostics, select Diagnostics|Digital Port from the String View screen. The screen displays the status of the inputs. An ON status means a contact is closed.
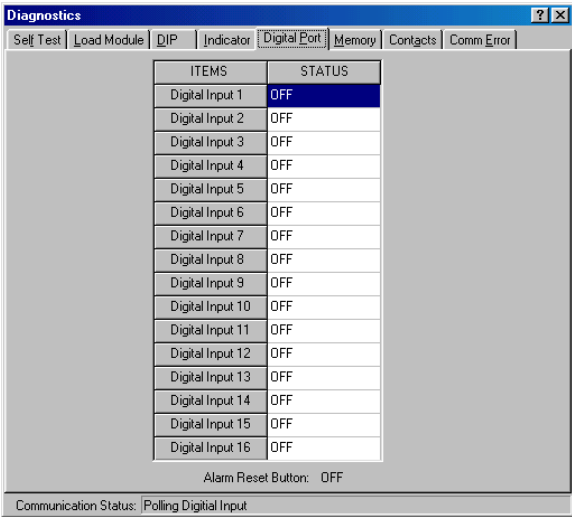
Figure 93. Digital Port Diagnostic (BDS)

21.8.   Memory (BDS)

To open Memory Diagnostics, select Diagnostics|Memory from String View. To clear all
measured data stored in nonvolatile SRAM memory, click Clear Data Memory.

Figure 94. Memory Diagnostic (BDS)

SRAM memory stores calibration and setup information and actual data, such as Discharge,
Alarm and Resistance test data. Flash memory is used for uploads of BDS firmware, which
can upgraded in the field or from a remote location via modem. Refer to the *Upgrades*
section.

The Memory diagnostic checks Flash memory for the integrity of the upgraded firmware file.
To run this test, click Start and select a file to compare to the contents in Flash memory. This
test takes several minutes to complete.

21.9.   Contacts (BDS)

This diagnostic checks the external critical and maintenance alarm contacts and the optional
contacts for proper connection. To open Alarm Contacts Diagnostics, select
Diagnostics|Contacts from String View. In the Select Contact area, click a contact or alarm
button, then click On. You can confirm contact operation by verifying a device connected to
the contacts turns on and off.
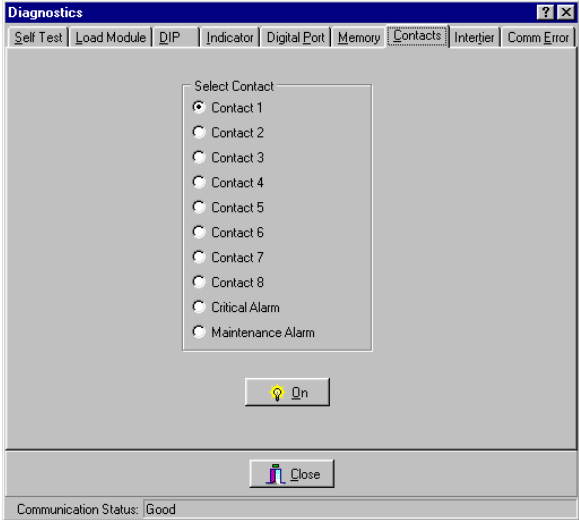
Figure 95. Alarm Contacts Diagnostic (BDS)

21.10. Intertier (BDS)

The Intertier diagnostic monitors the signal on each intertier input. Use this diagnostic for verifying the calibration of these input channels or troubleshooting. To open Intertier Diagnostics, select Diagnostics|Intertier from the String View screen.
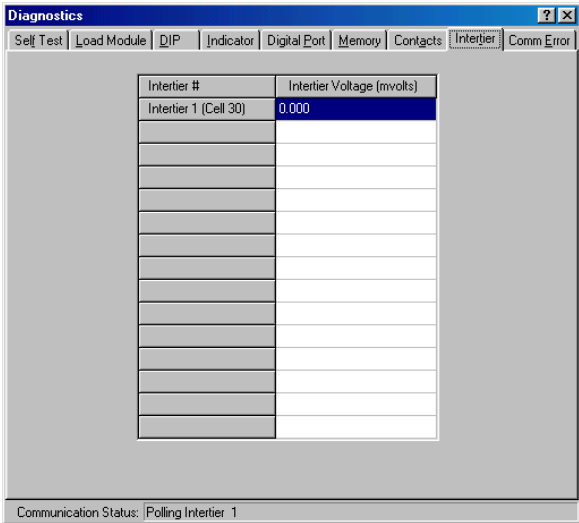
Figure 96. Intertier Diagnostic (BDS)

Intertier Voltage (mvolts) - This column indicates the voltages being sent. This screen displays up to 15 intertiers for the BDS and is used to confirm calibration accuracy. The cell number is the lower of the two cell numbers across which the intertier is connected (selected on BDS Setup|Battery|Parameters).

21.11. Communication Error (BDS)

Communication integrity between the BDS and DCM is constantly monitored. When a communication error occurs, the Error Counts for the associated DCM increments, and String Status on the String View screen indicates "DCM - Comm Error." Error Counts can reach 255 before rolling back to zero.

Check DCM Address - Click this button to check the DCM address. Using groups of flashes, the DCM Status LED indicates the string and DCM address for that DCM. The first series of flashes indicates the string ID. (For example, one flash represents string 1, five flashes string 5.) After a pause, a second series of flashes indicates the DCM ID within that string. After another pause, two rapid flashes indicate the end of the cycle, which then starts over.
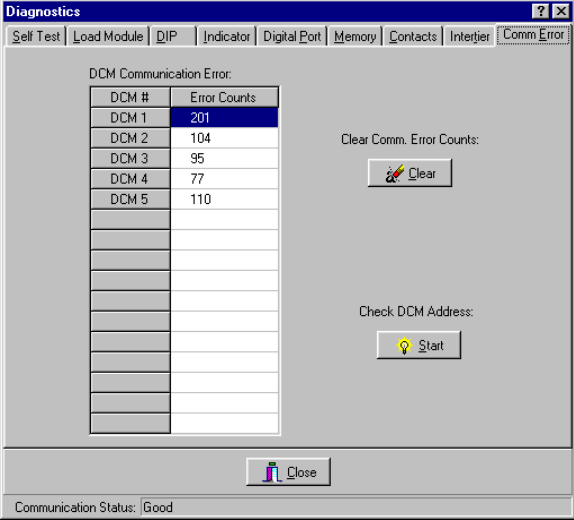
Figure 97. Communication Error Diagnostic (BDS)

Clear Comm Error Counts - Click this button to reset the values in the Error Counts column to zero.

BDS Diagnostics

21.12. Resistance Testing Multiple DCM Units

When a BDS resistance test is performed, all the DCM units connected to the BDS are tested. To test a specific DCM that may be causing problems, at the Resistance screen or Intercell Resistance screen, select Diagnostics|R-Test in a DCM from the main menu. On the Select DCM box, click the buttons for the DCM you want to test. To capture new readings, click OK.
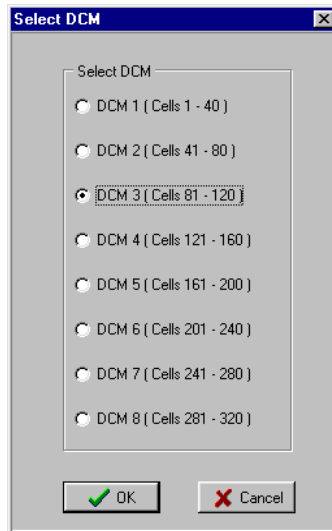
Figure 98. Select DCM

If you clicked OK from the Resistance dialog box, the screen heading changes to Resistance in DCM *n* (Cells *n* - *n*) (microhms) and the resistance test starts.

If you clicked OK from the Intercell Resistance dialog box, the screen heading changes to Intercell in DCM *n* (Cells *n* - *n*) (microhms) and the resistance test starts.

After a few minutes, the 'test in progress' message disappears, and the Get button becomes active. Click **Get** to display the readings. The bottom of the screen displays a summary of the resistances and any intertier values measured. To stop the test before completion, click the Stop button.

NOTE: When Diagnostics is used, resistance readings are not transferred to the permanent database.

21.13. View DCM Resistance and View DCM Intercell

After conducting a resistance test using Diagnostics|R-Test in a DCM and obtaining results using the Get button, you may select Diagnostics|View DCM Resistance or Diagnostics|View DCM Intercell to alternately view the Resistance in DCM *n* or Intercell in DCM *n* dialog boxes. As previously mentioned, when Diagnostics is used, resistance readings are not transferred to the permanent database. Be certain to record the needed results before closing these screens.

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22. Upgrades

E^2 (electrically erasable) memory on the MPM and SRAM memory on the BDS Controller store calibration and setup information and actual data, such as Discharge, Alarm and Resistance test data. On both units, flash memory is used for uploads of firmware, which can be upgraded on-site or remotely via modem. Refer to the MPM or BDS *Diagnostics-Memory* section for a complete description.

Software and firmware upgrades are distributed on a CD-ROM or in a PROM IC, or as a file on the Albércorp Web site at www.alber.com. Upgrade instructions are included with the CD or IC, or are on the Web site.

NOTE: On the BDS, the Setup|Upgrade Firmware item is enabled only when the BDS Controller is connected to String 1.
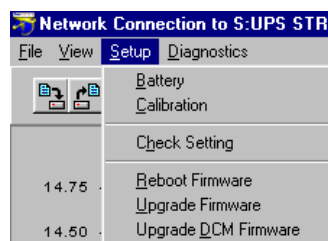
Figure 99. Upgrade Menu (BDS)

23. *Error Codes*

CATEGORY	CODE	MESSAGE	SITUATION
Database	0001	The database could not be copied to the working database. Hard drive may be full.	When copying a database to a working database
	0002	The working database could not be backed up. Hard drive may be full.	When backing up a database
	0003	You cannot save the database to the working database that is reserved by the Data Manager.	The user tries to save a database to MPM.MDB
	0004	You cannot open the working database that is reserved by the Data Manager.	The user tries to open MPM.MDB as a database
	0005	Database Not Found. <Database File Name>	When opening a database
	0006	Data import error (DDetail Table). Please try again.	When importing discharge data
	0007	Data import error (DSummary Table). Please try again.	When importing discharge data
Location	0100	The location name and ID must be unique for each battery location. The location name or ID chosen has already been used.	The user set up two locations using the same name or ID
	0101	There are more than 16 locations.	In the local computer, there are more than 16 locations set up.
	0102	Location ID does not match. Actual location name is <Location name>.	In direct connection, compare location ID in monitor and in database
	0103	SERVICE cannot be deleted.	The user tries to delete Service location
	0104	Invalid location name.	Input invalid location name in location setup
	0105	Location not found in <Database table name>.	Search location
	0106	Location ID not found in <Database table name>.	Search location
Communi-cation	0200	No response on Polling/Answer Port Modem.	When initializing modem
	0201	No response on Answer Port Modem.	When initializing modem
	0202	The currently selected COM Port, COM <ComPort #>, does not exist. Click OK and choose a different port.	When initializing COM port
	0203	The currently selected COM Port, COM <ComPort #>, is already in use by another program. Click OK and choose a different port.	When initializing COM port
	0204	The currently selected Com Port, Com <ComPort #>, is not available. Click OK and choose a different port.	When initializing COM port
	0205	No response from Modem/Cable Multiplexer.	When connecting modem/cable multiplexer
Firmware Upgrade	0300	Upgrade failed: No response for sending code three times.	When sending frames
	0301	Upgrade failed: Not responding.	Check firmware location (PROM or flush memory) in the beginning of firmware upgrade

CATEGORY	CODE	MESSAGE	SITUATION
Data	0400	Resistance test failed: 60 minute time-out.	Manual R-test is not completed in 60 minutes
	0401	Data format error. The data may be saved for a different monitor configuration.	When reading resistance or historical data
	0402	The raw count equals 0. Please check hardware.	During calibration
	0403	Data import error (Encode date/time). Please try again.	When importing alarm data
	0404	Wrong overall voltage data.	Got invalid overall voltage in discharge data
	0405	Subset <Subset #> does not have an initial value.	When viewing discharge curves, found invalid subset
	0406	Subset <Subset #> does not have a final value.	When viewing discharge curves, found invalid subset
Operation	0500	Subset 3 is selected, but Subset 2 is not selected. If you want to show two curves, the second curve should be in Subset 2.	Wrong selection in Curve Option of Discharge View screen

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