Battery Monitor Data Manager

User's Guide

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4. 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.

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Information in this document is subject to change without notice.

This manual is for use with the following
versions of software and firmware:

BMDM Software Version 5.59 or later
MPM Firmware Version 2.11 or later
BDS Controller Firmware Version 2.41 or later
DCM Firmware Version 3.01 or later

Battery Monitor Data Manager User's Guide,
Part Number 4200-004, Book Revision 6.13

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Drawings or figures in this manual may be for reference only or superseded by later drawings. For the latest information, refer to the drawings supplied with your system.

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1. Safety Information

- You must read and understand these safety precautions and those elsewhere in this manual before installing, powering up or using the system.
- Except as explained in this manual, do not attempt to service Vertiv Corporation 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 gets into the equipment, unplug it immediately and contact an authorized service center or Vertiv Corporation.
- The equipment must have adequate ventilation. Do not block equipment ventilation openings.
- Do not exceed equipment voltage, power ratings or capabilities.
- When grounding is required, make sure the equipment is properly grounded.
- Do not let unauthorized persons operate the equipment.
- Do not energize the cabinet or any component with 115VAC (or 230VAC if applicable) 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.
- High voltage or current may be present inside the equipment and on the equipment terminals. Only qualified personnel should perform the operations described in this manual. Calibration must be performed only by technically qualified persons. Observe electrical safety precautions when removing and installing equipment covers, when connecting leads, and when making adjustments.
- Proper installation and testing are essential to the correct functioning of your system. If you have any questions, contact Vertiv Corporation.
- This manual describes the general installation and use of the system. If your system has features or accessories not described in this manual, contact Vertiv Corporation.
- Drawings in this manual may be for reference only or superseded by later drawings. For the latest information, refer to the drawings supplied with your system.

1.1. If You Have Questions

If you have any questions about the installation or testing of your system, contact Vertiv Corporation at (954) 377-7101 or fax (954) 377-7042. Request BMDM, MPM or BDS assistance.

2. System Requirements

These are the minimum requirements for the BMDM (Battery Monitor Data Manager) program.

Microsoft Windows™ XP, 2000, Windows 7, or 8.

Pentium4™ 1GHz or higher microprocessor.

128Mb of memory for Windows 2000. 256Mb for Windows XP.

150Mb of hard disk space for program installation. 1Gb of space for data storage.

CD drive.

A typical MPM system requires these manuals.

Battery Monitor Data Manager User's Guide, 4200-004 (this book)

MPM-100 Installation Instructions, 4200-034

MPM-100, BDS-256 and BDS-40 Monitors Product Description Guide, 4200-039

MPM-100 Commissioning Procedure with Acceptance Test Report, 4200-036 (optional)

UPS (uninterruptible power supply) manufacturer's instruction manual (if a UPS is used)

A typical BDS system requires these manuals.

Battery Monitor Data Manager User's Guide, 4200-004 (this book)

BDS-256 Battery Diagnostic System with BDS Controller Installation Instructions, 4200-028
or BDS-40 Battery Diagnostic System Installation Instructions, 4200-045

MPM-100, BDS-256 and BDS-40 Monitors Product Description Guide, 4200-039

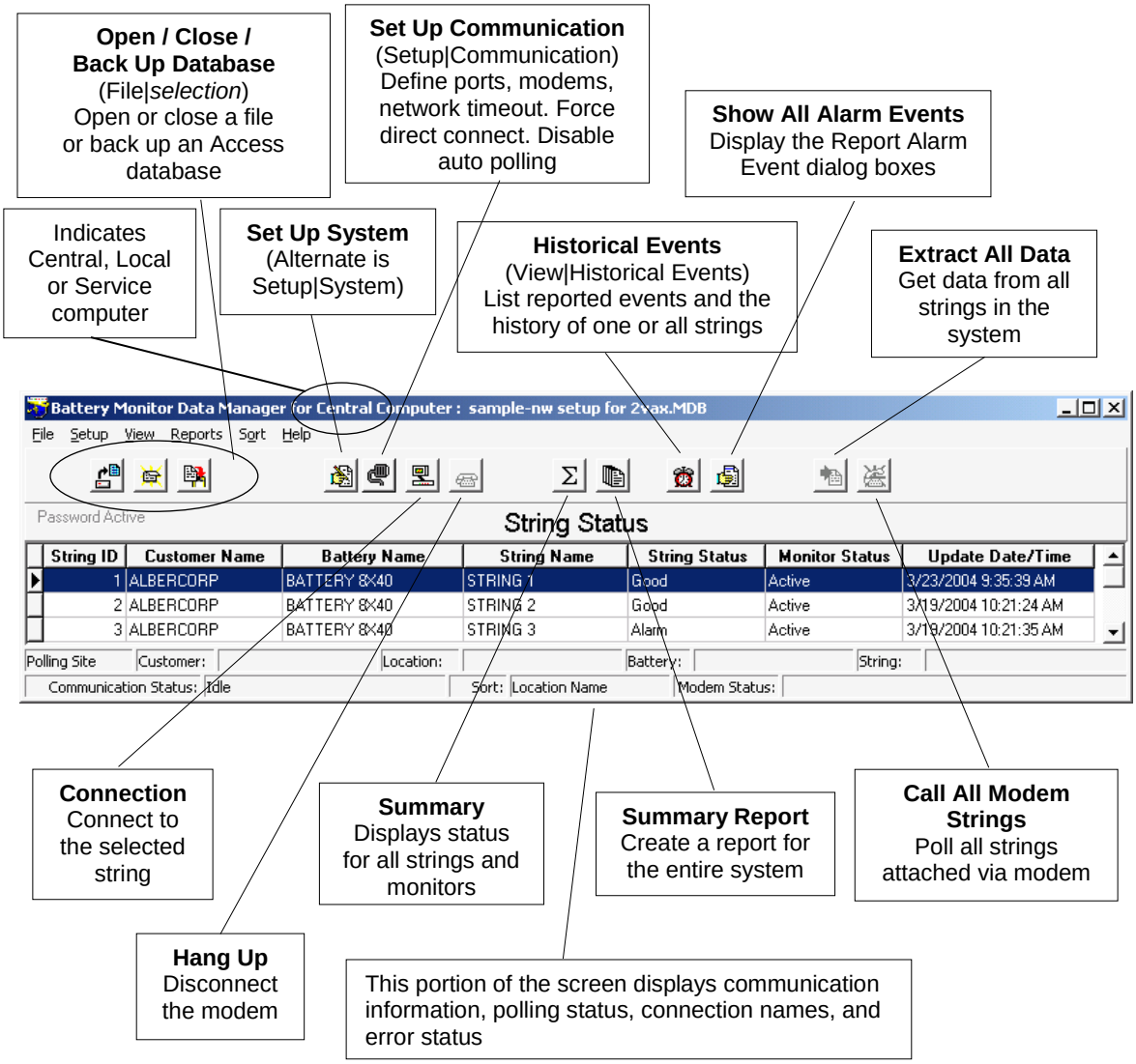
BDS-256 Commissioning Procedure with Acceptance Test Report, 4200-009 (optional)
or BDS-40 Commissioning Procedure with Acceptance Test Report, 4200-057 (optional)

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 BMDM (Battery Monitor Data Manager) program starts. Each button name or function is listed in the index for ready reference.



String Status screen –String Status appears when the BMDM program starts. It lists the strings in the database and their last known status.

String View screen –String View shows the cells in a string as a bar graph, table or both. It appears after a string is selected on the String Status screen and computer to monitor communication is established. You can view a string off-line by selecting View|Offline.

4. Program Installation and Options

When installing the BMDM, you will choose Install BMDM Manager. Other screen options provide you with documentation, connection to the Alber Web site or contact information.

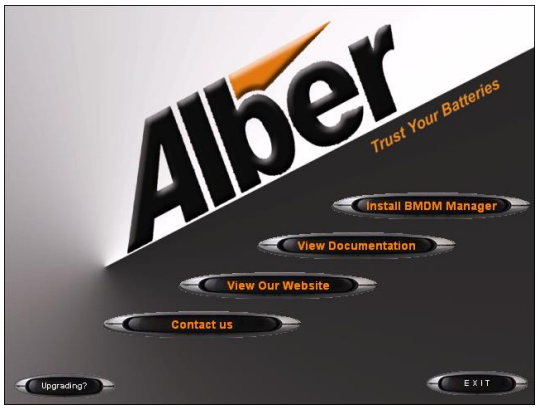


Figure 1. BMDM Opening Screen

4.1. Sample Databases

BMDM sample databases provide strings and data you may use to test button actions, observe screens, create graphs, and generate reports.

Sample Database for Access - When using Access, at BMDM start-up a message asks, "Do you want to load a sample database?" Click Yes if you want to explore the BMDM. Clicking Yes opens the **AlberDemo.mdb** Access database. If the "load a sample database" message does not appear, you may enable it on Setup|Preferences. You may also open the sample file by selecting File|Open|AlberDemo.mdb.

4.2. Installing the BMDM

Before installing the BMDM program, close all other programs. To install the program, insert the CD into the computer and wait for autorun. If the CD does not run, select Start|Run from the Windows desktop. At the Run box, type `d:\launch` (or other drive letter) and follow the instructions.

4.3. Starting the Program

To start the Battery Monitor Data Manager, double-click the BMDM icon on the desktop. The first time the program runs, "Do you want to load a sample database?" appears. Click No if you want to use the Configure Station screens. Refer to *Sample Databases* and *Using Configure Station*.

4.4. Configuring BMDM to Run as a Windows Service

The BMDM can be run as a service so the application will continue to run in the background even after the user logs off Windows. The following describes how to configure the BMDM software as a service.

Note: the BMDM uses the "AlwaysUp" third party application to run the BMDM as a service. It is automatically installed with the BMDM software package starting with versions 5.86 and SQL 6.33 or later.

To Setup the BMDM as a service using the “AlwaysUp” application, do the following:

1. Check if your operating system is 32 or 64 bit.
2. Click on the appropriate shortcut to install the BMDM Service
   a. For 32-bit operating system, click on **Start, All Programs**, **Alber, MPM Manager**, then click on the shortcut **Install BMDM Service 32-Bit.**
   b. For 64-bit operating system, click on **Start, All Programs**, **Alber, MPM Manager**, then click on the shortcut **Install BMDM Service 64-Bit.**

Note: Depending on your operation system, this message may appear. Click on **This program installed correctly** to finish the installation.

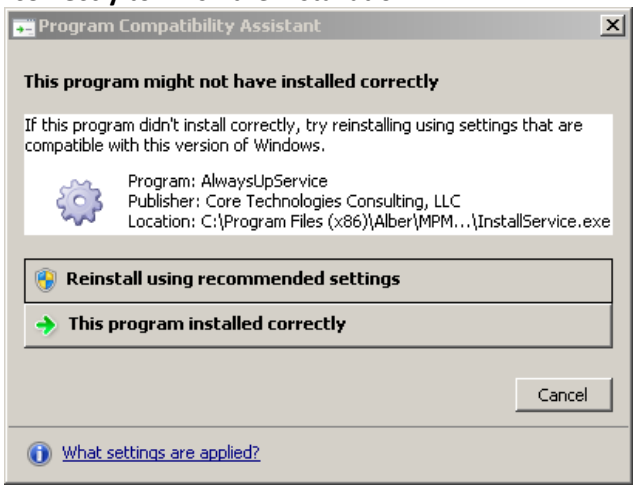


Figure 2. AlwaysUp Program Compatibility Assistant

3. Type Windows key + R and enter **Services.msc** and check for the **BMDMService (managed by AlwaysUpService)** entry. Right click the entry and click **Start** to start the service.

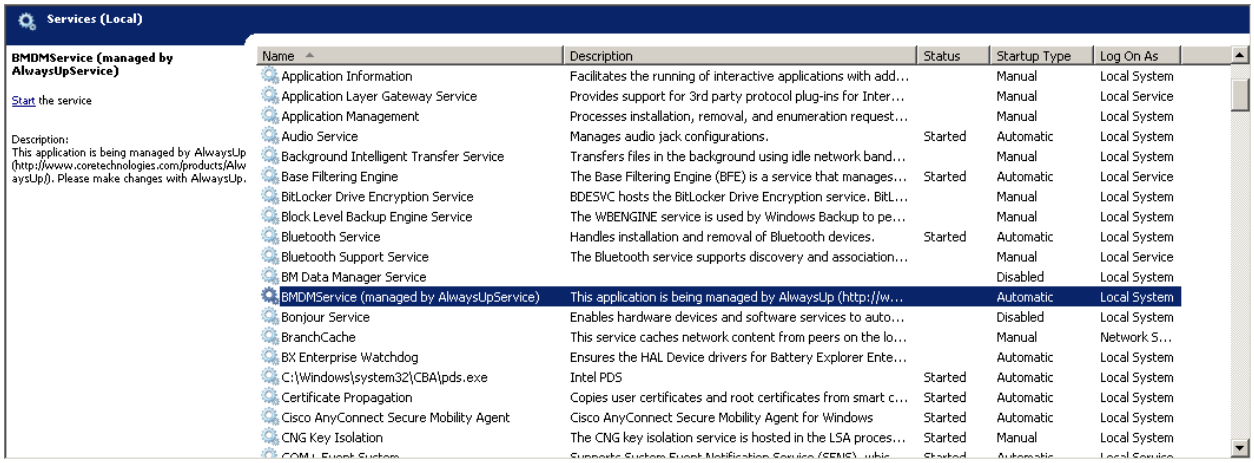


Figure 3. BMDM and AlwaysUp Running as a Service

4. Type **Ctrl+Shift+Esc** to open the task manager. Check for the **BMDM.exe *32** under the Processes tab. This confirms that the BMDM is running as a service.

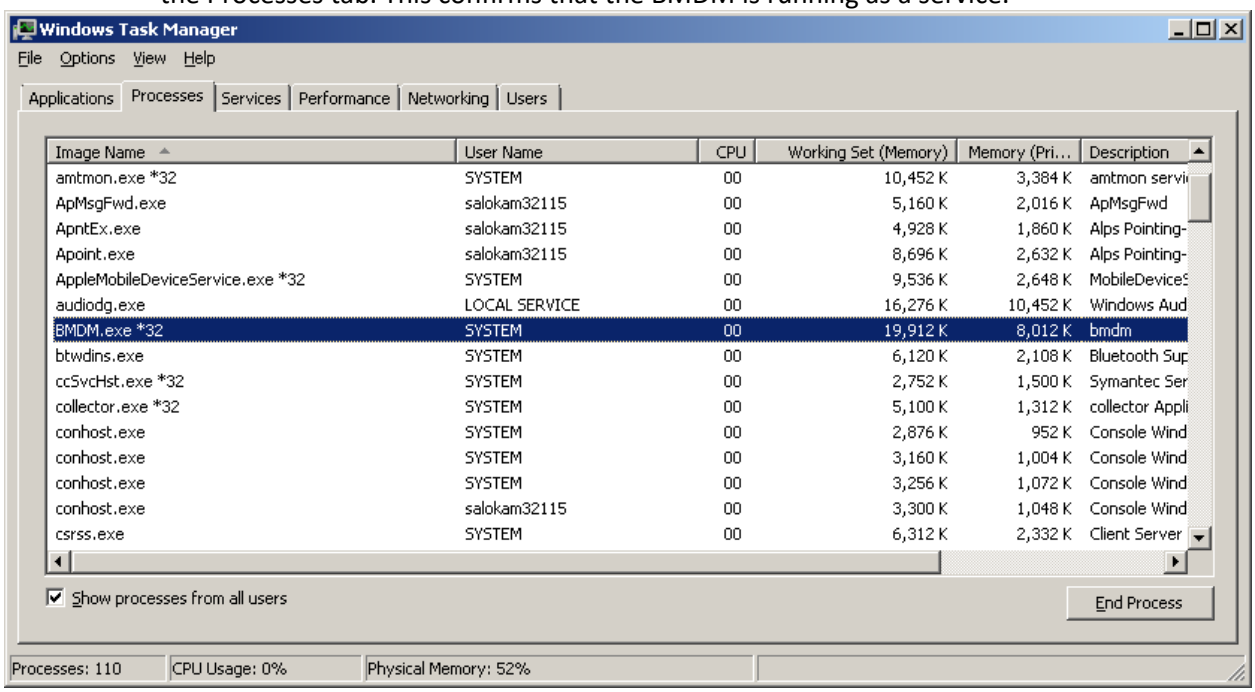


Figure 4. BMDM is Running as a Service

5. To launch the BMDM user interface, click **Start, All Programs**, **Alber, MPM Manager**, then click on the shortcut **Run BMDM Service in Session**.

Note: When using the BMDM as a service, use only **Run BMDM Service in Session** to launch BMDM. Attempting to run the BMDM using the regular icon shortcut will cause issues such as having two instances of BMDM.exe running at the same time or shared violation errors.

6. It is recommended to replace the regular BMDM shortcut on the desktop with the **Run BMDM Service in Session** shortcut to prevent the user from launching the BMDM incorrectly.

4.5. Database Notes

A BMDM database file contains cell and battery readings and setup data. The BMDM program stores MPM and BDS data in an Access-based **.MDB** file.

Access initial database file - During installation, the BMDM places the empty Access database file **mpm-db3.mdb** under Program Files\Alber\MPM Manager\Database or in another folder selected at time of installation. This empty default database opens when you have not previously opened another database.

Creating a new database - You may create a new Access database using File|New.

Deleting a database - You cannot delete an Access MDB database file from within the BMDM program. To delete a database, use standard Windows procedures to delete the MDB file from the folder where it is saved. The file is typically located at Program Files/Alber/ MPM Manager/Database.

Because databases may contain unrecoverable battery data, regularly back up MDB files to another computer to help prevent data loss. Refer to *Automatic and Manual Backup*.

4.6. Default Passwords

The BMDM program has one default password, `alber`, which accesses all areas of the program and can be changed by the user. It is important to note that different passwords may be selected for various program areas. New passwords may be alphanumeric and are not case sensitive.

Additional passwords may be needed when using options. For example, when setting up an email account for alarm notification, the password is determined externally and is not changeable using the BMDM. Be certain to record new passwords for reference. If lost, they cannot be retrieved, and you will have to contact Alber for an unlock code.

System Setup Password - A password for System Setup is stored in the BMDM database and may be eight characters long. To change it, from the String Status screen, select Setup|System|Password. Refer to *System Setup: Password*.

Battery Setup Password - A password for the Battery Setup, Calibration, Diagnostics, and Check Settings Upload screens is stored in MPM or BDS firmware and must be five characters. To change it, from String Status, select Setup|Battery|General. Refer to *Battery Setup: General (MPM* or *BDS)*.

The Battery Setup password is cleared from the MPM or BDS firmware when the Alarm Reset switch clears existing names. Refer to the *Clear Existing Names (On-site)* text in the *Synchronizing Using Check Settings* chapter.

4.7. Computer Types

The first time the program runs, a question about computer type appears.

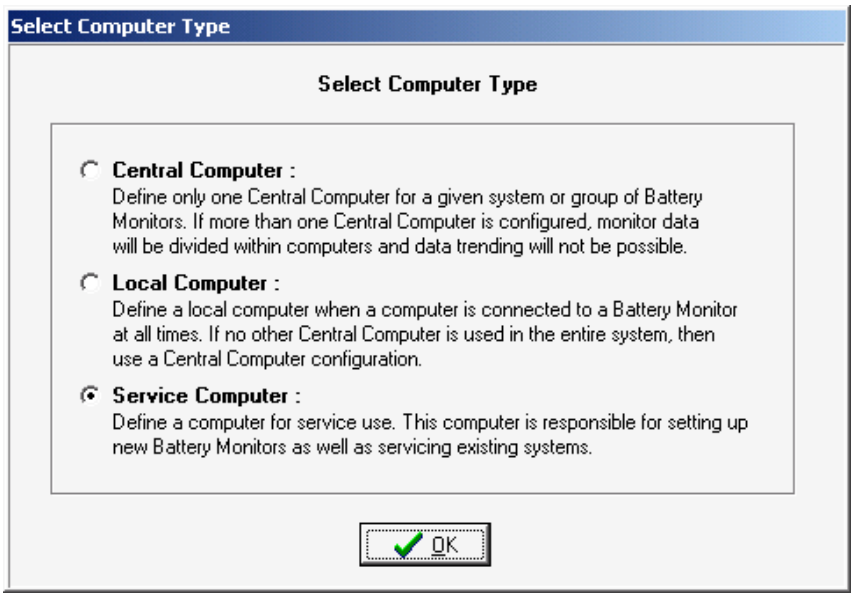


Figure 5. Select Computer Type

You select a computer type only once. Refer to *Understanding Computer Types* before answering. The following text is on the Select Computer Type 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 to extract data, the monitor data could become corrupted.

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.

On install, the database updates to the latest version. After setup, the String Status screen title bar indicates the computer type: Central, Local or Service. To change the type, refer to *Changing Computer Type*.

4.8. Changing Computer Type

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

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

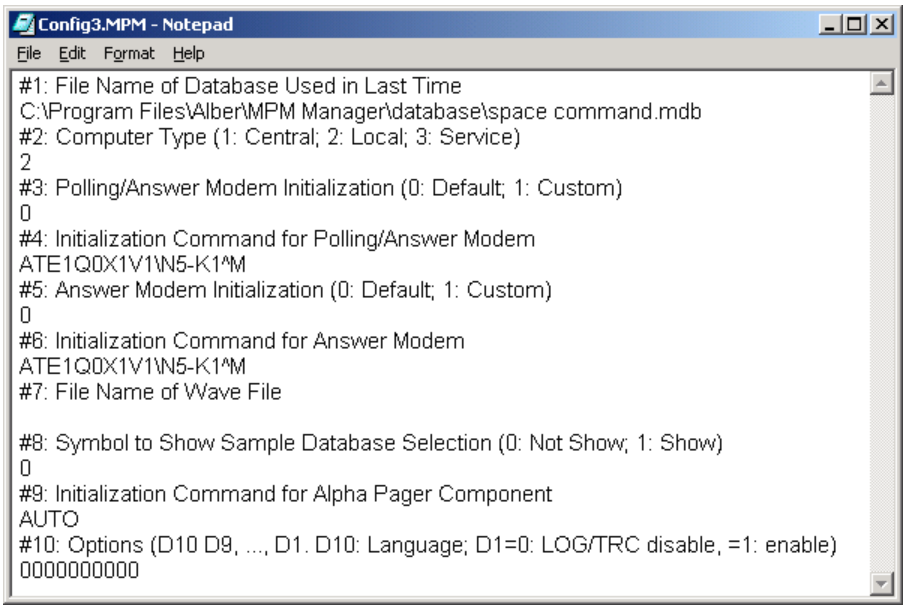


Figure 6. Config3.MPM File

Save the text file and close the 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 not meant to be copied.

4.9. File Types

The BMDM program uses several file extensions.

MDB ..... An Access™ database file that stores cell and battery readings and setup data. At installation, the BMDM creates an empty database file. When the BMDM opens a backup file, it extracts it from ZIP to MDB.

MPM ..... The configuration file Config3.MPM under Program Files\Alber\MPM Manager that you may edit to change computer type (Central, Local or Service).

PDF ..... A file format that protects against unintended changes. The Web Report Generator generates a report as a PDF file every 24 hours.

WAV ..... A sound file used for alarm sounds.

ZIP ..... A compressed file for backup of an MDB database file. Saving the working database as a backup saves the MDB file as a ZIP.

ZRF ..... A compressed file for reports. The Report Generator displays and prints text and graphs and saves customized reports in a ZRF format that protects against changes. You may also view and print ZRF files using the Archive Reader.

4.10. Help Screens

The BMDM has built-in help, which you may activate three ways. Most screens have a question mark in the upper right corner. Click the question mark, then click the ? cursor over an item to open a help description. If a screen has no question mark, press the F1 function key to display help for the entire screen.

Finally, you may click Help on the menu bar to open the text portion of the manual, through which you may browse using the Table of Contents or Index. The on-screen manual does not include tables and figures.

5. Using Configure Station

The Configure Station dialog boxes for a Local, Central or Service computer facilitate setting up communication and alarm reporting. The first time the BMDM runs, at the "Do you want to load a sample database?" message, select No to display the boxes. You may later open these boxes by selecting Setup|Configure Station.

String Status > Setup|Configure Station

To start Configure Station, select Setup|Configure Station. The Monitor Connection Type dialog box appears. Because subsequent boxes depend on previous selections, each box is described without reference to others. For more details on dialog box items, refer to the sections mentioned.

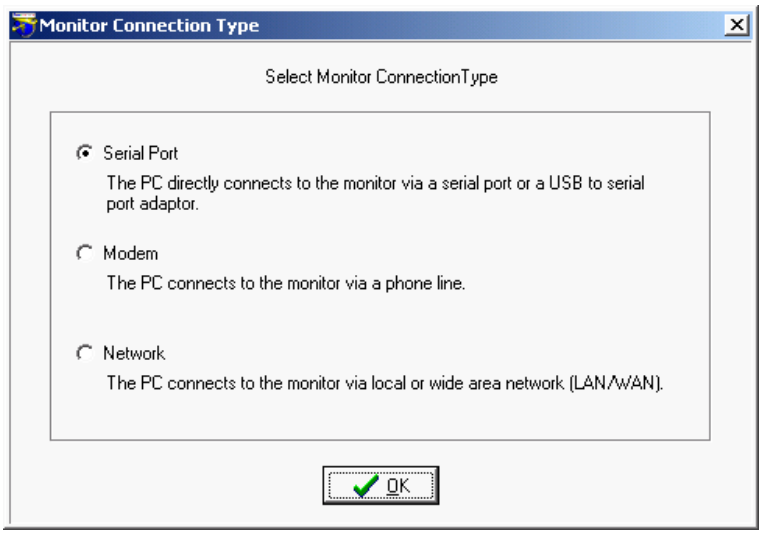


Figure 7. Configure Station - Monitor Connection Type

Select the method by which the monitor is connected to the computer.

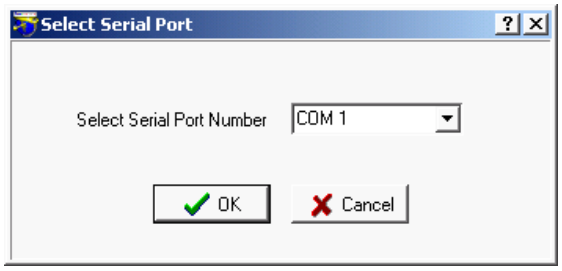


Figure 8. Configure Station - Select Serial Port

If communicating via serial port, select a COM port.

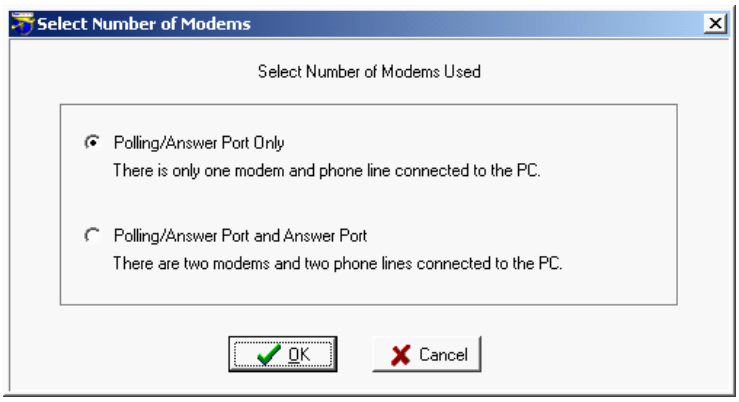


Figure 9. Configure Station - Select Number of Modems

If communicating via modem, select the number of modems in use. For details, refer to *Setting Communications*.

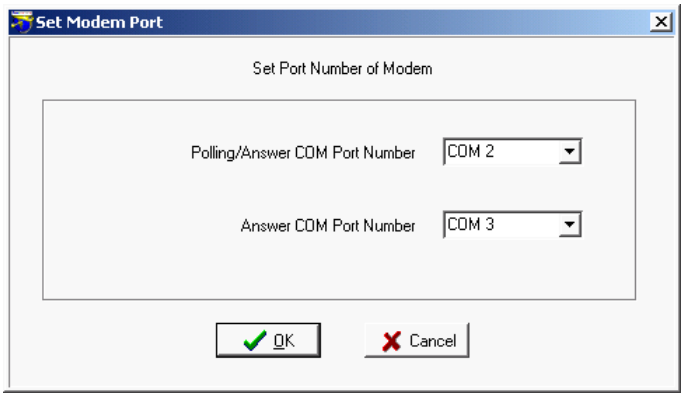


Figure 10. Configure Station - Set Modem Port

If communicating via modem, select the modem COM ports. For details, refer to *Setting Communications*.

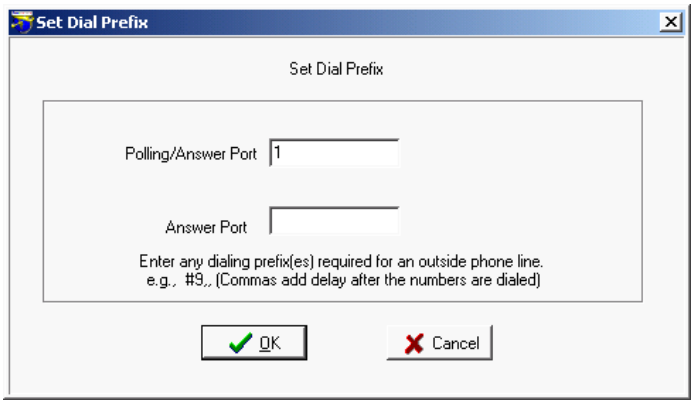


Figure 11. Configure Station - Set Dial Prefix

If communicating via modem, select the dialing prefix. For more details, refer to *Setting Communications*.

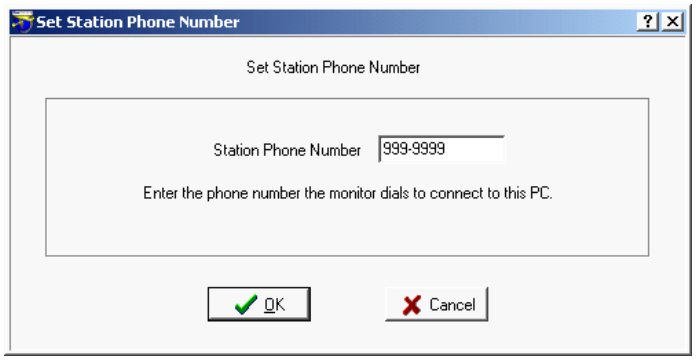


Figure 12. Configure Station - Set Station Phone Number

If communicating via modem, type the telephone number of the computer the MPM or BDS monitor calls when a system goes into alarm or discharge.

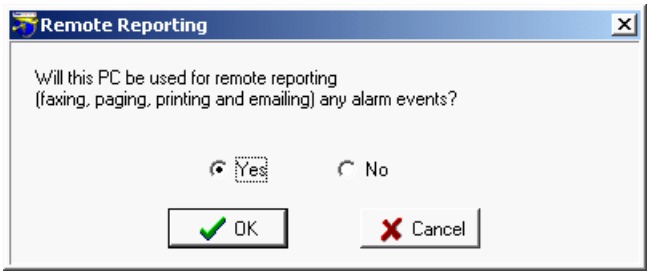


Figure 13. Configure Station - Remote Reporting

To set up parameters for automatic alarm notification using fax, page, email or print, click Yes.

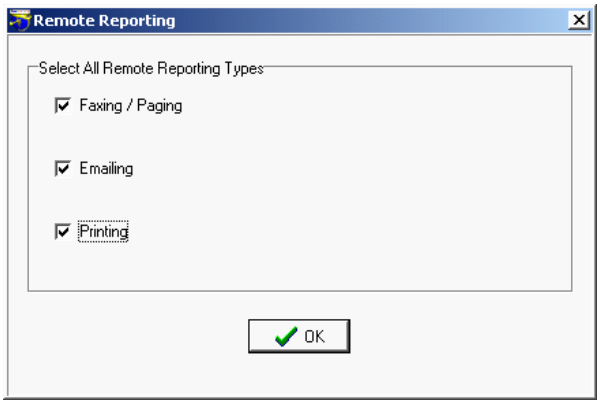


Figure 14. Configure Station - Remote Reporting Types

Select the methods by which alarms will be reported.

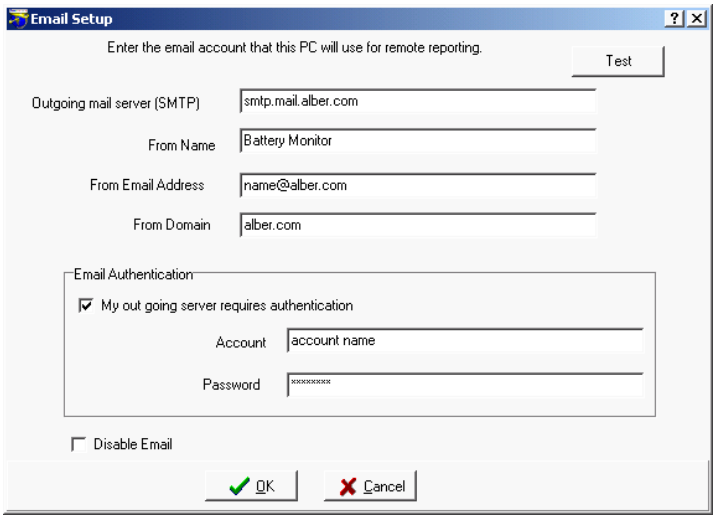


Figure 15. Configure Station - Email Setup

If sending alarms via e-mail, complete this dialog box. Refer to *Setting Up an Email Account*.

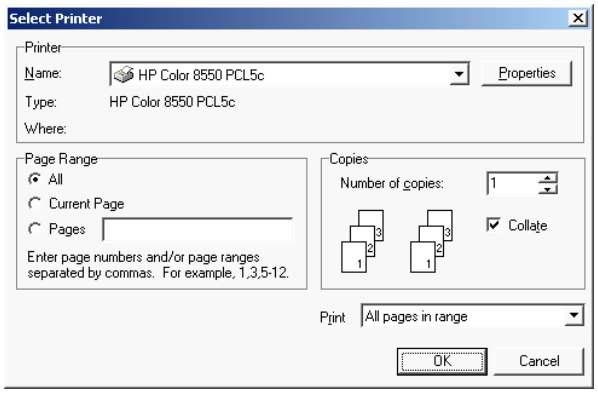


Figure 16. Configure Station - Select Printer

If sending alarms to a printer, this dialog box appears, which is also under File|Printer Setup. The key item to select is the default printer.

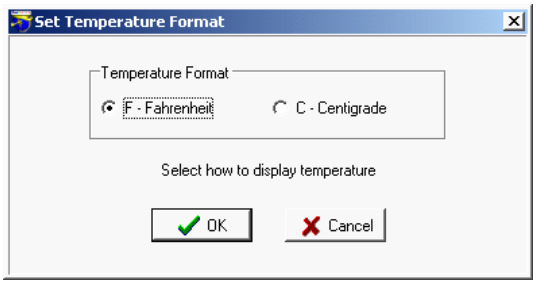


Figure 17. Configure Station - Set Temperature

This box always appears. Select how temperatures will be displayed, either in degrees Fahrenheit or Centigrade.

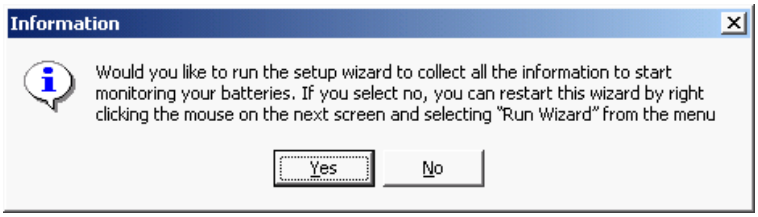


Figure 18. Configure Station - Information

If running the BMDM for the first time with an Access database, this box opens the hardware setup wizard. You may start this wizard at any time by selecting Setup|Run Wizard.

5.1. BMDM Configuration Wizard

String Status > Setup|Run Wizard or Right-click mouse|Run Wizard

The BMDM Configuration Wizard sets up monitor hardware and battery strings. Using the Wizard is the recommended method for setup, as it ensures that basic setup requirements are completed. If you choose not to use the Wizard, you must use the various BMDM setup dialog boxes.

To start the Wizard, select Setup|Run Wizard or right click on the String Status screen and select Run Wizard. The self-guided Wizard dialog boxes are not described in this manual.

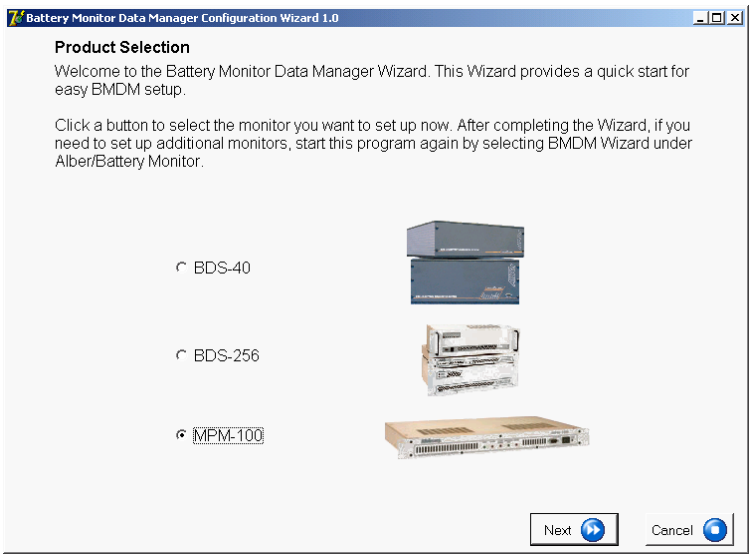


Figure 19. BMDM Configuration Wizard Opening Screen

Practical Theory

6. Understanding Computer Types

When installing the BMDM program, select one of three computer types: Local, Central or Service. This section explains the types of computers.

6.1. Central Computer

For managing many sites, use a Central computer. This can be a remote computer with one modem, or two modems for more than 100 monitors. A computer continuously running the BMDM can automatically poll the monitoring systems, test for normal status, answer calls from alarming monitors, receive and store data in a central database, report problems to personnel, and list conditions on the String Status screen.

If using only one site with a Central computer, you may connect the computer to a monitor RS-232 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 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 for all monitors. This is important because only a Central computer removes data permanently from monitor memory.

Select Central Computer when you want to:
Connect a computer to manage one or more monitors and have the computer manage the database. Only a Central computer updates the time when passing midnight.

A Central computer can do the following:

Set 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, page personnel, fax or email 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 when the Central computer is on-site.

Note: You may set up an on-site, remote (off-site) or notebook computer as Central, but there must be only one Central computer polling a monitor. A serial multiplexer is required when using more than one monitor with an on-site computer.

6.2. Local Computer

For continuous, on-site display of battery information, use a Local computer. You can use a Local computer with a Central computer. A Local computer performs most Central computer functions, except that only a Central computer can permanently remove data from monitor memory.

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 only. When the switch is lit, the front port is selected. Use the rear port for connecting to a permanent Local computer, Service computer or 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.

The BMDM program on a Local and Central computer is the same, except it is set for Local rather than Central to implement special data handling 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 on-site.

A Local computer can do the following:

Set alarm parameters and test intervals.

Calibrate a monitor.

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

Report string and monitor status automatically.

Upon an alarm occurrence, page personnel, fax or email a report, and sound an alarm.

Note: When no network is available, a serial multiplexer is required when using more than one monitor.

6.3. 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 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 memory.

6.4. Facility Monitor

You can connect the monitor to a facility monitor or any device that communicates using MODBUS ASCII protocol. Third-party vendors can view all information available to the Data Manager. Vertiv Corporation can supply the register map and application notes 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.vertivco.com for more details.

Practical Theory

7. Understanding Polling, Extraction and Backup

This chapter explains how polling, extraction, and backup are implemented in Central, Local, and Service computers running Access. A table summarizes the functions. The terms *status* and *data* are used in this chapter as follows:

Status defined - A report of the normal and error conditions and alarm events for the strings being monitored.

Data defined - Data (or string data, battery data) are the voltage float values, resistance values, and discharge values acquired through testing.

The Extract function never deletes *status* from the monitor. Depending on computer type, Extract may delete *data* from the monitor.

7.1. Types of Polling

Polling can be automatic or manual for computers using an Access database.

Polling defined - The process of having the BMDM program connect to the BDS or MPM monitor and request present battery and monitor status. Polling may be done automatically.

Auto Polling via RS-232 or LAN (Continuous Polling) - The computer automatically connects to one or more monitors and then continually polls each string in the database sequentially. This continuous autopolling is done via network or RS-232 direct connection, not via modem. The polling interval is adjustable.

Auto Polling via Modem - Autopolling via modem occurs one time per day. Each string is polled, then autopolling ceases until the next day. This prevents having the telephone line continuously in use.

Disable Auto Polling / Auto Answering - To allow auto polling or auto answering, do not select this box on Communication Setup.

7.2. Extraction of Data

Extraction can be automatic or manual for computers using an Access database. Status is never deleted using Extract.

Extraction defined - Extraction is the process of having the BMDM program connect to a BDS or MPM monitor and transferring float, resistance, discharge, and alarm data from monitor memory to the BMDM database. Depending on computer type, extraction may copy or copy then remove the data from the monitor. Refer to the table in this chapter.

Manual Extraction - After BMDM to MPM or BDS connection, you may initiate manual extraction by clicking of any of these buttons: View Resistance, View Intercell, View Current Historical Alarms, View Discharge, Extract All, and History. You may also start manual extraction by clicking the **Extract All Data** button or the **Extract Data** pop-up menu item when enabled.

Auto Extraction - Enabled by checking the Auto Extract Data box on Communication Setup. With auto extraction, data transfers from the monitor to the BMDM database one time a day, at 10PM for a Local computer or at 12 midnight for a Central computer.

7.3. Polling and Extraction Notes

Auto Polling via Modem with a Central Computer - Central computer autopolling via modem is available once a day at midnight. Select **Modem** on Setup|System|Link, set Polling to **Enable** on Setup|System|Link, and do not check the **Disable Auto Polling / Auto Answering** box on Setup|Communication. Modem connection does not permit continuous autopolling.

Continuous Auto Polling - A Central, Local or Service computer connected to the monitor via RS-232 or network can perform continuous autopolling. Set Polling to **Enable** on Setup|System|Link, and do not check the **Disable Auto Polling / Auto Answering** box on Setup|Communication. Using a Service computer for continuous polling is not recommended.

Pause Auto Polling - On String Status, you may select Setup|Pause Auto Polling to temporarily suspend continuous polling. This is convenient if you are selecting other strings in the list. Selecting Pause Auto Polling does not change settings on the Communication Setup or Link dialog boxes.

Extracting Data via Modem with a Central Computer - A Central computer connected via modem can extract data. Select **Auto Extract Data** on Setup|Communication. The Central computer polls monitor status at midnight, copies monitor data to the Central computer database, and deletes the data from the monitor.

Extracting Data with a Central or Local Computer via RS-232 or Network - 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. During autopoll at 10PM, a Local computer copies monitor data to the Local computer database, but does not delete the data from the monitor. At midnight, the Central computer autopolls monitor status, copies the monitor data to the Central computer database, and deletes the data from the monitor.

7.4. Automatic and Manual Backup

Within this section, a **backup** is defined as a file that is generated by the BMDM program automatically or upon user request.

The BMDM program stores data from the MPM or BDS in a Microsoft Access compatible file. As defined in *File Types*, an MDB file is a database file that stores cell and battery readings and setup data. A WinZip® ZIP file is a compressed file for backup of an MDB database file.

The working database is automatically saved as a ZIP file at midnight. The number 1 is appended to the file name and the extension becomes ZIP. Backups are made for three days, appended with 1, 2 or 3. On the fourth day, the oldest backup is overwritten. On the first of the month, another backup is created, with the month and year appended to the file name. On subsequent first days of each month, another file is created, again with the month and year appended.

At any time, to save a database as an MDB database file, select File|Save As. To save the MDB file as a ZIP backup file, select File|Backup Database. To open a backup file, select File|Open Backup. When the BMDM opens a backup file, it converts it from a ZIP to an MDB database file.

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

Computer Type[1] and Database	Connected Via	Backup	Auto Polling	Auto Extraction[2]
Central Access	Modem	Midnight (12:00AM)	Midnight (12:00AM)	Copies the status; copies then deletes data. Concurrent with autopoll.
Central Access	RS-232	Midnight (12:00AM)	Continuous	Copies the status; copies then deletes data. Concurrent with first autopoll after 12AM.
Central Access	LAN	Midnight (12:00AM)	Continuous	Copies the status; copies then deletes data. Concurrent with first autopoll after 12AM.
Local Access	Modem	Midnight (12:00AM)	10:00PM	Copies the status; copies data. Concurrent with autopoll.
Local Access	RS-232	Midnight (12:00AM)	Continuous	Copies the status; copies data. Concurrent with first autopoll after 10PM.
Local Access	LAN	Midnight (12:00AM)	Continuous	Copies the status; copies data. Concurrent with first autopoll after 10PM.
Service Access (See Note 1)	Modem	Midnight (12:00AM)	Autopolling not available (Manual only)	Auto extraction not available. (Manual only)
Service Access (See Note 1)	RS-232	Midnight (12:00AM)	Continuous	Auto extraction not available. (Manual only)
Service Access (See Note 1)	LAN	Midnight (12:00AM)	Continuous	Auto extraction not available. (Manual only)
Note 1: End-user use of a computer set as Service type is not recommended. Note 2: Status and data copy and delete functions are the same for manual extraction.				

Figure 20. Computer Types: Backup, Polling and Extraction Table

Practical Theory

8. Understanding System Installation

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 *Installation Instructions* manual, then read this section before placing the system into service.

You should initially configure monitor settings on-site through the front or rear panel RS-232 Local port during installation. You may change programmable settings later.

New monitors have location, battery, and string names blank and 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, known to the user, and correspond between the monitor and calling computer for a connection to occur.

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

8.1. Connecting Using a Local Computer

The following 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.

8.2. Connecting Using a Central Computer

The following describes how to set up an MPM or BDS for use with a Central computer. You may set up an on-site or notebook computer as a Central computer, but there must be only one Central computer polling a monitor.

- 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.

8.3. Connecting Using a Service Computer

The following 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:
  (Use this option 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 notebook (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 notebook (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. (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*.

Practical Theory

9. Understanding How Data is Stored

This section describes how the BMDM processes data and how the MPM or BDS stores the data. For details about how the BMDM creates and backs up database files, refer to *Understanding Polling, Extraction and Backup*.

9.1. Data Storage in the MPM

Data in the MPM is stored in nonvolatile E^2 memory, which retains about a year's worth of typical data. Collected data is stored until transferred to the Central or Local computer. This same memory stores setup and calibration data, 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 on-site or remotely.

The MPM stores these kinds of data:

Alarms - 100 records that show when a parameter went into alarm and left alarm, and 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. Memory size and the number of cells monitored limit the data stored: many short or a few full discharges.

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 would calculate the memory required as:

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

This worst case 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 allow a full analysis of battery performance during the event.

Resistance - 1.6kb of nonvolatile memory are allocated for resistance data. 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.

9.2. Data Storage in the BDS

Data in the BDS is stored in nonvolatile SRAM memory, which retains about nine month's worth of typical data. Collected data is stored until transferred to the Central or Local computer. This same memory stores setup and calibration data, 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 on-site or remotely.

The BDS stores these kinds of data:

Alarms - 100 records that show when a parameter went into alarm and left alarm, and 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: 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 would 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 worst case assumes all cells reach end voltage. Time stamped data allow a full analysis of battery performance during the event.

Resistance - 10.6kb of nonvolatile memory are allocated for resistance data. Memory limits 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.

Practical Theory

10. Understanding the Time to Go Algorithm

The battery Amp-hour (Ah) rating indicates the current (Amps) the battery can deliver over time (hours). For example, if a battery can deliver 5 Amps for 20 hours, it has a 100Ah rating. However, because discharge rate, temperature, and age affect battery capacity, Amp-hour rating can vary. A 100Ah battery that discharges over two hours might deliver only 56Ah. To compensate for this nonlinearity, you can use Peukert's Equation to estimate the Amp-hours remaining (or time to go) in a lead-acid battery based on discharge rate. If capacity testing is not an option, you can get the numbers for the equation from the discharge curves on manufacturers' data sheets, but the result will be less accurate than that obtained by using values gotten from actual capacity testing.

Peukert's Equation demonstrates how the Amp-hour capacity of a lead-acid battery varies according to rate of discharge. Rather than Ah = I x T, the Peukert Equation reads:

$$C = I^n t$$

where constant C = the theoretical capacity of the battery, I = the discharge current in Amps, t = the time of discharge, and the exponent *n* = the Peukert number, a constant for the given battery. The exponent value can vary from greater than 1 to about 2. Values closer to 1 indicate a well performing battery; higher numbers indicate more capacity diminishes when the battery is discharged at higher rates.

Calculate the Peukert number by determining the capacity obtained at any two discharge rates:

$$n = \frac{(\log t_2 - \log t_1)}{(\log I_1 - \log I_2)}$$

where t_1 is the hours of discharge at current I_1 and t_2 is the hours of discharge at current I_2.

To determine the Peukert number, discharge the same, fully charged battery twice at convenient discharge rates.

First, discharge the battery below the normal discharge rate. When the battery reaches discharge level, as determined from manufacturers' spec sheets, note the Ah consumed and the time the discharge took. Calculate the average Amps by dividing the Ah consumed by the length of time. For example, if the Ah consumed was 300 and the discharge took 50 hours, the average Amps equals 6. Use this value for I_1 in the above formula and use the time the discharge took for T_1.

Charge the battery and repeat the process for a discharge rate higher than normal. Use the resulting values for I_2 and T_2 in the formula. Calculate the value for *n* to obtain an exponent accurate for your normal rate. Use this exponent *n* in the Peukert Equation to estimate time remaining during a normal discharge.

Performing two capacity tests to obtain the variables for Peukert's Formula can yield accuracy as good as 0.5% to 1%.

Although the Time to Go calculation may offer a close estimate, many other battery parameters affect run time as a battery ages. These aging phenomena show up as different failure modes and influence the accuracy of the Time to Go calculation. Vertiv Corporation recommends that you not rely solely on the Time to Go data for battery run time and that you only consider the Time to Go as an estimate.

To activate the Peukert's Equation algorithm in the BMDM program, open the Setup|Battery|Discharge dialog box and assign values in the Time to Go area.

11. Selecting Preferences

String Status > Setup|Preferences

At any time, you may open the Preferences dialog box to change program appearance or activate options.

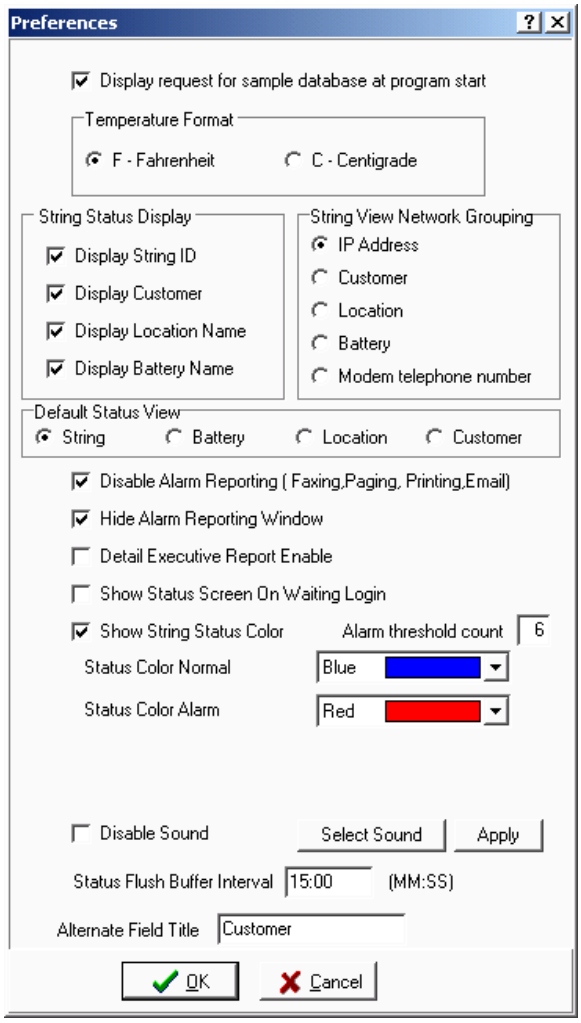


Figure 21. Preferences

Display Sample Database - To display the message, "Do you want to load a sample database?" at BMDM program start, select this box.

Temperature Format - Select a temperature format. Do not change format after setting up the system. Stored temperatures will not convert between F (Fahrenheit) and C (Centigrade or Celsius).

String Status Display area - Selecting **Display String ID**, **Display Customer**, **Display Location Name** or **Display Battery Name** displays these columns on the String Status screen.

String View Network Grouping area - When connected to a string, a drop-down list at the top of the screen shows the name of the string being displayed. On Preferences, clicking **IP Address**, **Customer**, **Location**, **Battery** or **Modem telephone number** filters the list by these parameters. The default filter is IP Address. These filters are active for network connection only.

Default Status View area - Select an option button to have the default String Status screen display Battery Status, Location Status or Customer Status at program start.

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

Hide Alarm Reporting Window - Select to stop the report alarm box from popping up.

Detail Executive Report Enable - Only appears on a Central computer. Select to automatically generate daily executive reports, which are saved in PDF format at Program Files\Alber\ MPM Manager\Web \String Summary or System Summary. These reports are viewed when connecting via the Web interface.

Show Status Screen on Waiting Login - Check to keep the String Status screen displaying when no user is logged in.

Show String Status Color - To have color indicate status on the String Status screen, select this box, an alarm threshold count, and a color.

Alarm Threshold Count - This is the number of alarms required on a string to make the Normal color change to the Alarm color.

Status Color Normal - A good status, with no alarms, displays in the color selected from this Status Color Normal drop-down box.

Status Color Alarm - A string in alarm with the number of alarms selected in the Alarm Threshold Count box displays in the color selected in this Status Color Alarm drop-down box.

Disable Sound - Select to globally disable alarm sounds. Not selecting enables a sound upon an alarm. You must also check Sound Alarm on Setup|System|Reporting, which applies to specific strings. Refer to *Setting Up a New MPM or BDS System*. To select an alarm sound, click **Select Sound** on Preferences and choose a sound. Click Open then **Apply** to hear the sound. **Note**: When in Battery setup and remote reporting is disabled, the alarm threshold must be set to one. The string status is set to have an alarm and the string status color is automatically applied.

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.

Alternate Field Title - Type a name in this field to assign the Customer field title another name, such as Region or Subdivision. The new name will appear in various program areas where the word Customer appeared.

12. Setting Communications

String Status > Setup communication *or* Setup|Communication
Select this dialog box to define communication settings.

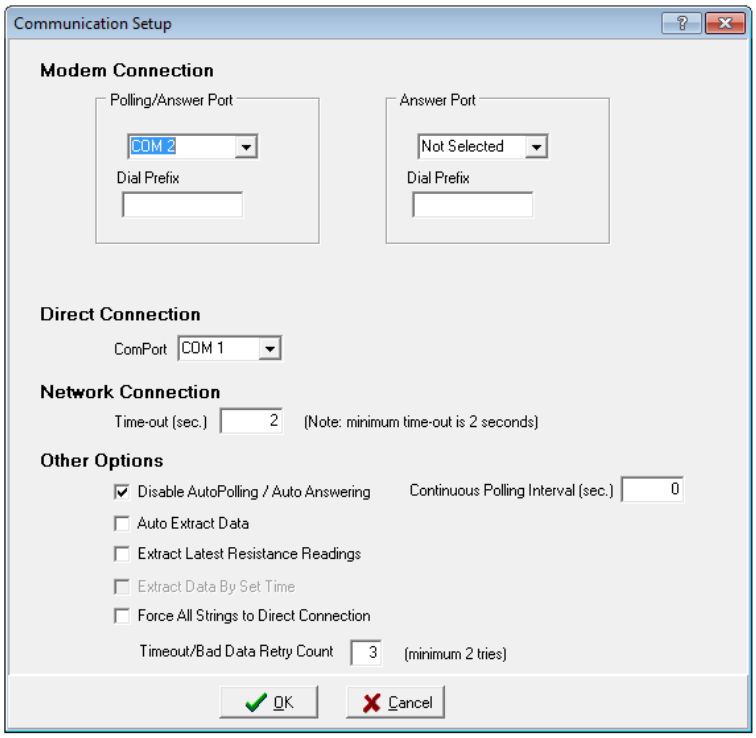


Figure 22. Communication Setup

Polling/Answer Port and **Answer Port** - Using the drop-down lists, 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. If you define only one port, it both polls and answers. Define one port from the Polling/Answer Port list and choose Not Selected under Answer Port. For larger systems, use two modems to allow simultaneous polling and remote reporting.

Dial Prefix - This is the number, usually a 9, that accesses an outside phone line. Type at least two commas after the number for a time delay. Leave this box blank if the computer directly connects to an outside line.

Direct Connection - Com Port - If you selected the Direct button on System Setup|Link, select a COM port. If any strings are configured as Direct Connect, then select the Com Port number.

Network Connection - Time Out - This sets the time allowed for connecting to the network, typically 2 seconds.

Disable Auto Polling / Auto Answering - For computer–monitor connection via RS-232 or network, not selecting this box enables continuous polling. With continuous polling, the BMDM polls monitor string status at the time interval set in the Continuous Polling Interval box. Refer to *Understanding Polling, Extraction and Backup* for definitions of status and data.

Extract Latest Resistance Readings – enabling this option, allows you to view the latest resistance readings when resistance history has previously been extracted by a central computer. This allows you to view the latest resistance readings without the central computer database.

Continuous Polling Interval (seconds) - If Disable Auto Polling / Auto Answering is not selected, set the time interval that polling occurs. The BMDM continually polls monitor string status at this interval, typically 15 seconds.

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, Extraction and Backup* for polling details.

Extract Data by Set Time - To extract data at a time other than midnight, select Auto Extract Data, then select this box and type a time in the Extract Time field on System Setup Link for each string.

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 USB or RS-232 port. This feature saves having to modify the database Link connections and is useful when temporarily using a Local or Service computer.

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

12.1. Determining the USB COM Port

If your MPM or BDS system has USB capability, you must determine which COM port the computer selects for the USB driver and then set the COM port in the BMDM program.

Note: Items on your version of Microsoft Windows may have different names from those described in the following text.

First, connect the MPM or BDS system to the USB port on the computer and power up the computer and the system.

From the Windows desktop, click Start|Settings|Control Panel|System. On the System dialog box, click the Hardware tab, then click the Device Manager button.

Expand the Ports folder, then find the listing for the USB. A typical listing might read: USB Serial Port (COM 4). Write down the COM port number for later use, then close the Device Manager dialog box and exit back to the Windows desktop.

On the Communication Setup dialog box in the BMDM program, select the previously noted COM port on the Direct Connection drop-down list. Click OK.

13. Setting Up an Email Account

String Status > Setup|Email Setup

Use Email Setup to set up the account under which the BMDM sends emails. This dialog box contains the global Email Disable selection.

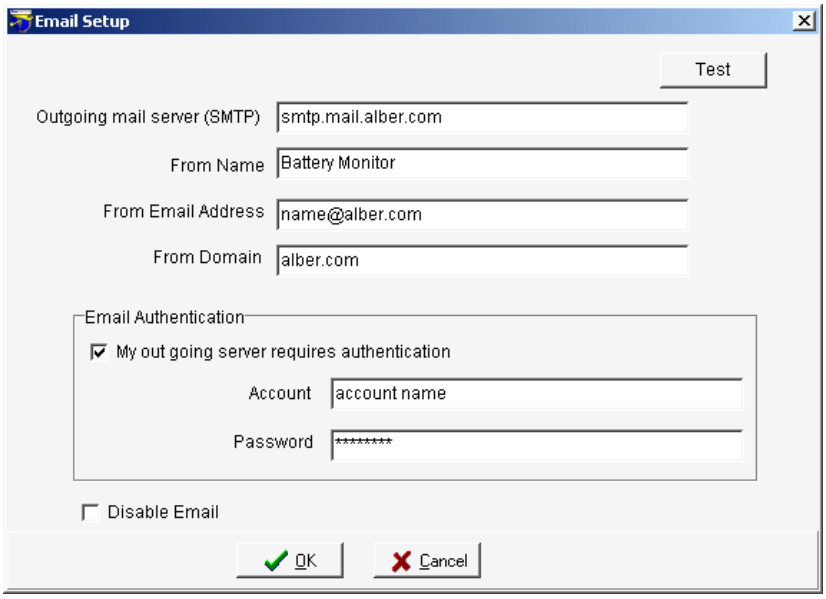


Figure 23. Email Setup

Outgoing Mail Server (SMTP) - Specify the mail server for outgoing messages. Obtain this from your Internet service provider or network administrator.

From Name - Type the name that will appear in the recipient's email From field.

From Email Address - Type the email address the BMDM will use as a sender.

From Domain - Type the mail server domain name of the outgoing mail server.

My outgoing server requires authentication - Select this box if your email requires ESMTP. This specifies that you must log on to your outgoing mail server.

Account - Type the mail server account user name or number.

Password - Type the password for the account.

Disable Email - This selection globally disables all BMDM email settings. To not send any alarm or other BMDM emails, check this box.

Test - To send an email to test the setup, click the Test button. The Test Email dialog box appears.

13.1. Testing Email

String Status > Setup|Email Setup|Test

The Test Email box tests the settings on the Email Setup dialog box.

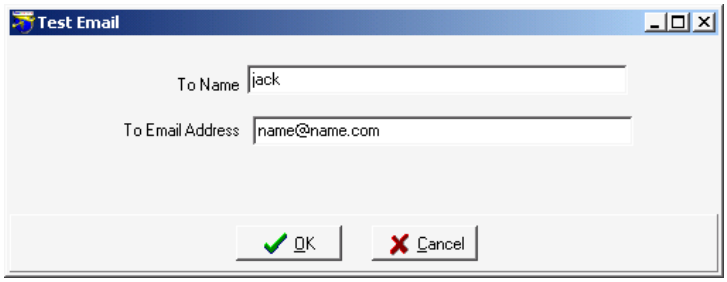


Figure 24. Test Email

At **To Name** and **To Email Address**, type the recipient's name and email address. Click OK to send the email and close the box. Confirm the email is received at the location to which it was sent.

14. Setting Up a New MPM or BDS System

String Status > Setup system *or* Setup|System

BMDM setup involves defining what systems exist. Each system setup must identify customer, location, contacts, battery and string information, and other data. All System Setup dialog boxes except String are identical for both the MPM and BDS.

14.1. System Setup: General Notes

System Setup is password protected. After selecting Setup|System, type the password and click OK. The password times out after five minutes or you may click the top left Password Active to disable it. If the password is incorrect, the System Setup boxes appear, but New, Save and Delete are inactive. You can have different Battery Setup and System Setup passwords. Refer to *Default Passwords*.

The first time the String Status screen appears, no status information exists. As you add new systems, they are listed with Unknown status. To set up a new system, select Setup|System, click New on the Customer dialog box, and complete the System Setup boxes. Systems previously set up are listed on String Status. When you click Setup|System, the name highlighted in the list appears in the 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 previously saved customer information.

The New button on the Location, Battery, and String boxes adds a new location under an existing customer, a new battery under an existing location, or a new string under an existing battery.

To change names or information for an existing system, use the Setup|System dialog boxes. If BMDM and monitor location, battery or string names do not match, connection fails and an error message appears. Blank spaces or hyphens can affect a name.

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

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

Depending on which System Setup box is displayed, clicking Delete removes all information for the displayed customer, location, battery or string. All associated set up data will be permanently lost.

14.2. System Setup: Customer

String Status > Setup|System|Customer

Use the Customer dialog box to add new customer details.

The Customer tab and *Customer* field names may be changed to another name, such as Region, by selecting Setup|Preferences, then typing a new name at Alternate Field Title.

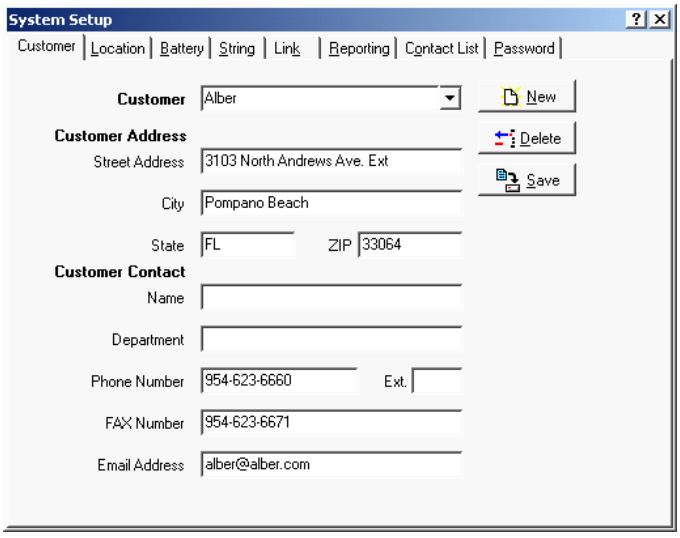


Figure 25. System Setup - Customer

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

Customer Name (required) - To add new customer details, click New and type the customer name. If monitoring only one customer, you may identify a region, division, etc. Complete the **Customer 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 responsible for the battery system. This name may be used for reports faxed using Setup|System|Reporting.

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

14.3. System Setup: Location

String Status > Setup|System|Location

Before completing the Location dialog box, confirm the correct customer is selected on the Customer box.

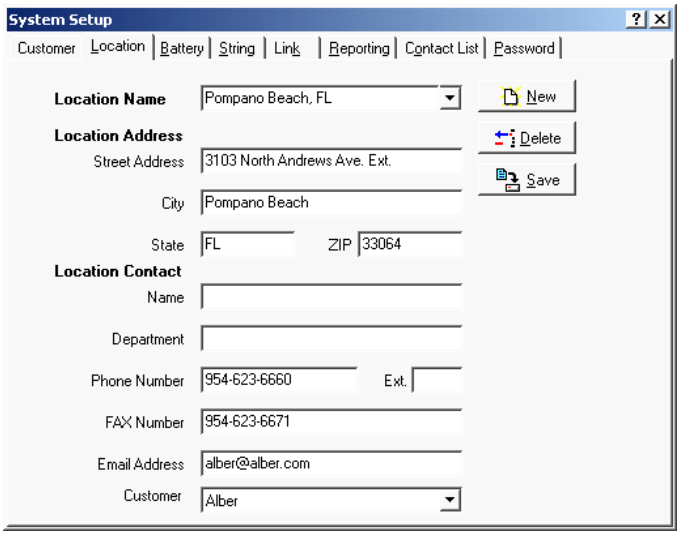


Figure 26. System Setup - Location

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

Location Name (required) - Type the 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 these Setup|System dialog boxes. If database names do not match names in the monitor, connection fails. 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. This location name must match the location name in the database of the connecting computer.

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

Customer (or alternate field name) - Normally, this field is not changed. To move the location name and related battery and string setup data to a different customer, select a name from the drop-down list. This is useful where many locations are under a few customers. By adding customer names (or regions, etc.), the data becomes more manageable.

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

14.4. System Setup: Battery

String Status > Setup|System|Battery

The Battery dialog box assigns a battery name, cell and string parameters, and cell numbering on the String View screen. Before completing this dialog box, confirm the correct customer and location are selected on the Customer and Location boxes.

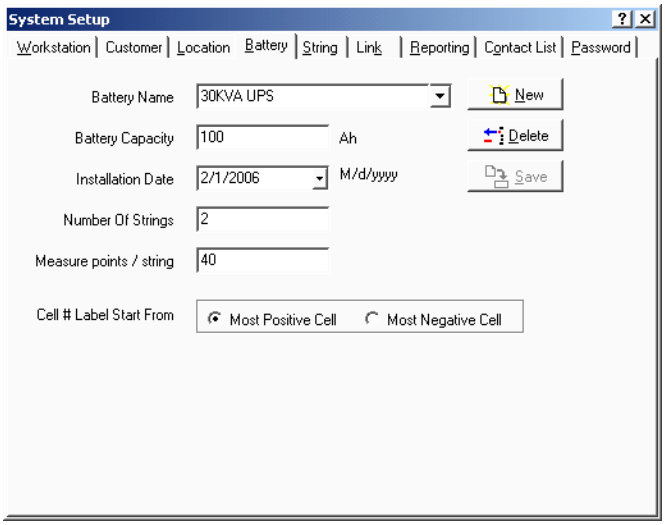


Figure 27. System Setup - Battery

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

Battery Name (required) - Assign a unique name to the battery. Location, battery, and string names identify the strings and hardware to which the monitor is connected.

Note: To change the battery name after monitor setup, use these Setup|System dialog boxes. If database names do not match names in the monitor, an error message appears.

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. This battery name must match the battery name in the database of the connecting computer.

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 at the eight hour rate.

Installation Date - Type the battery installation date or select from the drop-down calendar. If desired, change the computer date format under 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 (required) - Type the number of parallel strings within the battery.

Measure points / String (required) - Type the number of cells or modules per string.

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.

14.5. System Setup: String

String Status > Setup|System|String

The String dialog box assigns a string name, configuration, model and manufacturer names, capacity, and MPM string names. Before completing this dialog box, confirm the correct customer, location, and battery are selected on the Customer, Location, and Battery boxes. The Start Cell # box for MPM changes to string # when BDS is selected. See below.

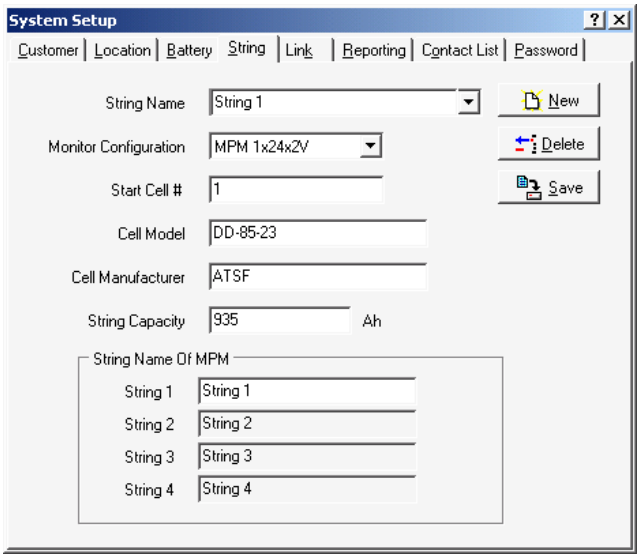


Figure 28. System Setup - String (MPM shown)

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

String Name (required) - Type a name for each MPM or names for each string for a BDS. Location, battery, and string names identify the strings and hardware to which the monitor is connected.

Note: To change the string name after monitor setup, use these Setup|System dialog boxes. If database names do not match names in the monitor, an error message appears.

Note: You cannot have two identical string names under the same battery name. Selecting different strings changes selections on the Link and Reporting dialog boxes. This string name must match the string name in the database of the connecting computer.

Monitor Configuration (required) - Select a configuration from the drop-down list. To determine MPM hardware configuration, refer to the model number in the chart in *MPM Configuration Options*.

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

String # (BDS) (required) - 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 has two or more strings, such as a 2 x 24, you may type names for each string. These names appear in reports where string names are used. The default names are String 1, 2, 3 and 4. Disabled for BDS.

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

14.6. System Setup: Link

String Status > Setup|System|Link

The Link dialog box enables polling and sets computer to monitor connection. Before completing this dialog box, confirm the correct customer, location, battery and string are selected on the Customer, Location, Battery, and String boxes.

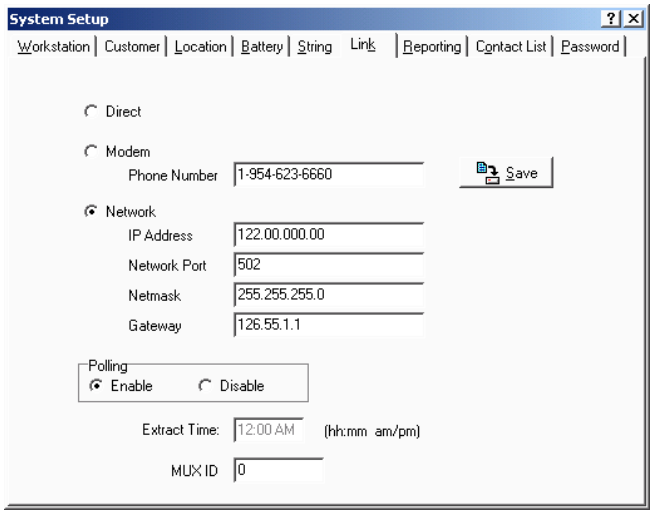


Figure 29. System Setup - Link

You must select either **Direct** or **Modem** or **Network**.

Direct - Select if the monitor directly connects to a computer serial port. On the Setup|Communication box, define the COM Port at Direct Connection.

Modem - Select if the monitor connects to the computer via modem. In **Phone Number**, type the phone number of the monitor that the Central computer calls (the number to which the monitor is connected). On Setup|Communication, define the COM Port at Modem Connection.

Network - Select if the monitor connects to the computer via network. Complete IP Address, Network Port, Netmask and Gateway (below).

IP Address - Type the IP address of the monitor. 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 and **Gateway** - Type the monitor subnetmask number. Type the default gateway number used by the monitor. If using a local LAN, the gateway number can be left blank.

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

Polling Enable or Disable - These buttons allow polling on a per string basis, to avoid receiving error messages when a system is off-line. Select Enable to request monitor and battery status every 24 hours. 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, Extraction and Backup*.

Extract Time: If Extract Data by Set Time is selected on Communication Setup, type the data extraction start time in this field.

MUX ID (required) - 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 the *Serial Port Multiplexer User's Guide*.

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

14.7. System Setup: Reporting

String Status > Setup|System|Reporting

The Reporting dialog box selects the devices the Central or Local computer contacts when the monitor reports during continuous polling or calls in an event. Before completing this dialog box, confirm the correct customer, location, battery, and string are selected on the Customer, Location, Battery, and String boxes. A Service computer cannot open the Reporting box.

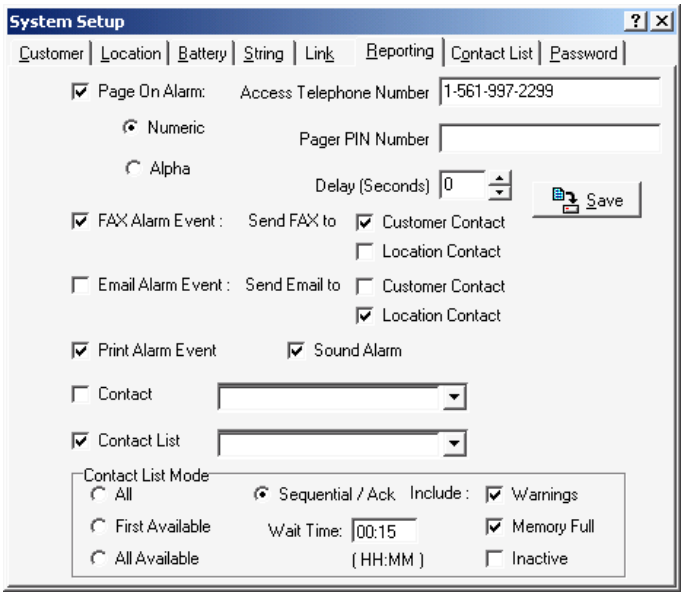


Figure 30. System Setup - Reporting

Page On Alarm - Select to display the Page Report Alarm Event box 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 phone number if numeric or the modem ID number if alphanumeric. If using an alphanumeric pager, use an access number that has a TAPI interface that communicates using a modem instead of voice. For example, SkyPage's access number is (800) 759-6366. This can also be the TAPI phone number for cellular phones if the cell phone supports text messaging.

Pager PIN Number - Type the pager private ID (PIN) number if needed or the cell phone number if using text messaging.

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

Fax Alarm Event - Select to display the Fax Report Alarm Event box 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 Customer or Location dialog box.

Email Alarm Event - Select to display the Email Alarm Event box on error and send alarm notification via email. Check a box to direct the report to the **Customer Contact** or **Location Contact**. The system sends to the email address on the Customer or Location dialog box. Confirm global Disable Email is not checked on the Email Setup dialog box.

Print Alarm Event - Select to display the Print Report Alarm Event box on error and send alarm notification to a printer. To select a default printer, at the String Status screen, click File|Printer Setup. If alarms do not print when received, change the **Spool Data Format** setting. On Windows, click Start|Settings|Printers. Right click the icon for your printer, then click Properties|Details|Spool Settings. At Spool Data Format, select EMF or RAW.

Sound Alarm - Select to enable an audible alarm for this string when an alarm event occurs. Select the alarm sound by clicking Select Sound under Setup|Preferences. To enable alarm reporting and alarm sounds, confirm global Disable Alarm Reporting and Disable Sound are not selected on the Preferences dialog box.

Contact - To contact a person from any contact list, select the check box and choose a name from the drop-down list. This name is in addition to names in a group contact list.

Contact List - To contact a group of people from a contact list, select the check box and choose a group contact name from the drop-down list. Members of the group will be contacted based on the Contact List Mode.

The **Contact List Mode** area has the following selections.

All - Upon an alarm event, contact all names in the contact list, whether on-duty or off.

First Available - Upon an event, contact the first name on-duty in the contact list. No further action is taken.

All Available - Upon an event, contact all names on-duty in the contact list. No further action is taken.

Sequential / Ack - Upon an event, contact the first name on-duty in the contact list and wait a preset time for acknowledgement. If none is received, contact the next available person in the list and wait for acknowledge. Continue and repeat the sequence until acknowledgement is received or until the list is gone through one time.
Note: You must select Acknowledge in the Alarm Button area on Setup|Battery|General.

Wait Time - Click the box and type a time (in hours and minutes) that the program waits before calling the next person when Sequential/Ack is selected.

Include **Warnings**, **Memory Full** and **Inactive** - Select these check boxes to contact and require acknowledgement when these events occur and Sequential/Ack is selected. If not selected, event notice is sent only once and no acknowledgement is required.

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

14.7.1. Using a Cell Phone for Text Messaging

You may use a cell phone to receive text messages. Type your provider's TAP telephone number in the Access Telephone Number field and type your cell phone number in the Pager PIN Number field. You can find cell phone provider TAP telephone numbers at www.notepager.com/tap-phone-numbers.htm. Not all cell phone providers offer this text messaging service. The Email or Pager fields can also send text messages to a cell phone.

14.8. System Setup: Contact List

String Status > Setup|System|Contact List

The Contact List dialog box selects persons to be contacted during an alarm reporting event, in addition to those listed on the Customer and Location dialog boxes.

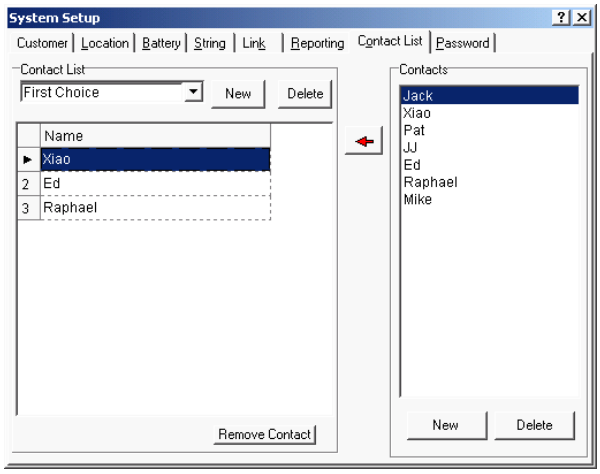


Figure 31. System Setup - Contact List

Contact List - Each Contact List (group) name contains a group of persons to contact. To create a new Contact List name, click New in the left Contact List panel. The Contact List Name dialog box appears. At **List Name**, type a name, then click OK.

Delete (left panel) - To remove a contact list (group) name from the list, click a name from the drop-down Contact List and click Delete. This permanently deletes the contact list.

Delete (right panel) - To remove a person's name from the list of potential contacts, click a name on the right Contacts list and click Delete. This permanently deletes the contact.

Remove Contact - To remove a person's name from the group Contact List, click the person's name to highlight it, then click Remove Contact.

Sort Names - To move a person's name up or down the list to change call priority, click and drag the number before the name up or down the list onto another number.

Contacts - To type persons' names to add to a list of potential contacts, click New on the right panel on the Contact List dialog box to open the Contact Information box.

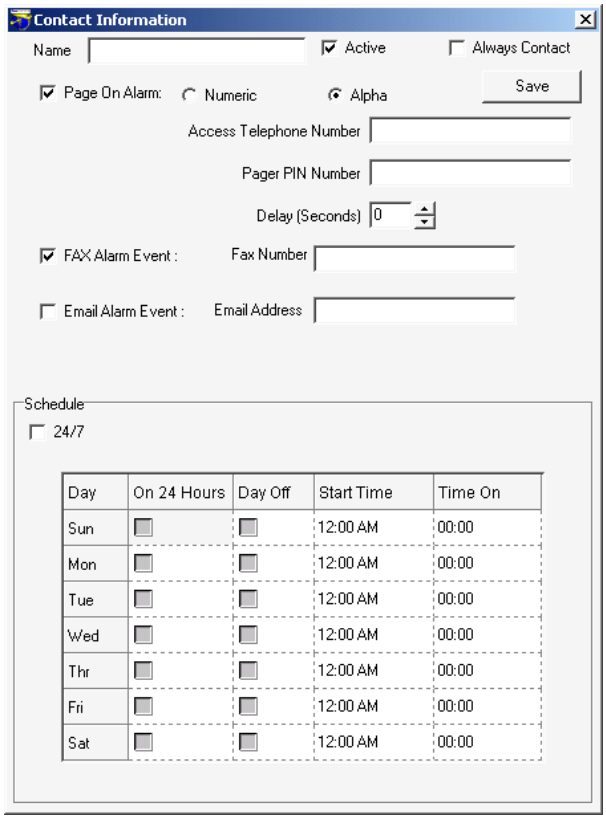


Figure 32. System Setup - Contact Information

String Status > Setup|System|Contact List|New (on right panel)

Use the Contact Information dialog box to add names to the list of potential contacts.

Name - Type the contact person's name.

Active - Do not select if the person is unavailable. For example, the person is on vacation.

Always Contact - Select to always contact the person, regardless of settings elsewhere. The Active check box must be selected.

Page On Alarm - Select to display the Page Report Alarm Event box 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 phone number if numeric or the modem ID number if alphanumeric. If using an alphanumeric pager, use an access number that has a TAPI interface that communicates 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 (Seconds) - If using a numeric pager, type the delay in seconds before the numeric message is sent.

Fax Alarm Event - Select to send alarm notification to a fax machine. At **Fax Number**, type the fax machine phone number the system will dial.

Email Alarm Event - Select to send alarm notification to the person via email. Type an address in the **Email Address** box. Confirm Disable Email is not checked on the Email Setup dialog box.

Use the **Schedule** area to build the time on / off for the person.

24/7 - Select if the person is on call 24 hours a day, 7 days a week or, in the Sunday through Saturday grid, you may select the following:

On 24 Hours - Select if the person is on call the entire day.

Day Off - Select if the person is not available that day.

Start Time - If the person is available part of the day, click the Start Time field and type the time availability starts. You may press Enter to step to the Time On field.

Time On - Click this field and type the *number of hours* the person is available. You may press Enter to step to the next Start Time field.

When finished, click Save to return to the Contact Lists dialog box. To edit information after saving, double-click the name in the right side Contacts list.

Add Names to Contact List - To add people to a Contact List, first select a group name from the drop-down Contact List. Next, click a person's name in the Contacts list on the right, then either click the red arrow or right click the name and select Add to List. The name appears in the list on the left.

If you want to add new names to the Contact or Contact List boxes on the Reporting dialog box, click the Reporting tab. If not and you are finished, click Save and close the dialog box. If you want to change the password, click the Password tab.

14.9. System Setup: Password

String Status > Setup|System|Password

Use the Password dialog box to change the System Setup password. If the password is incorrect, you can view protected screens but cannot change parameters. The Password tab appears only if the correct password is entered when Setup|System is selected.

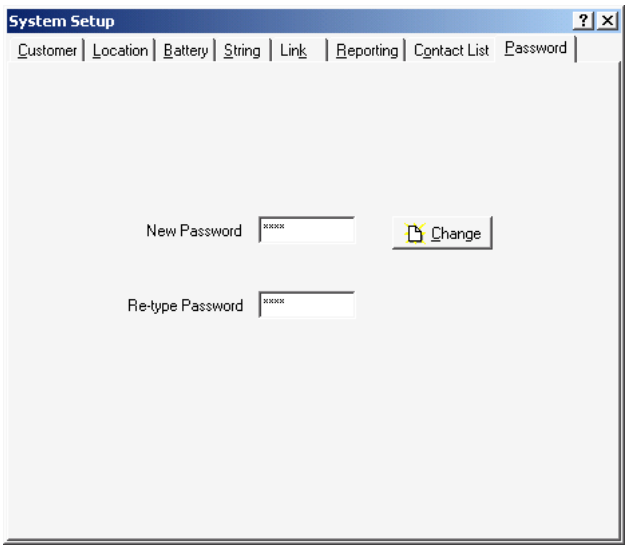


Figure 33. System Setup - Password

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 long. Click Change. The new password is now in effect.

Record the new password for reference. If the password is lost, you must contact Vertiv Corporation.

15. Synchronizing Using Check Settings

The location, battery, and string names are key for letting a computer connect to a monitor; all names must match or connection fails. Typically, a Central computer assigns names into the monitor, and Check Settings uploads to the computer any test times, alarm thresholds, and data settings put into the monitor during commissioning. **Synchronizing** is the process of uploading using Check Settings and must be done using a Central computer connected to the monitor via RS-232, modem or network. An upload for a BDS 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, complete the Battery Setup dialog boxes.

Before synchronizing, you should understand the Upload, Close, Recheck, and Send Time buttons on the Check Settings dialog boxes. The Battery Setup password enables Send Time and Upload.

Upload Button - To transfer settings between the computer and monitor, click Upload. The data transferred depends on computer type. A Central computer sends the location, battery, and string names, string ID, current date and time to the monitor, and the monitor sends all other settings to the computer database. Using a Local or Service computer, the monitor transfers setup to the computer, but names, date and time are not sent to the monitor. You need to click Upload on only one Check Settings box, usually Check Settings|General. If you are uploading a BDS, repeat the Upload a second time.

Close Button - After transferring settings using Upload, to close Check Settings, click Close.

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

Send Time - This button sends the date and time from the computer to the monitor without affecting other settings.

String Status > Connection

Complete the Preferences, Communication Setup, and System Setup dialog boxes then, on the String Status screen, highlight the location name you want to synchronize and click Connection.

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 the In Database and In Monitor columns, click Upload to transfer from monitor to computer database. After upload, click Close. All data is 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, the location, battery or 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 preceding *System Connects Normally* paragraph.

Note on Network Settings - Network parameters do not upload using Check Settings|General. To change the IP Address, Netmask or Gateway, use 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 be sent only 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 - With 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 102) - When connecting, the "Location name, battery name and string name do not match" message may appear.

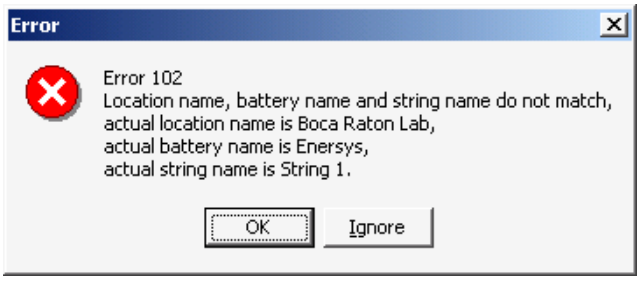


Figure 34. Connection Error Message

Extra or missing spaces and hyphens affect names. Click OK to return to String Status or click Ignore to display Check Settings. If 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 message box, or
2. If on-site with the equipment, clear the existing names in the monitor and enter new names as described below.
3. After correcting the problem, attempt to connect, then upload using Check Settings.

Clear Existing Names (On-site)

MPM - To clear 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 MPM hardware password to the default, and clears all data in the monitor, including active alarms.

BDS - To clear 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 BDS hardware password to the default. Optionally, instead of pressing the reset switch, you can clear the names on the Diagnostics|Memory screen.

15.1. Connecting With a Service Computer

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

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

16. Check Settings Screens

Active check: String Status > Connection *then* Setup|Check Settings|*dialog box*
Offline: String Status > View|Offline|Setup|Check Settings|*dialog box*

The Check Settings dialog boxes display settings in the BMDM database and MPM or BDS nonvolatile memory. Use Check Settings to synchronize a battery location. On a Local, Central or Service computer, when String View displays an active connection, you may click Setup|Check Settings to view Check Settings setup, send the time and date, and upload settings. You cannot change settings using these boxes. Offline you can view the settings, but the Send Time, Recheck and Upload buttons are not active.

Open the Check Settings dialog boxes. When MPM and BDS boxes are similar, only one figure is shown below. For item definitions, refer to *Synchronizing Using Check Settings* and *Programming Battery Setup for the BDS* or *MPM*.

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

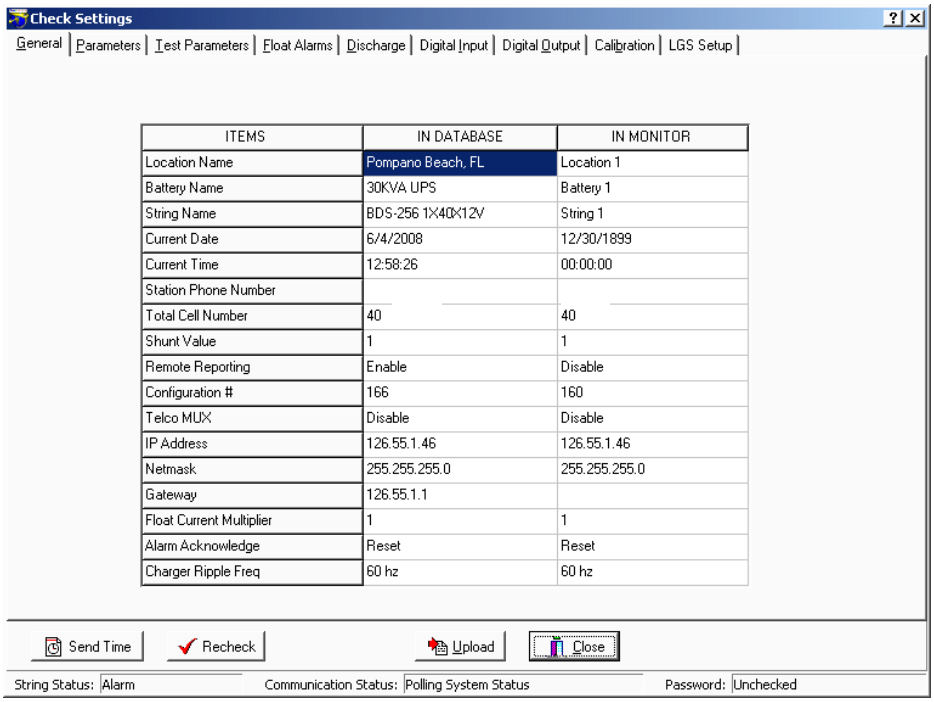


Figure 35. Check Settings - General (MPM / BDS)

Note: When you click Upload on Check Settings, the Location Name, Battery Name, and String Name in the monitor do not overwrite the names in the computer database. However, when a Central computer is used to download to the monitor, these three names are overwritten in the monitor when Send is clicked on Battery Setup.

The Check Settings|Parameters dialog boxes for the MPM and BDS are shown below.

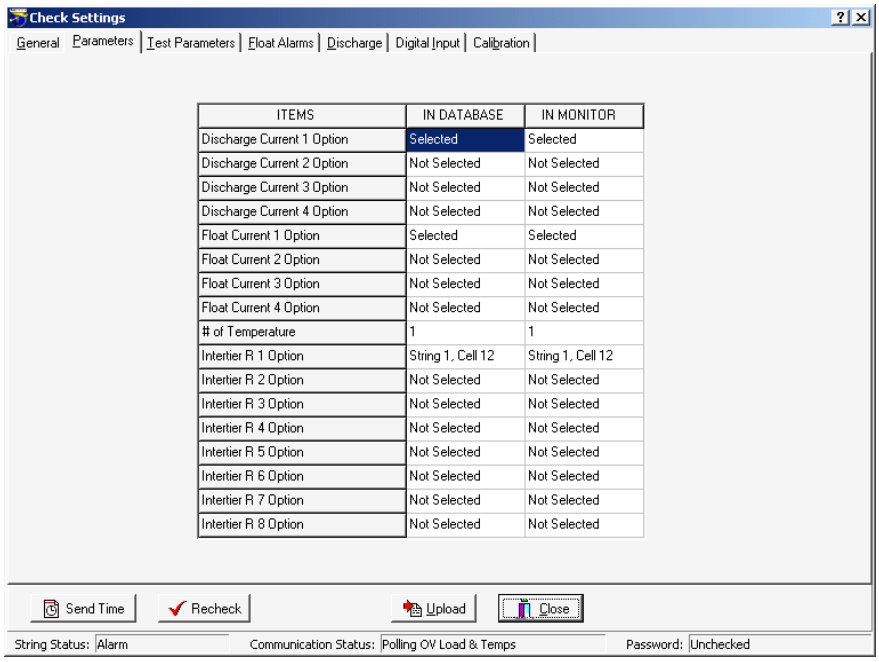


Figure 36. Check Settings - Parameters (MPM)

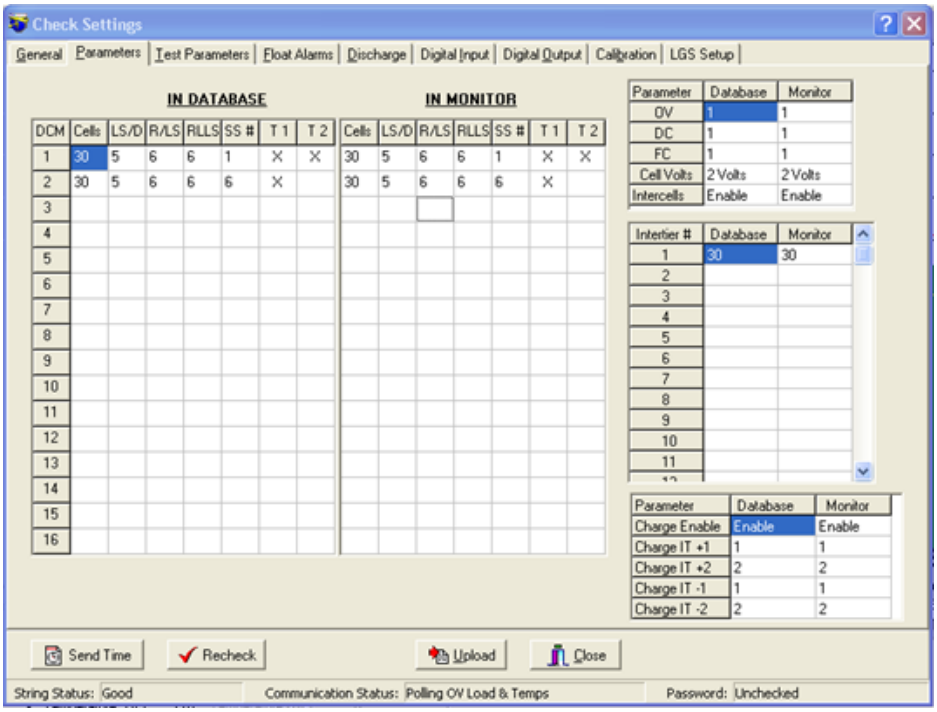


Figure 37. Check Settings - Parameters (BDS)

For BDS setup, the system shows information based on string one only.

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

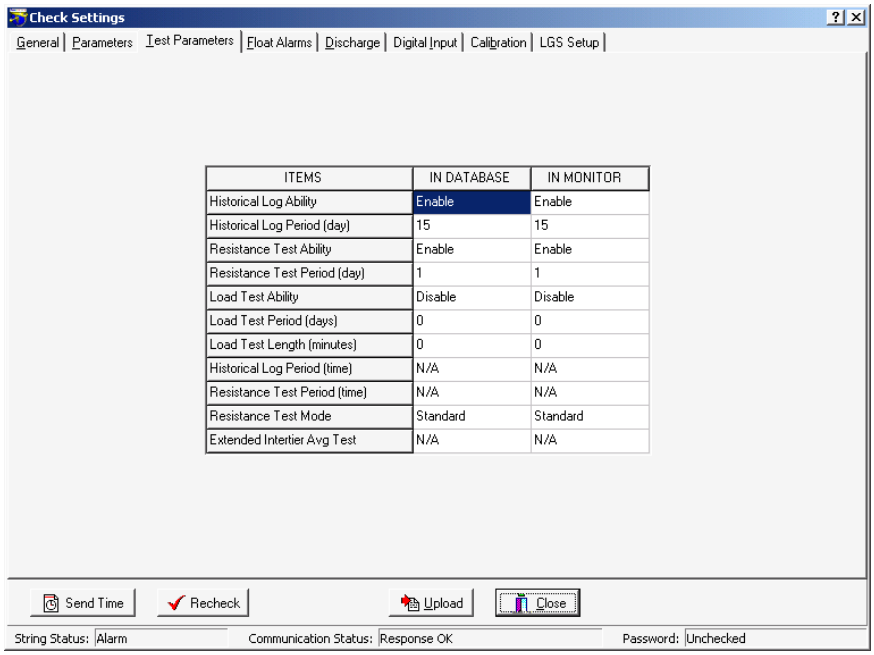


Figure 38. Check Settings - Test Parameters (MPM / BDS)

The Check Settings|Float Alarms dialog boxes for the MPM and BDS are shown below.

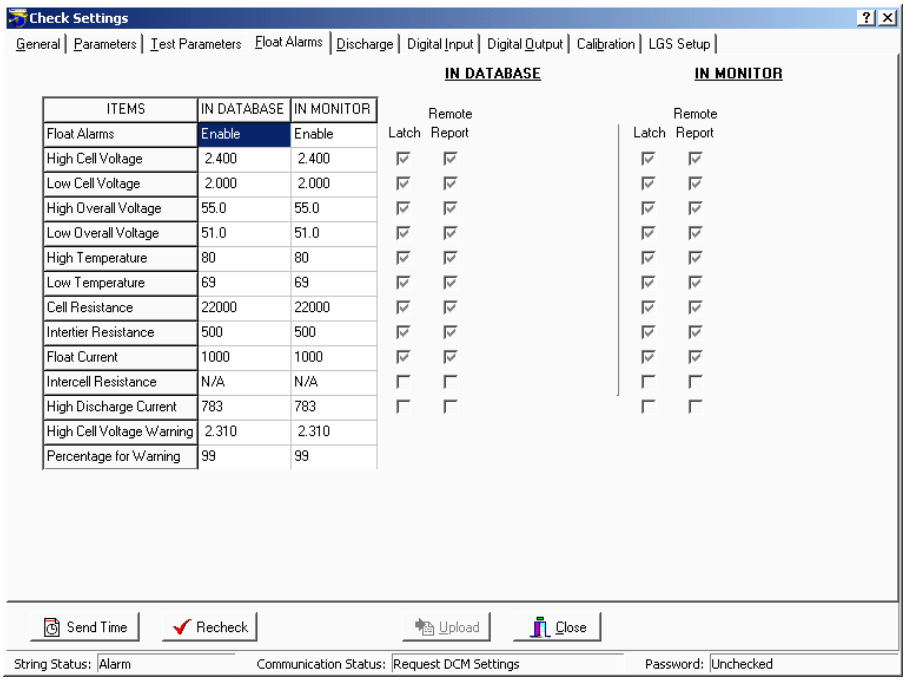


Figure 39. Check Settings - Float Alarms (MPM)

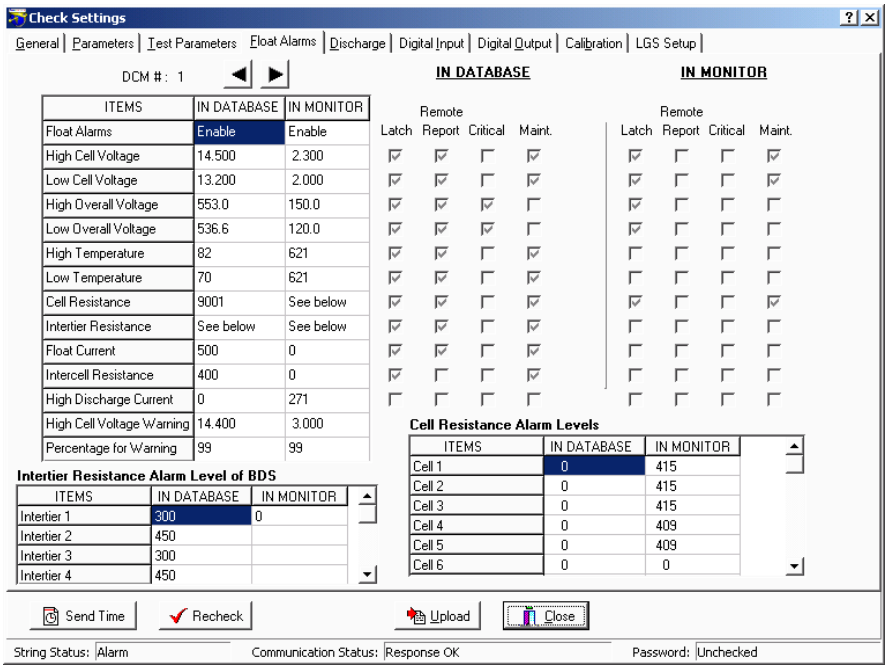


Figure 40. Check Settings - Float Alarms (BDS)

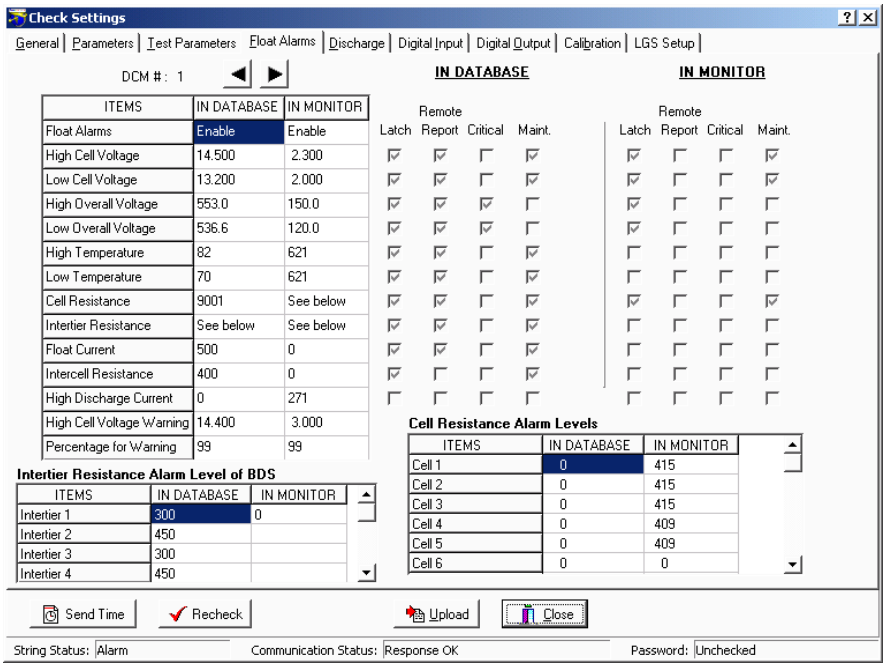


Figure 41. Check Settings - Float Alarms (BDS)

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

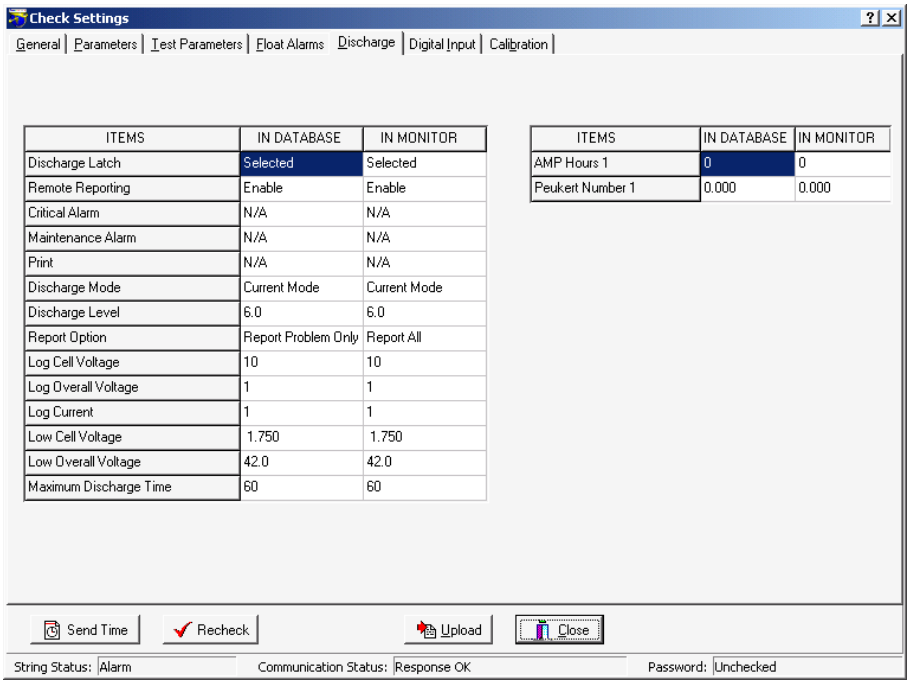


Figure 42. Check Settings - Discharge (MPM / BDS)

The Check Settings|Digital Input dialog boxes for the MPM and BDS-256 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. Not available for the BDS-40.

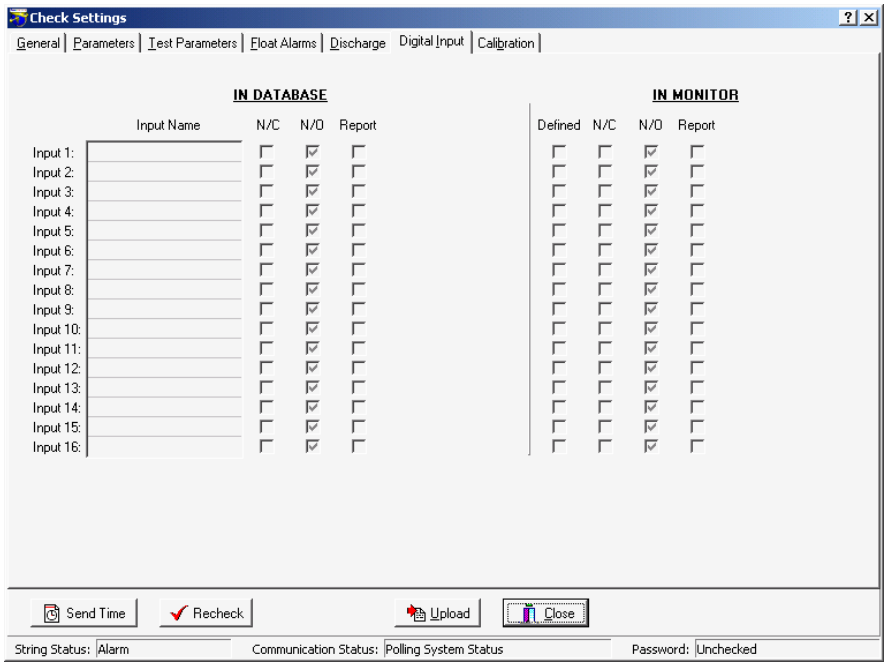


Figure 43. Check Settings - Digital Input (MPM)

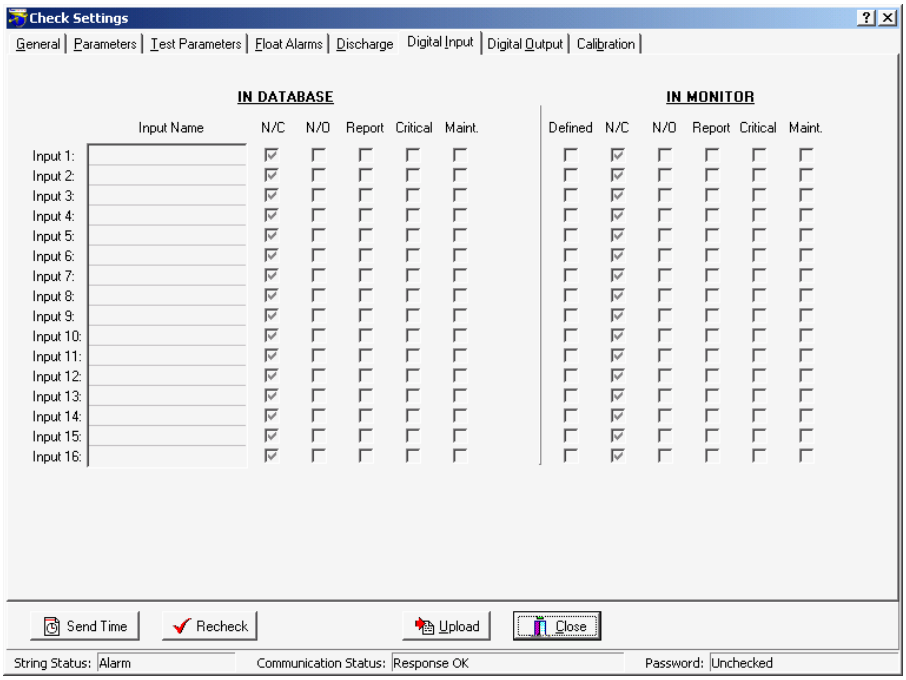


Figure 44. Check Settings - Digital Input (BDS)

The Check Settings|Digital Output dialog boxes for the MPM and BDS-256 are shown below. The Digital Output tab and dialog box disappear if a BDS-40 is selected.

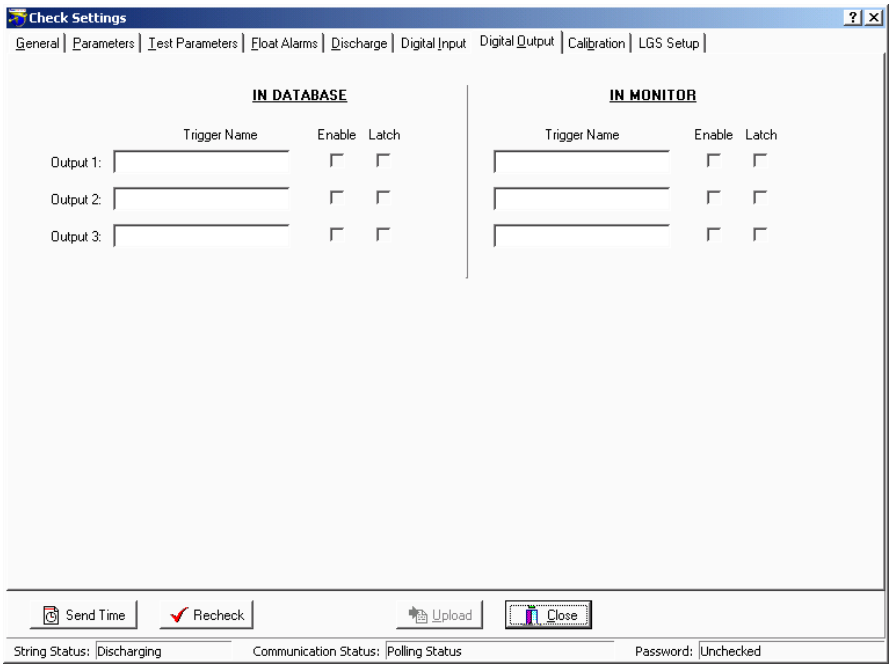


Figure 45. Check Settings - Digital Output (MPM)

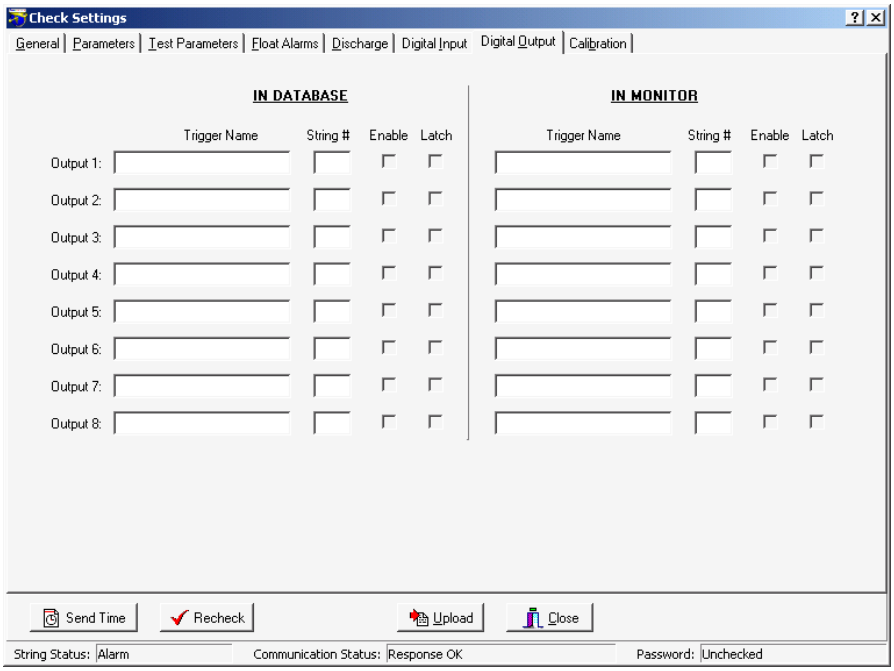


Figure 46. Check Settings - Digital Output (BDS/256)

For BDS setup, the system shows information based on string one only.

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.

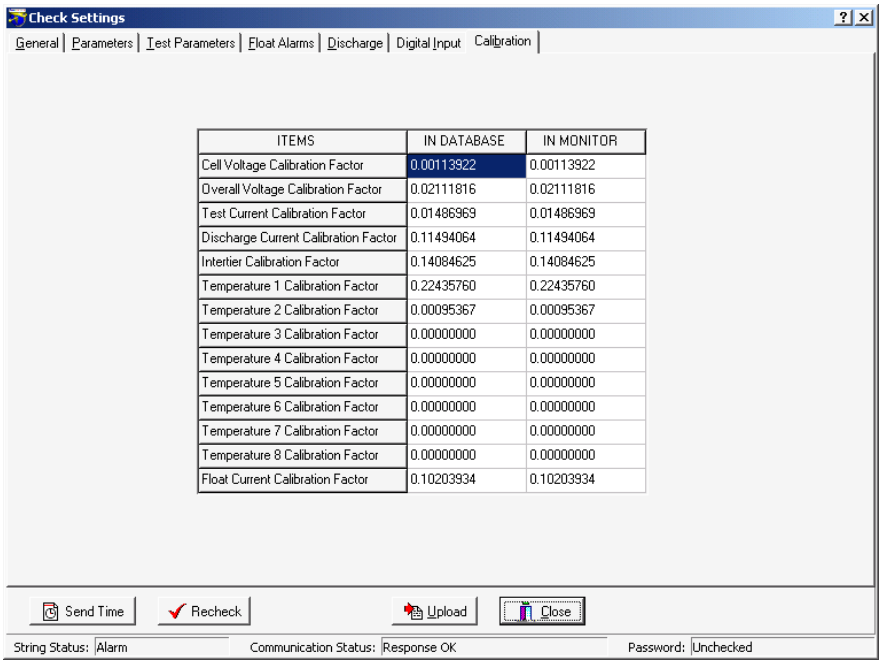


Figure 47. Check Settings - Calibration (MPM)

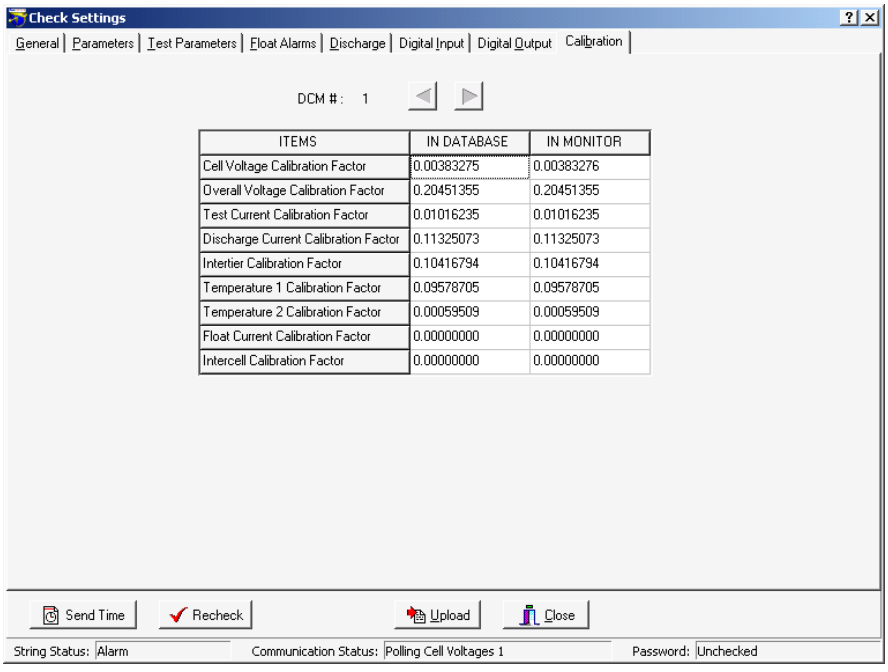


Figure 48. Check Settings - Calibration (BDS)

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

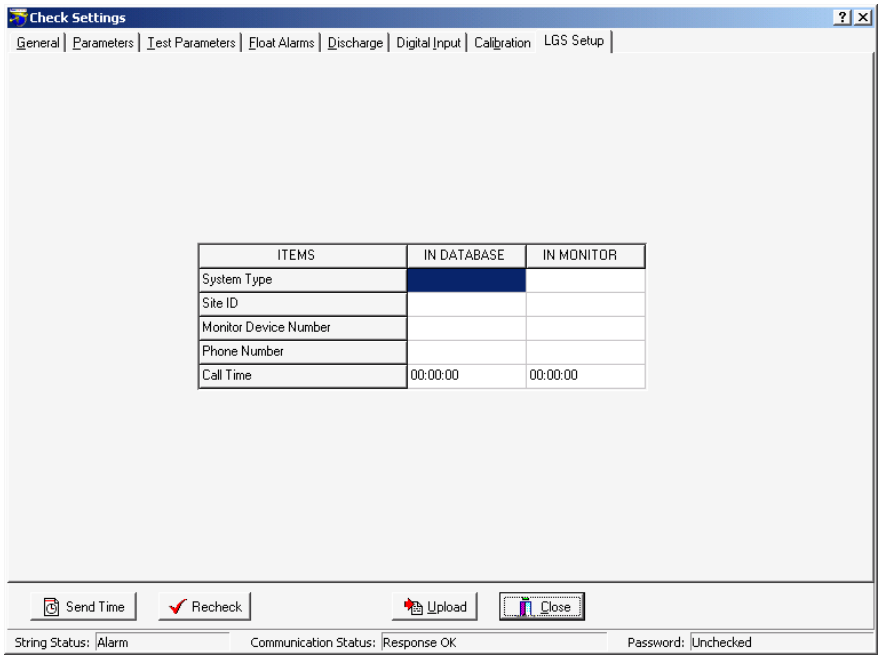


Figure 49. Check Settings - LGS (MPM / BDS)

16.1. Check Settings Screens in Controller

BDS Only: String Status > Connection *then* <CTRL>Setup|Check Settings|*dialog box*

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

A typical dialog box, Check Settings in Controller|Calibration for the BDS, is shown below.

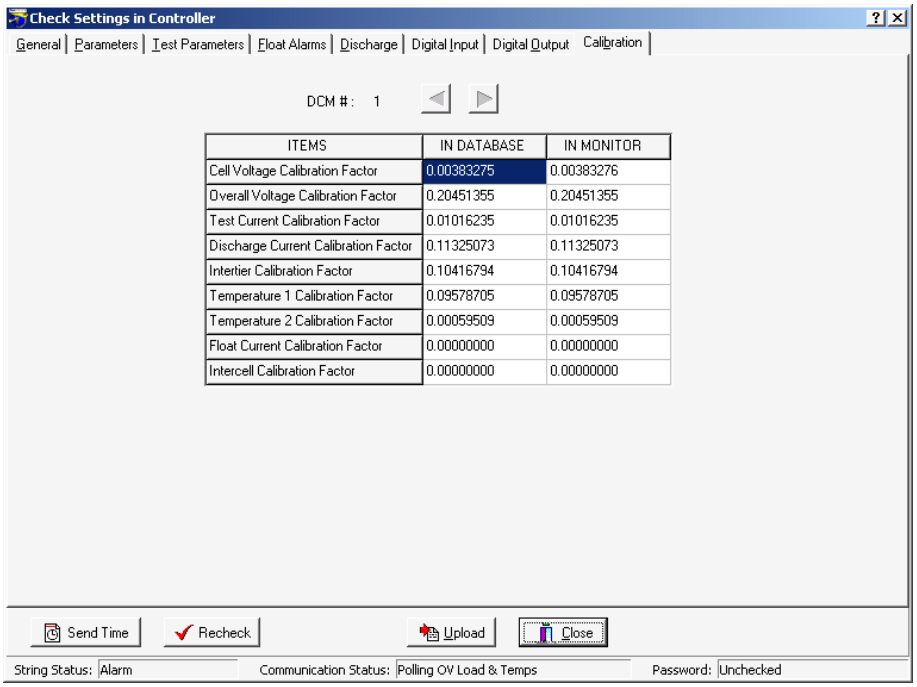


Figure 50. Check Settings in Controller - Typical Screen (BDS)

17. Programming Battery Setup for the MPM

From String Status, click Connection to display the String View screen.

String View > Setup|Battery|*dialog box*

After completing Preferences, Communication Setup, and System Setup, complete the Battery Setup dialog boxes. To open Battery Setup, on the String Status screen, highlight the location name, then click Connection. After computer to monitor communication is established, the String View screen appears. To perform battery setup, select Setup|Battery to display the dialog boxes.

Password - If the Battery Setup boxes are protected, type the Battery Setup password and click OK. This password closes when communication ends. If the password is incorrect, the Battery Setup boxes appear, but the Send button is inactive.

To change the location, battery or string names after the monitor is set up and communicating, use the Setup|System dialog boxes.

Send Button and **Close Button -** On the Battery Setup 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 from all boxes. Changes are not saved or sent if you only click Close.

17.1. Battery Setup: General (MPM)

String View > Setup|Battery|General

The following appear on the General dialog box.

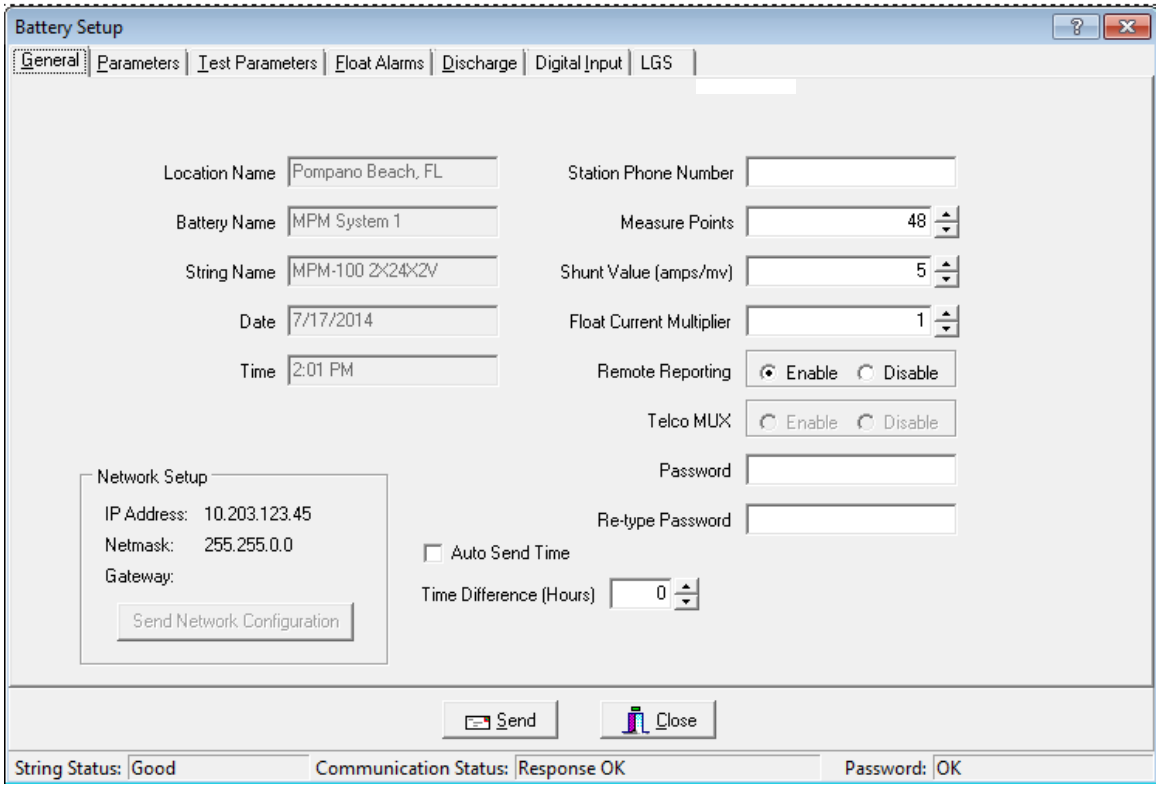


Figure 51. Battery Setup - General (MPM)

Location Name, Battery Name, String Name - Location, battery, and string names identify the strings and hardware to which the monitor is connected. Make sure databases have the same names to ensure proper connection. Location, battery, and string names can only be changed under Setup|System.

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 - Type the telephone number of the Central computer the MPM monitor calls when a system goes into alarm or discharge.

Measure Points - This is defined by Monitor Configuration on Setup|System|String. Normally, do not change the Measure Points number; however, you may change it for custom configurations (BDS only) not listed on System Setup|String.

Note: Do not change the Measure Points number for multi-string configurations. If you enter a lower cell number for a configuration of 2x24, for example, 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.

Float Current Multiplier - When a series of batteries is connected with more than one cable, it may not be possible to get the float current sensor around all the cables. In this case, you may connect the sensor around one of the cables and set the Float Current Multiplier for the total number of cables. The connecting cables must be of equal length.

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

Telco MUX - 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 long.

IP Address, **Netmask** and **Gateway** - Displays the IP address, netmask, and 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 MPMs are connected via RS-232 or modem, not network.

Auto Send Time - Check this box to have the time of day sent from the computer to the hardware during autopolling and data extraction.

Time Difference (Hours) - This spin box lets you compensate for any plus or minus time difference between the computer and hardware installation locations. When the computer sends the time of day to the hardware, either during autopolling or Check Settings upload, the time is automatically adjusted.

Alarm Button - If Sequential/Ack is selected on the System Setup Reporting dialog box, select **Acknowledge** so the monitor notifies the computer that acknowledgement was sent and received. This stops sequential calling but does not reset the alarm. Select **Reset** if Sequential is not selected.

17.2. Battery Setup: Parameters (MPM)

String View > Setup|Battery|Parameters

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

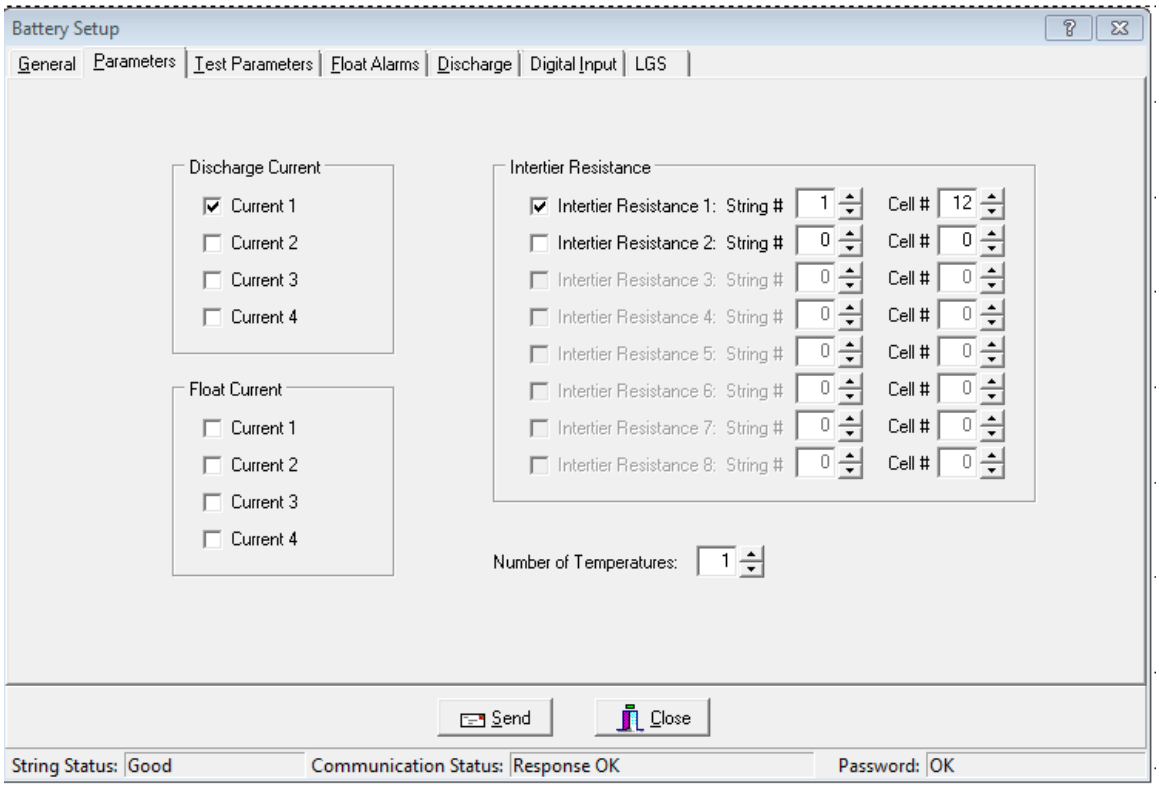


Figure 52. Battery Setup - Parameters (MPM)

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. The intertier resistance must be selected in numerical order.

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 screen. Set the value in the High Float Current field on Setup|Battery| Float Alarms. Actual current that exceeds set value appears in red on the Cell Voltage screen and causes an alarm. The float charging current probe (FCCP) may take 25 minutes to stabilize after a power change. Refer to the Multitel, Inc. *Float Charging Current Probe User's Manual*.

17.3. Battery Setup: Test Parameters (MPM)

String View > Setup|Battery|Test Parameters

The following appear on the Test Parameters dialog box.

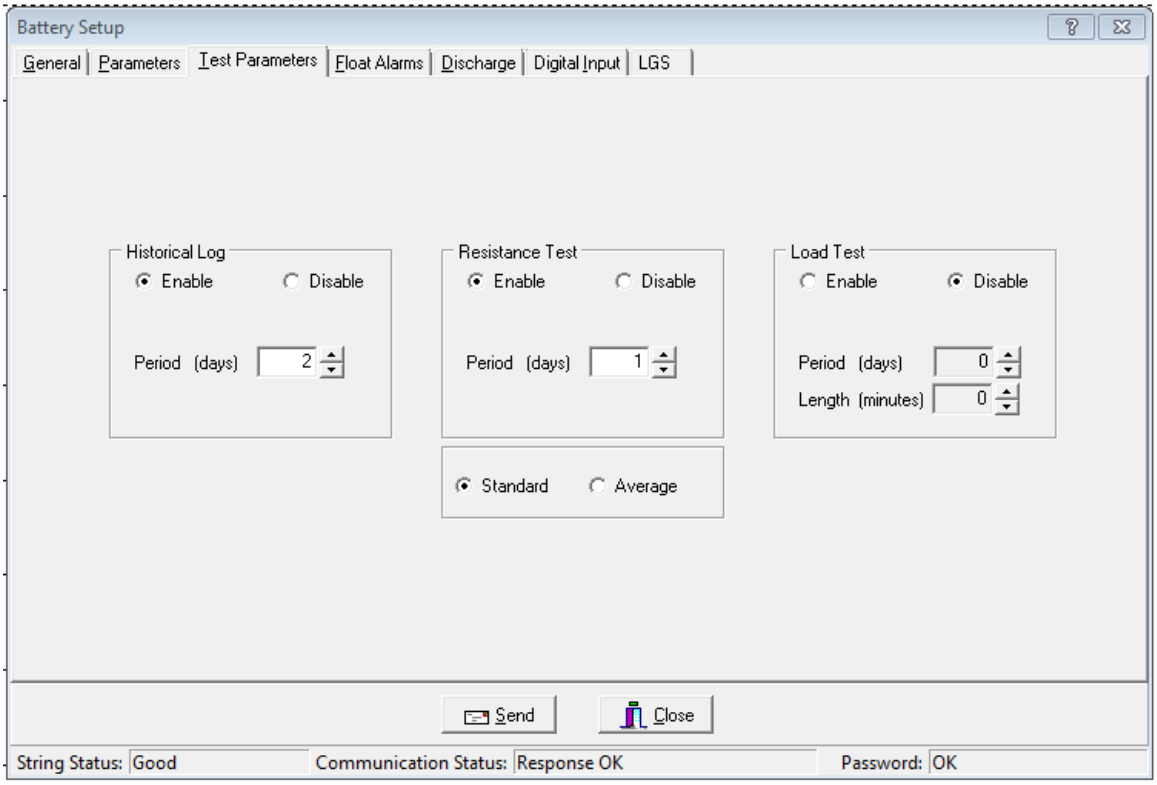


Figure 53. Battery Setup - Test Parameters (MPM)

Logging / R-Test Time Mode area - Click the **Absolute Date and Time** option button to specify the exact day of the month, from 1 to 28 (29, 30 and 31 are not used), and time the historical log is updated and the resistance test is performed. Click the **Day Interval** button to specify how often (in days) the historical log is updated and the resistance test is performed.

Historical Log area - Click **Enable** to activate, then complete Period (days) and Period (time) described below. Specify how often in days or the date and time the voltages, currents, and temperatures are recorded in the history log.

Period (days) and **Period (time)** - Either select how often the historical log is updated, or select the day of the month and time the log is updated.

Resistance Test area - Click **Enable** to activate, then complete Period (days) and Period (time) described below. Specify the resistance test interval in days or date and time. If set to 30 days, resistance is tested every 30 days starting at 12:00 A.M. (midnight). If you program the Load Test for the same interval as the Resistance Test, the Resistance Test is delayed three days.

Period (days) and **Period (time)** - Either select how often the resistance test is performed, or select the day of the month and time the test is performed.

Standard or **Average** - Normally select Standard. If the charger employs digital control of battery voltage, which causes voltage fluctuation, select Average.

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 Resistance Test (above).

17.4. Battery Setup: Float Alarms (MPM)

String View > Setup|Battery|Float Alarms

The following appear on the Float Alarms dialog box.

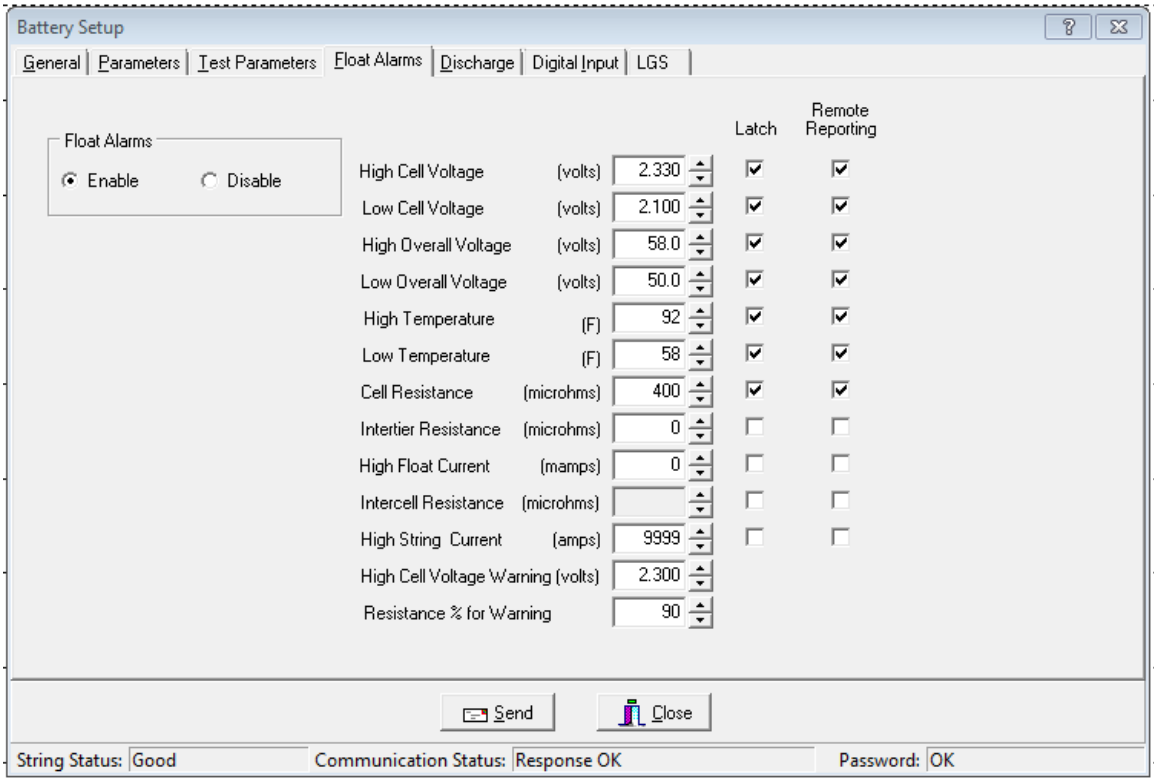


Figure 54. Battery Setup - Float Alarms (MPM)

Float Alarms Enable or **Disable** - Global control of all float alarms for local alarm status and alarm contact activation. Select Enable for 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 the String Status screen indicates Alarms Disabled.

Cell Resistance Threshold - Global applies the alarm level in the Cell Resistance (microhms) field to all cells. **Individual** and Input Level sets alarm levels on a cell basis using the Cell Resistance Alarm Levels box.

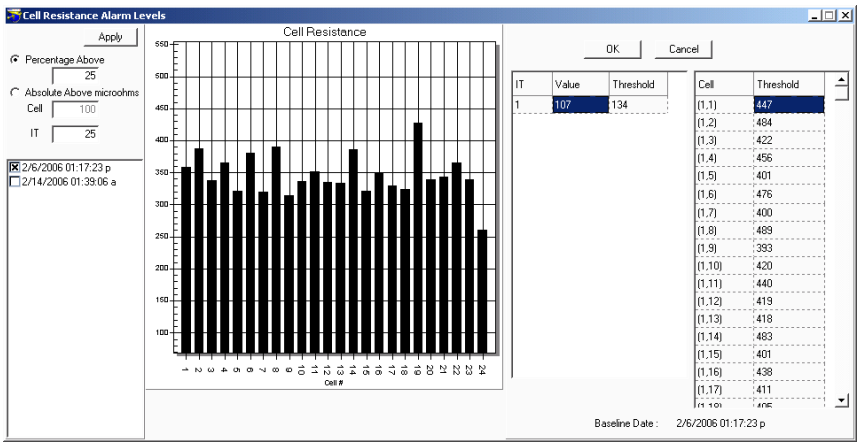


Figure 55. Cell Resistance Alarm Levels Setup (MPM)

Cell Resistance Alarm Levels box - To set Alarm Levels on a cell basis, click Individual and Input Level and select options on this box.

Percentage Above - Sets the cell alarm level a percentage above the selected dataset levels. Type a value (1 to 99) in the Percentage Above field.

Absolute Above (Microhms) - Sets the cell alarm level a numeric value above the selected dataset levels. Type a value (1 to 99) in microhms in the Absolute Above field.

Date area check boxes - Click one dataset date in this area on which to base alarm levels. The system stores the date of the baseline data and displays it on the lower right after the Apply button is clicked.

Apply - Click apply to apply selected levels to the cells. The values appear in the Threshold column. If you do not want to edit individual cell levels (see below), click OK.

Cell, **Intertier** and **Threshold** columns - To edit individual cell or intertier alarm levels in the Threshold column, click the value and type a new value. After editing, click OK.

Note: Values are not saved until Save or Send is clicked on the Float Alarms or another Battery Setup box.

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 the bar graph colors on the Cell Voltage String View screen. During normal float condition, the bar colors change as follows:

Bar Colors for all Normal and Violation Types	High Violation ..... Red Warning ..... Blue Normal ..... Green Low Violation ..... Yellow Out of Range Values ..... Maroon Negative Cell Voltage ..... Black

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.

17.5. Battery Setup: Discharge (MPM)

String View > Setup|Battery|Discharge

The following appear on the Discharge dialog box.

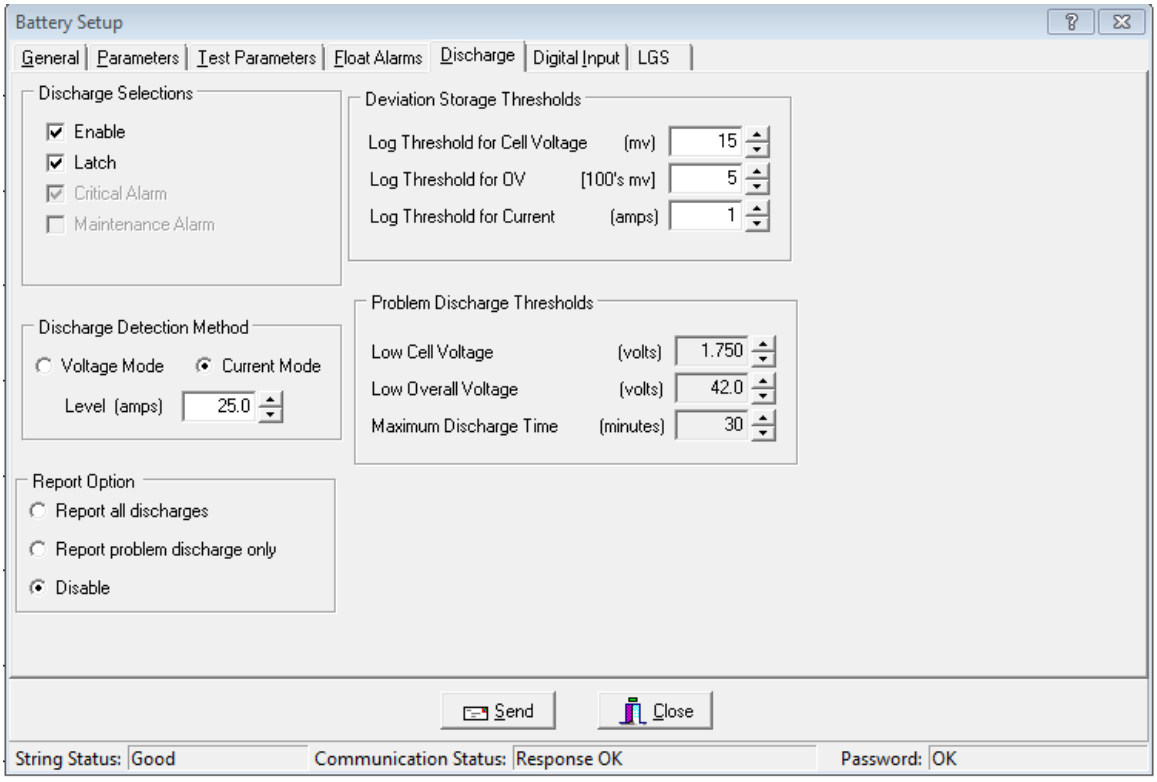


Figure 56. Battery Setup - Discharge (MPM)

Discharge Selections Area:

Enable - Select to let the monitor 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.

Voltage mode allows data recording during recharge, since data logging does not stop until the voltage goes above the threshold. If measuring discharge current, use Discharge Current Mode as a reliable source of trigger.

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 computer. 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 computer.

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

Deviation Storage Thresholds Area - **Log Threshold for Cell Voltage**, **Log Threshold for OV** (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, use 10mv for cell voltage, 100mv for overall voltage, and 1 amp for discharge current. Smaller values could cause monitor memory problems. 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. To enable these values, 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

Time to Go Area:

The String View screen can display a Time to Go (TTG) number. When an MPM discharge starts, the TTG box on String View indicates the estimated remaining time that the battery can deliver power. To disable this feature, leave the Amp Hours and Peukert Number boxes at zero.

IMPORTANT NOTE: The TTG Time to Go number is only an estimate.

Amp Hours - Type the amp hours of the battery at the 8 hour rating. To disable the estimated time feature, set to 0.

Peukert Number - Type the Peukert number derived by using Peukert's equation. Refer to *Understanding the Time to Go Algorithm*. To disable the estimated time feature, set to 0.

17.6. Battery Setup: Digital Input (MPM)

String View > Setup|Battery|Digital Input

The MPM has 16 digital inputs that may be connected to external dry contacts. You may set up these inputs on the Digital Input dialog box to report an alarm when the external contacts are activated.

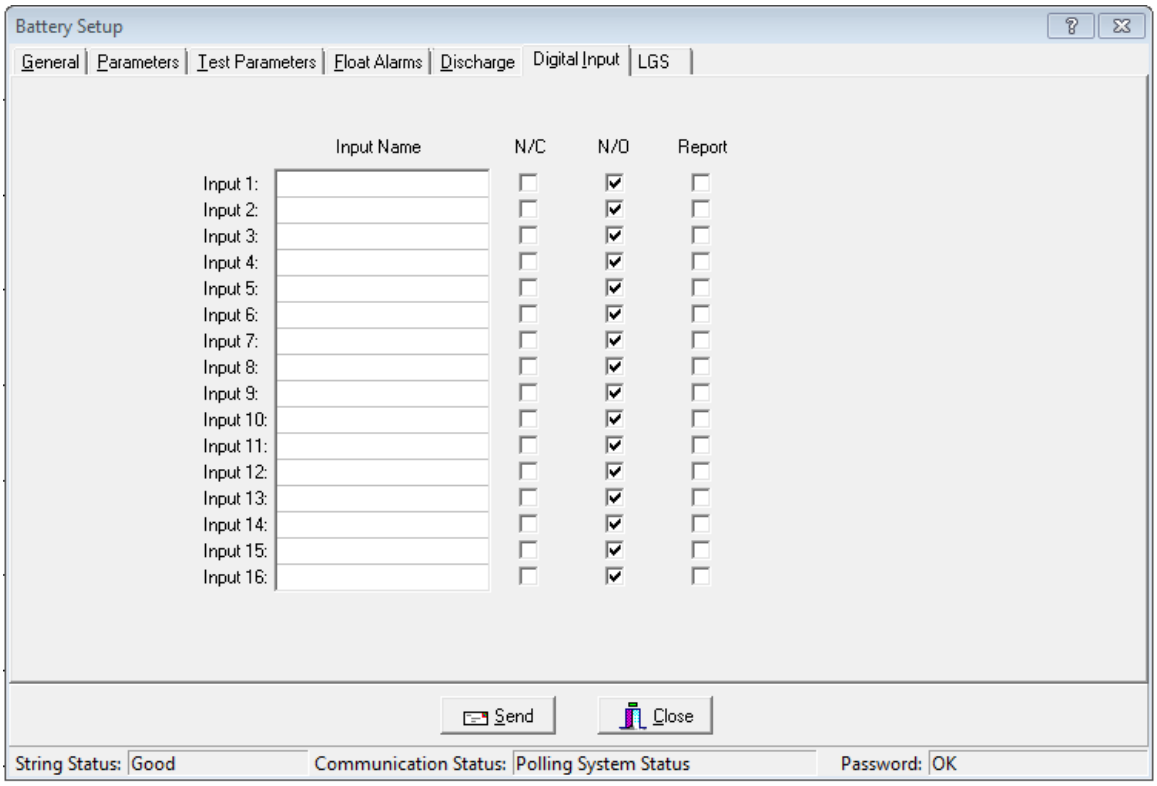


Figure 57. Battery Setup - Digital Input (MPM)

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

17.7. Battery Setup: Digital Output (MPM)

String View > Setup|Battery|Digital Output

The MPM has three optional relay contact control outputs you can define to trigger on an alarm event.

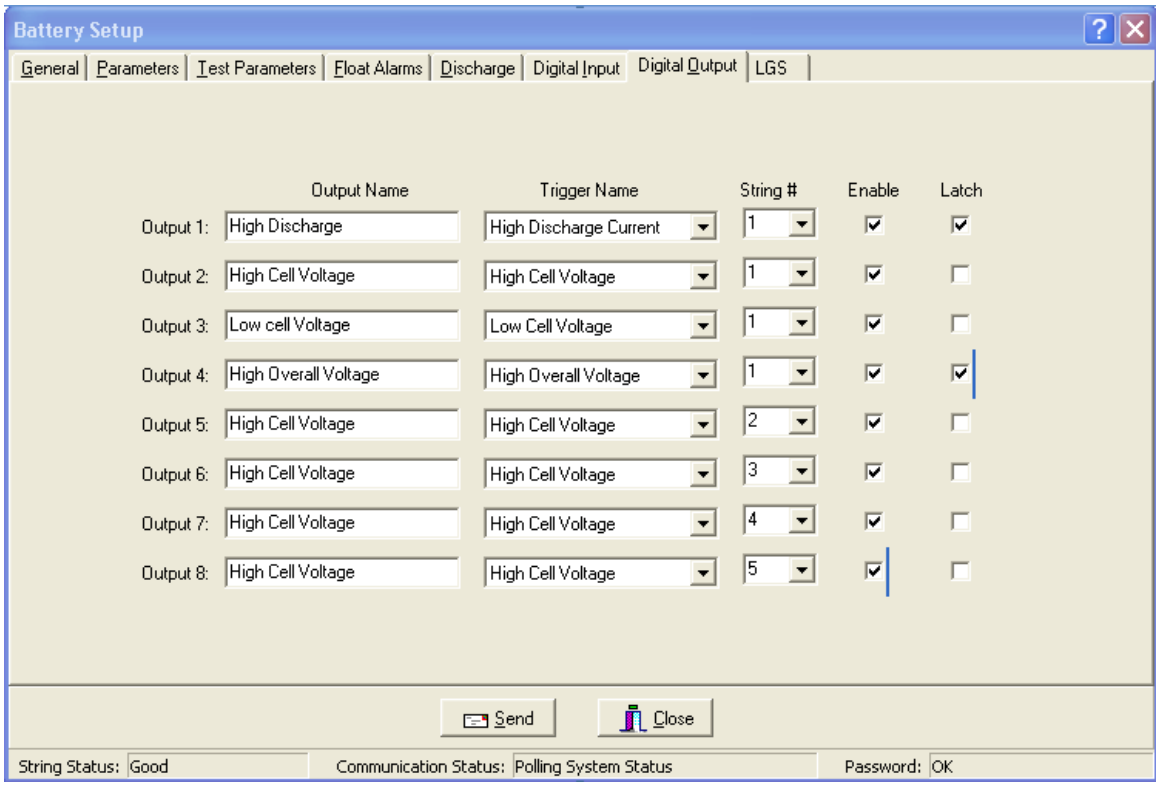


Figure 58. Battery Setup - Digital Output (MPM)

After defining an Output Name and Trigger Name, 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 upon alarm condition reset.

Output Name - Type a name that describes the external device being controlled.

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

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.

Battery Setup: LGS (MPM)

String View > Setup|Battery|LGS

Leibert Global Services (LGS) offers a service in which its Customer Response Center (CRC) remotely monitors your Alber BDS or MPM equipment and other facility devices around the clock. The CRC evaluates alarms and provides immediate telephone and e-mail assistance using a customer-defined response and escalation plan. For details about subscribing to the service, phone (800) 748-3666 or (800) SITEMON or e-mail LGS.monitoring@vertivco.com.

If you have subscribed to an LGS monitoring plan, complete the Battery Setup|LGS dialog box as follows.

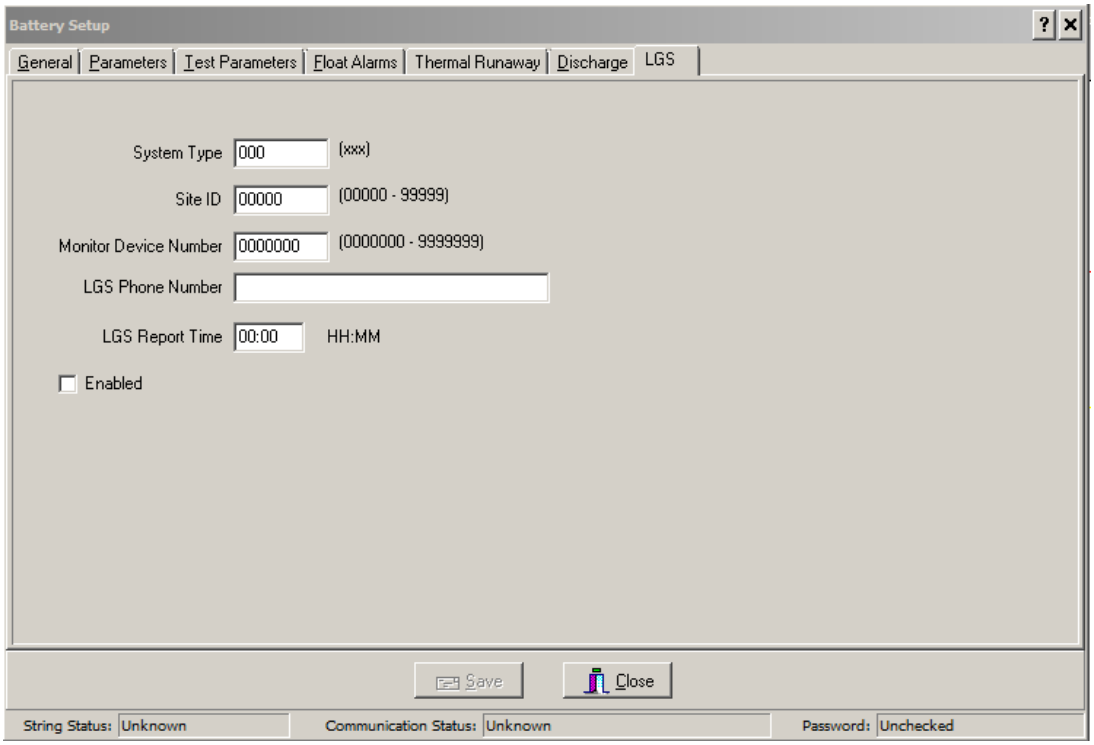


Figure 59. Battery Setup - LGS (MPM)

System Type - Type three characters to identify the device being monitored. For MPM-100, type MPM; for BDS-256, type 256; for BDS-40, type 040.

Site ID - Type the five character ID for customer site identification.

Monitor Device Number - Type the seven digit number used for customer device tracking.

LGS Phone Number - Type the telephone number that connects to the LGS remote monitoring service. This number is used for a daily communication test and alarm reporting.

LGS Report Time - Type the time the monitor calls in each day to confirm communication. Use the 24 hour clock; e.g., 13:45.

Enabled - Check this box to enable remote monitoring by LGS. Monitoring is enabled only after a monitoring plan has been purchased from LGS.

18. Programming Battery Setup for the BDS

From String Status, click Connection to display the String View screen.

String View > Setup|Battery|*dialog box*

After completing Preferences, Communication Setup, and System Setup, complete the Battery Setup dialog boxes. To open Battery Setup, on the String Status screen, highlight the location name, then click Connection. After computer to monitor communication is established, the String View screen appears. To perform battery setup, select Setup|Battery to display the dialog boxes.

Password - If the Battery Setup boxes are protected, type the Battery Setup password and click OK. This password closes when communication ends. If the password is incorrect, the Battery Setup boxes appear, but the Send button is inactive.

To change the location, battery or string names after the monitor is set up and communicating, use the Setup|System dialog boxes.

Send Button and **Close Button -** On the Battery Setup 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. Changes are not saved or sent if you only click Close.

18.1. Battery Setup: General (BDS)

String View > Setup|Battery|General

The following appear on the General dialog box.

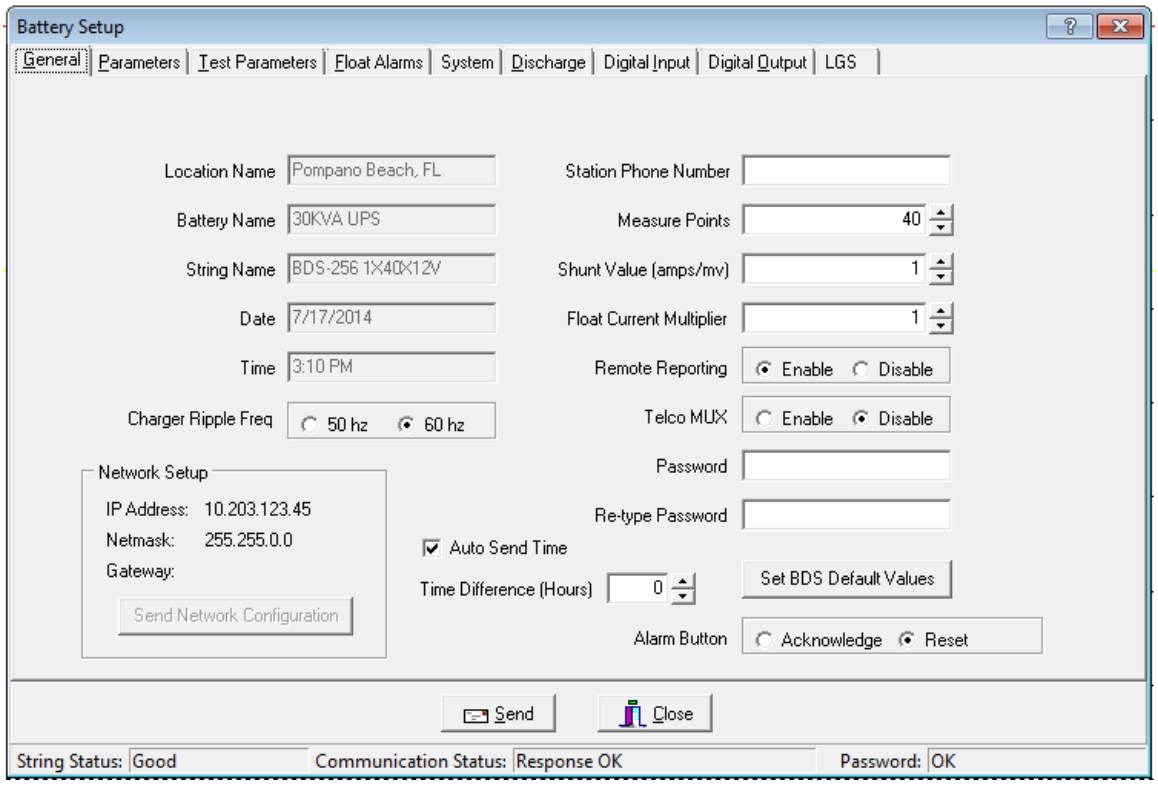


Figure 60. Battery Setup - General (BDS)

Location Name, Battery Name, String Name - Location, battery, and string names identify the strings and hardware to which the monitor is connected. Make sure databases have the same names to ensure proper connection. Location, battery, and string names can only be changed under Setup|System.

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

Charger Ripple Freq - Select to set the system to the charger ripple frequency of either 50Hz or 60Hz.

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

Measure Points - This is defined by Monitor Configuration on Setup|System|String. Normally, do not change the Measure Points number; however, you may change it for custom configurations not listed on System Setup|String. The Measure Points number defines 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.

Float Current Multiplier - When a series of batteries is connected with more than one cable, it may not be possible to get the float current sensor around all the cables. In this case, you may connect the sensor around one of the cables and set the Float Current Multiplier for the total number of cables. The connecting cables must be of equal length.

Remote Reporting Enable and **Disable** - Globally enables or disables the monitor remote reporting function. For a parameter to report on alarm, do not select the global Disable Alarm Reporting on Setup|Preferences, and 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 long.

IP Address, **Netmask** and **Gateway** - Displays the IP address, netmask, and 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 BDSs 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 Measure Points field.

Auto Send Time - Check this box to have the time of day sent from the computer to the hardware during autopolling and data extraction.

Time Difference (Hours) - This spin box lets you compensate for any plus or minus time difference between the computer and hardware installation locations. When the computer sends the time of day to the hardware, either during autopolling or Check Settings upload, the time is automatically adjusted.

Alarm Button - If Sequential/Ack is selected on the System Setup Reporting dialog box, select **Acknowledge** so the monitor notifies the computer that acknowledgement was sent and received. This stops sequential calling but does not reset the alarm. Select **Reset** if Sequential is not selected.

18.2. Battery Setup: Parameters (BDS)

String View > Setup|Battery|Parameters

The following appear on the Parameters dialog box. For the BDS-40, the OV Enable, Cell Voltage selection, and Intercell Enabled boxes are not available.

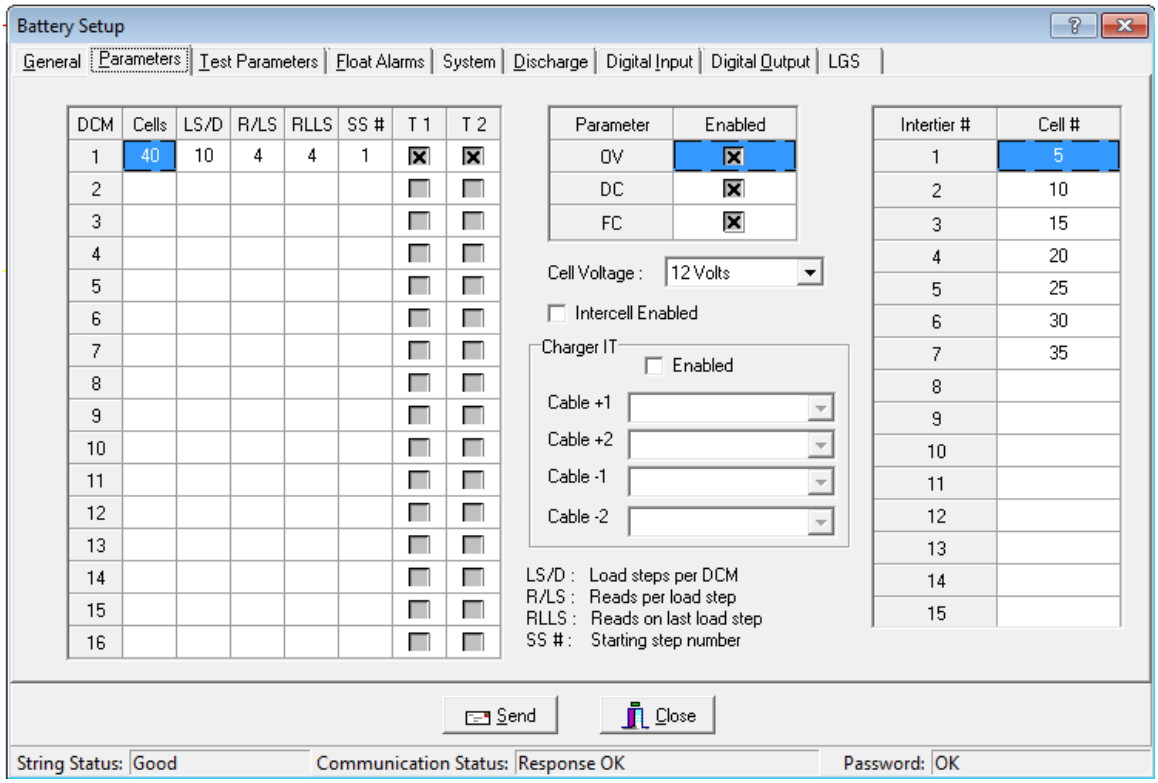


Figure 61. Battery Setup - Parameters (BDS-256)

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

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.

Config	DCM	Cells	LS/D	R/LS	RLLS	SS#
1x198x1V	1	44	2	22	22	1
	2	44	2	22	22	3
	3	44	2	22	22	5
	4	44	2	22	22	7
	5	22	1	22	22	9
1x8x2V	1	8	-	-	-	-
1x31x2V	1	31	3	10	11	6
1x62x2V	1	30	2	15	15	5
	2	32	2	15	17	7
1x65x2V	1	32	2	16	16	5
	2	33	2	16	17	7
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
1x193x2V	1	44	2	22	22	1
	2	44	2	22	22	3
	3	44	2	22	22	5
	4	44	2	22	22	7
	5	17	1	17	17	9
1x203x2V	1	40	2	20	20	1
	2	40	2	20	20	3
	3	40	2	20	20	5
	4	40	2	20	20	7
	5	45	2	20	10	9
1x205x2V	1	40	2	20	20	1
	2	40	2	20	20	3
	3	40	2	20	20	5
	4	40	2	20	20	7
	5	45	2	20	25	9
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

Config	DCM	Cells	LS/D	R/LS	RLLS	SS#
1x198x1V	1	44	2	22	22	1
	2	44	2	22	22	3
	3	44	2	22	22	5
	4	44	2	22	22	7
	5	22	1	22	22	9
	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 62. 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
1x62x6V	1	30	5	6	6	1
	2	32	5	6	8	6
1x65x6V	1	32	4	8	8	1
	2	33	4	8	9	5
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 63. BDS Configuration Data for Setup Files (continued)

Parameter / Enabled - The OV, DC and FC parameters are assigned to DCM #1. Select Enabled to view the parameter in String View and enable the hardware.

OV - Overall Volts. Not available for BDS-40.

DC - Discharge Current.

FC - Float Current.

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

Intercell Enabled - Select this box if making separate measurements for intercells. Not available for BDS-40.

Charger IT - Select the enabled check box if using the Charger IT option. This area allows you to select and assign a cable to a DCM and intertier channel. The Cable+1 is the first DCM and the Cable -1 is the last DCM.

Note: When intercells are enabled, they are defaulted to discrete. Each cable will have up to four intertier channels, for example:

- <DCM 1> <IT 1>
- <DCM 1> <IT 2>
- <DCM 1> <IT 3>
- <DCM 1> <IT 4>

Note: On combined reading board, the intertier channel number will always start the first available channel past the cells.

Intertier # / Cell # - For intertiers 1 to 15 in use, assign a cell number that relates to each intertier.

Note: When cell 1 is most negative, when assigning an intertier to a cell, use the cell number after the intertier.

The cell number is the lower of the two cell numbers across which the intertier is connected. For example, typing 16 assigns the intertier between cells 16 and 17. Each DCM can monitor up to ten intertiers. No more than 15 intertiers can be monitored for the entire string.

18.3. Battery Setup: Test Parameters (BDS)

String View > Setup|Battery|Test Parameters

The following appear on the Test Parameters dialog box.

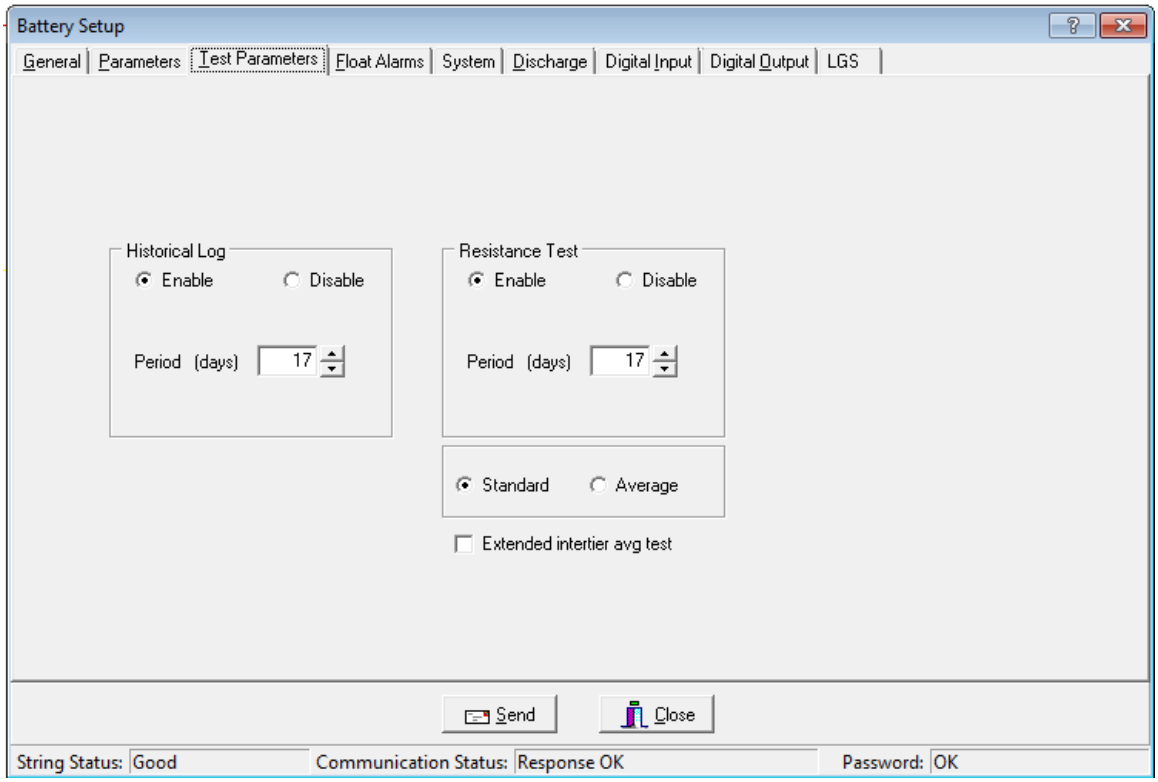


Figure 64. Battery Setup - Test Parameters (BDS)

Logging / R-Test Time Mode area - Click the **Absolute Date and Time** option button to specify the exact day of the month, from 1 to 28 (29, 30 and 31 are not used), and time the historical log is updated and the resistance test is performed. Click the **Day Interval** button to specify how often (in days) the historical log is updated and the resistance test is performed.

Historical Log area - Click **Enable** to activate, then complete Period (days) and Period (time) described below. Specify how often in days or the date and time the voltages, currents, and temperatures are recorded in the history log.

Period (days) and **Period (time)** - Either select how often the historical log is updated, or select the day of the month and time the log is updated.

Resistance Test area - Click **Enable** to activate, then complete Period (days) and Period (time) described below. Specify the resistance test interval in days or date and time. If set to 30 days, resistance is tested every 30 days starting at 12:00 A.M. (midnight). 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.

Period (days) and **Period (time)** - Either select how often the resistance test is performed, or select the day of the month and time the test is performed.

Standard or **Average** - Normally select Standard. If the charger employs digital control of battery voltage, which causes voltage fluctuation, select Average.

Extended Intertier Avg Test - If this box is checked, when a resistance test is performed, the intertier resistance is sampled a greater number of times and the result is averaged. This feature is useful when testing in high noise environments.

Average Cell Resistance - This field displays the average value of the last resistance test run.

Resistance offset adjustment +/- This field allows you to adjust your resistance measurements by percentage with a plus or minus offset adjustment. This function only applies to future resistance tests that are rerun. You may enable or disable this function at anytime during the process by clicking on the Enabled checkbox.

18.4. Battery Setup: Float Alarms (BDS)

String View > Setup|Battery|Float Alarms

The following appear on the Float Alarms dialog box.

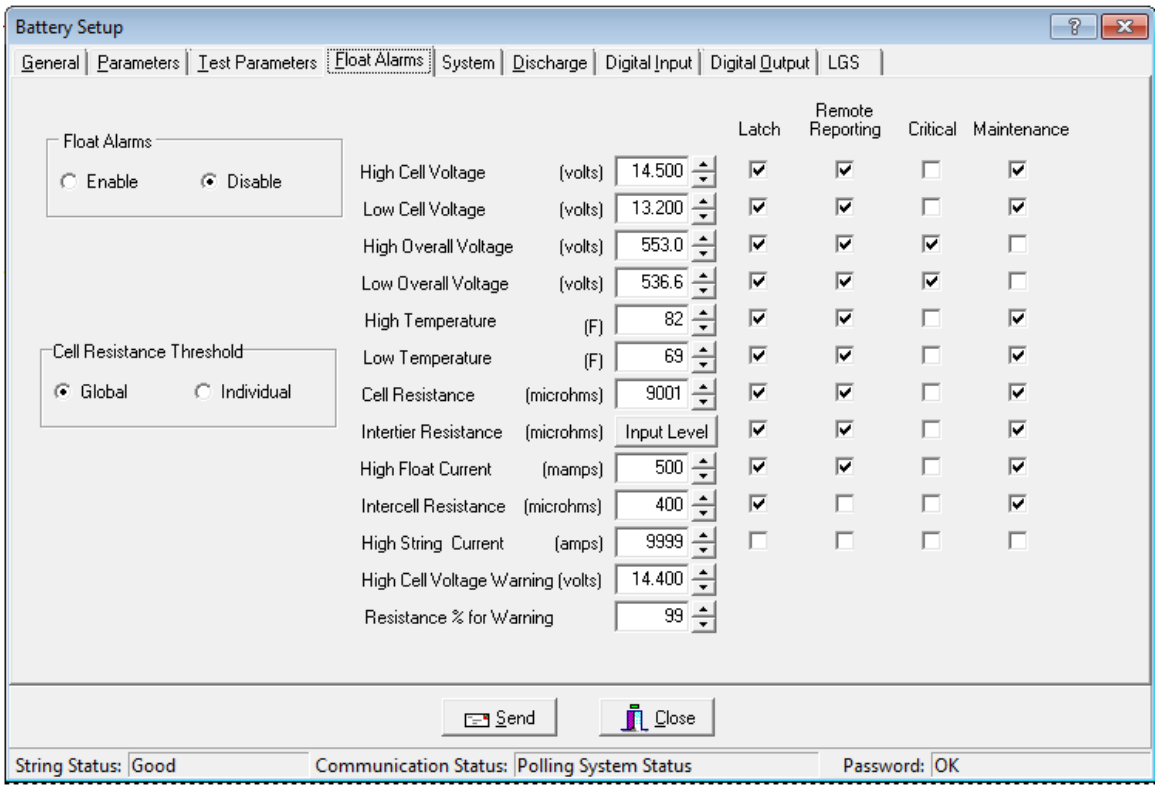


Figure 65. Battery Setup - Float Alarms (BDS)

Float Alarms Enable or **Disable** - Global control of all float alarms for local alarm status and alarm contact activation. Select Enable for 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.

Cell Resistance Threshold - Global applies the alarm level in the Cell Resistance (microhms) field to all cells. **Individual** and Input Level sets alarm levels on a cell basis using the Cell Resistance Alarm Levels box.

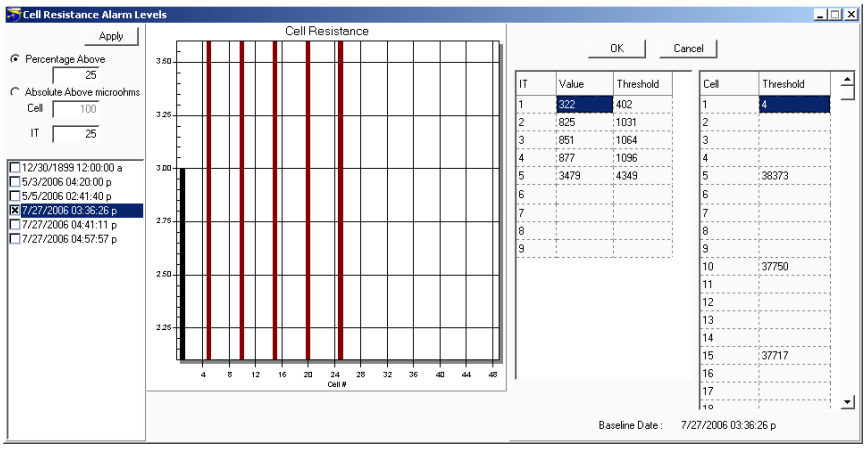


Figure 66. Cell Resistance Alarm Levels Setup (BDS)

Cell Resistance Alarm Levels box - To set Alarm Levels on a cell basis, click Individual and Input Level and select options on this box.

Percentage Above - Sets the cell alarm level a percentage above the selected dataset levels. Type a value (1 to 99) in the Percentage Above field.

Absolute Above (Microhms) - Sets the cell alarm level a numeric value above the selected dataset levels. Type a value in microhms in the Absolute Above field.

Date area check boxes - Click one dataset date in this area on which to base alarm levels. The system stores the date of the baseline data and displays it on the lower right after the Apply button is clicked.

Apply - Click apply to apply selected levels to the cells. The values appear in the Threshold column. If you do not want to edit individual cell levels (see below), click OK.

Cell, **Intertier** and **Threshold** columns - To edit individual cell or intertier alarm levels in the Threshold column, click the value and type a new value. After editing, click OK.

Note: Values are not saved until Save or Send is clicked on the Float Alarms or another Battery Setup box.

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 the bar graph colors on the Cell Voltage String View screen. During normal float condition, the bar colors change as follows:

Bar Colors for all Normal and Violation Types	High Violation ..... Red Warning ..... Blue Normal ..... Green Low Violation ..... Yellow Out of Range Values ..... Maroon Negative Cell Voltage ..... Black

String View > Setup|Battery|Float Alarms|Input Level *then* Save *or* Cancel

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.)

Note: The charger cable is only used for BDS and is intended to only be used for individual thresholds.

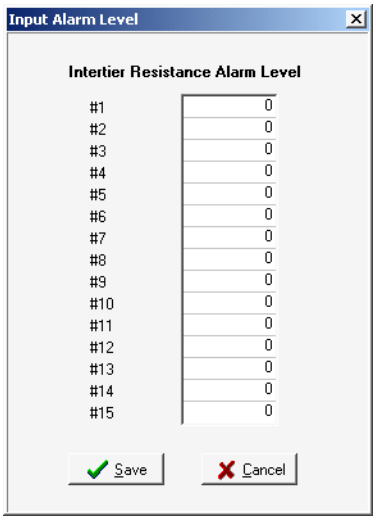


Figure 67. Input Alarm Level (Intertier Resistance Alarm Level)

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 bar graph colors.

18.5. Battery Setup: System (BDS)

String View > Setup|Battery|System

The Thermal Runaway and Hardware parameters are used to trigger system events.

Thermal runaway can be a very destructive and serious condition on standby batteries if not identified in the beginning of the development stages. If thermal runaway is ignored, severe damage to the battery as well as surrounding equipment can occur resulting in costly repairs or worse, injury to personnel. In all cases, thermal runaway can lead to abrupt system failure and disruption of service if not detected. A proactive method of some form must be instituted to deal with a thermal runaway condition. Furthermore, as described in the International Fire Code (IFC), VRLA battery systems shall be provided with a listed device or other approved method to preclude, detect and control thermal runaway (IFC 608.3)[1].

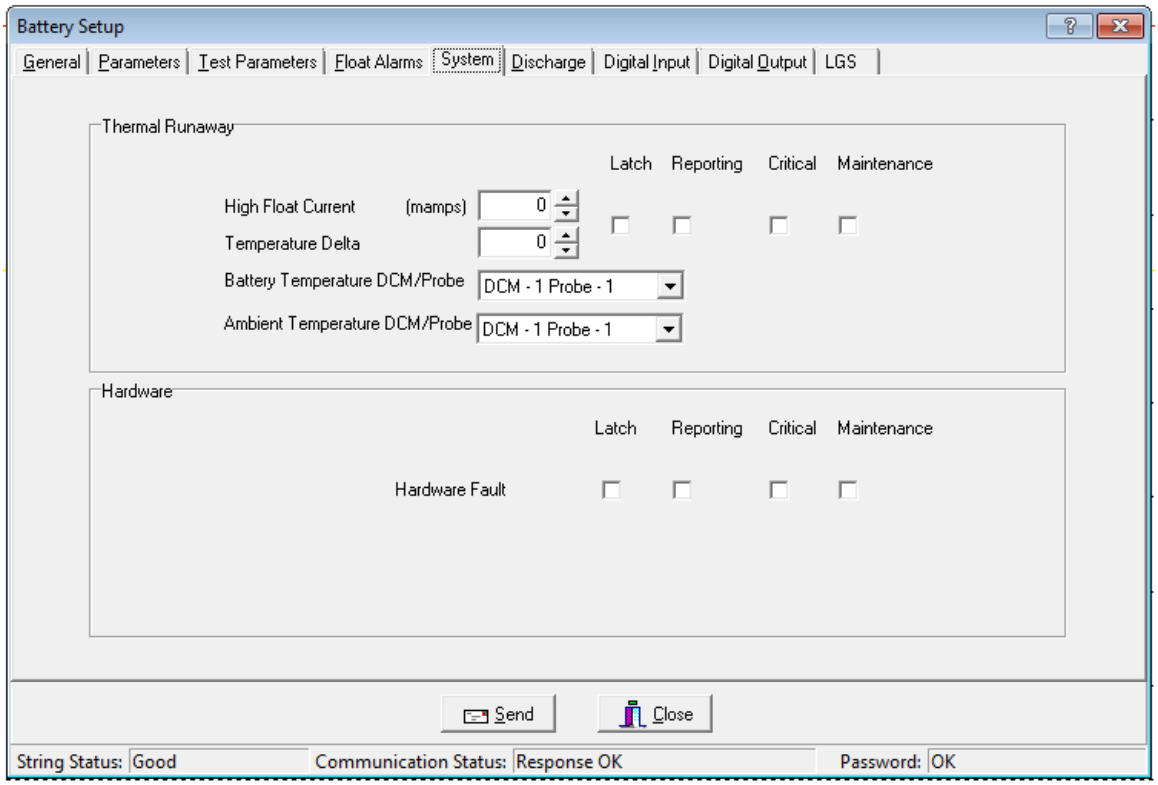


Figure 68. Battery Setup - Thermal Runaway (BDS)

High Float Current (in mamps) A float current threshold, which is independent of the Float Alarms - Float Current threshold, can be set. Entering a value of 0 will disable this parameter from the analysis for thermal runaway. Otherwise, a value from 1-5000ma can be entered. Seeing an abnormal rise in float current can be an indication of a thermal runaway condition. However, normal conditions like charging after a discharge can and will show elevated float currents for a period of time. The length of time and the amount of this elevated float current is difficult to predict as the depth of discharge and type of battery will affect this. Due to this, this parameter will be temporary disabled for making thermal analysis for 72 hours following a discharge.

[1] ICC, 2012 ICC International Fire Code® (IFC)

Temperature Delta A temperature delta can be set to identify the difference in temperature between two temperature probes. The desired location of these probes would be one measuring ambient temperature in the vicinity of the battery and the other placed directly onto the battery. Entering a 0 will disable this parameter for the analysis for thermal runaway. Otherwise, a value from 1-99F or 1-38C can be entered.

Note: To apply the Thermal Runaway feature, you must select a **High Float Current mamps** value and/or a **Temperature Delta** value. If both methods are used then both conditions must be met.

Although only one parameter can be used, it is advised to use both as the float current can be automatically disabled for a period of time following a discharge event. In the event a thermal runaway condition occurs during the recharge following a discharge, the temperature delta will rise indicating a thermal runaway condition. The BDS will now log high float current and/or temperature.

Latch - When selected, the high float current and temperature Delta alarm stays on until manually reset. If not selected, the alarm will go off when the high float current or temperature condition clears.

Reporting - When selected, the alarm will be reported and an alert will be displayed in the system. If not selected, the alarm will not be reported when a high float current or temperature alarm occurs on the system.

Critical Alarm and **Maintenance Alarm** - Two alarm are available for thermal runaway. Select Critical or Maintenance Alarm to define which alarm will report and appear in the system. If neither alarms are selected, alarm reporting is disabled for discharge.

Battery Temperature and Ambient Temperature DCM/Probe – These are selections to define where the probes are physically attached to the monitoring hardware. The system will know what DCM's are available but the individual setting the system up will need to know which probes to use and therefore properly assign them.

There is only one set of Latch/Reporting/Critical/Maintenance settings because either parameter will cause a thermal runaway event to be created in the alarm logging.

Optional Relay Module - If the system is configured with the optional relay module, each contact can be configured to a thermal runaway event as shown below. Each contact can be defined to a particular string and programmable to be latching or non-latching. If the alarm module is used for the BDS-40, there are only six alarm contacts available. If it is a BDS-256, then there are eight contacts available.
The **Hardware** section allows you to configure and generate alarms on hardware faults. At the time of this BMDM software release, the only hardware fault monitored is a communication fault between the BDS Controller and DCM's.

It is required to have Latching enabled. Critical and Maintenance should only be checked if the indicators on the front panel and alarm relay operation are required. Remote reporting is not required for this alarm to function properly.

18.6. Battery Setup: Discharge (BDS)

String View > Setup|Battery|Discharge

The following appear on the Discharge dialog box.

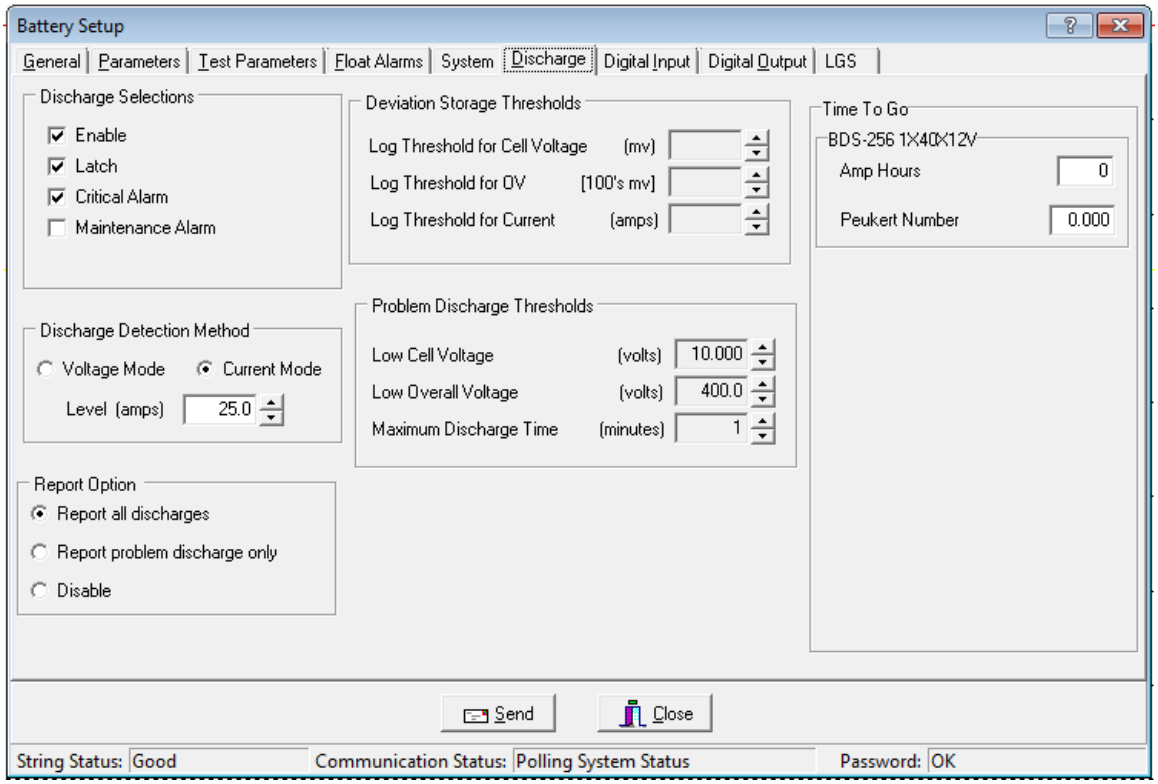


Figure 69. Battery Setup - Discharge (BDS)

Discharge Selections Area:

Enable - Select to let the monitor 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 bar graph colors.

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.

Note: If using the Current Mode, the minimum threshold **Level** to detect discharges must be at least 5% of the current transducer (CT) rating. For example, if the CT rating is 600A, the minimum Level is 30A.

Voltage mode allows data recording during recharge, since data logging does not stop until the voltage goes above the threshold. If measuring discharge current, use Discharge Current Mode as a reliable source of trigger.

To enable current mode, you must define the Current Channel on Setup|Battery| Parameters in the DCM# column.

Report All Discharges - If selected, the monitor reports all discharges to the Central computer. 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 computer.

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

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. To enable these values, 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

Time to Go Area:

The String View screen can display a Time to Go (TTG) number. When a BDS discharge starts, the TTG box on String View indicates the estimated remaining time that the battery can deliver power. To disable this feature, leave the Amp Hours and Peukert Number boxes at zero.

IMPORTANT NOTE: The TTG Time to Go number is only an estimate.

Amp Hours - Type the amp hours of the battery at the 8 hour rating. To disable the estimated time feature, set to 0.

Peukert Number - Type the Peukert number derived by using Peukert's equation. Refer to *Understanding the Time to Go Algorithm*. To disable the estimated time feature, set to 0.

18.7. Battery Setup: Digital Input (BDS)

String View > Setup|Battery|Digital Input

The Digital Input dialog box is available only when connected to String 1 of the BDS-256 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. Not available for BDS-40.

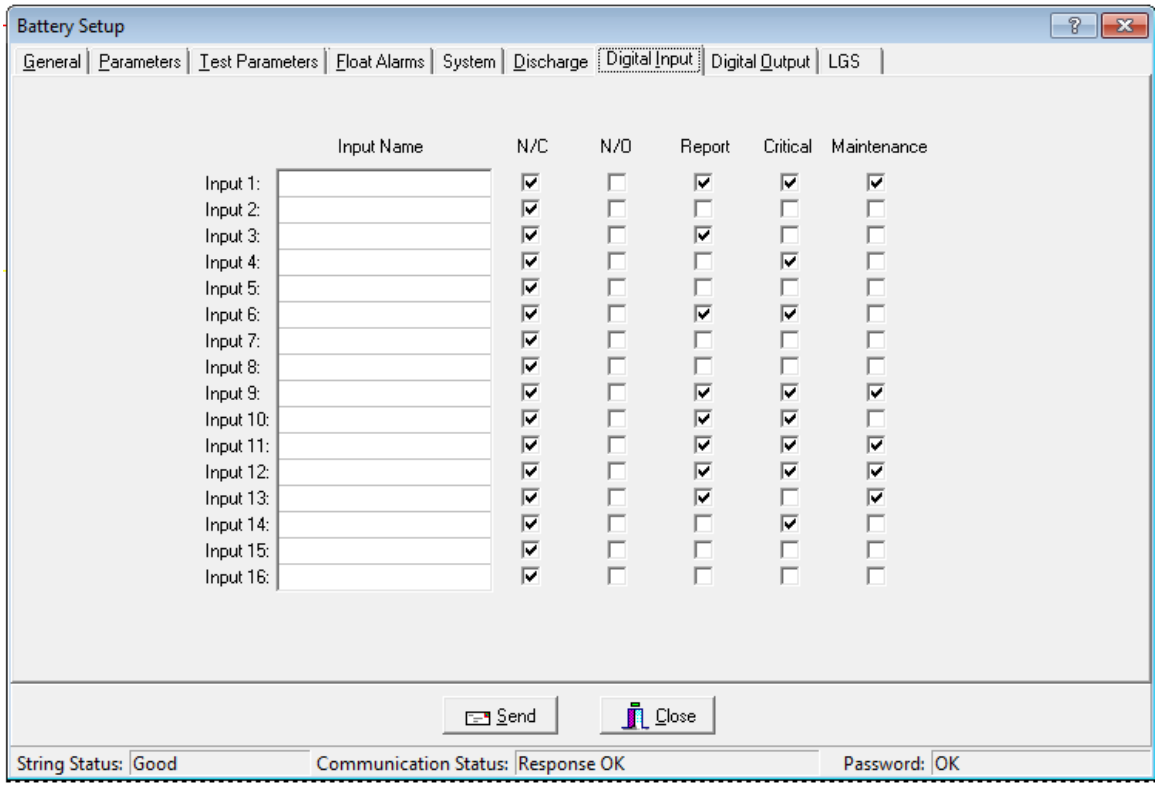


Figure 70. Battery Setup - Digital Input (BDS-256)

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 or **N/O** - Select the N/C box if the external contacts are normally closed. 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 bar graph colors.

18.8. Battery Setup: Digital Output (BDS)

String View > Setup|Battery|Digital Output

The Digital Output dialog box is available only when connected to String 1 of the BDS controller, as defined on Setup|System|String. Not available for BDS-40.

Note: Hardware failure – Latching should be enabled when using this trigger.

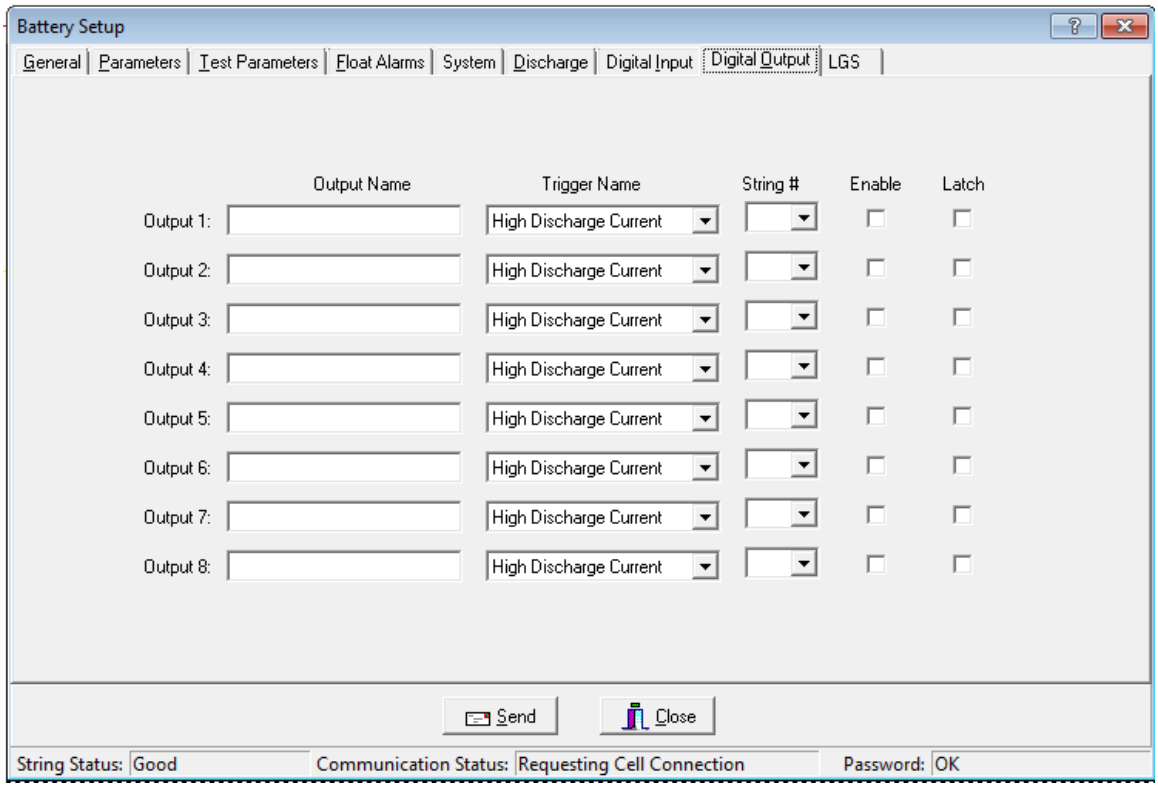


Figure 71. Battery Setup - Digital Output (BDS-256)

The BDS has eight optional relay contact control outputs you can define to trigger on an alarm event. After defining an Output Name and Trigger Name, 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 upon alarm condition reset.

Output Name - Type a name that describes the external device being controlled.

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, select All or 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.

Note: For BDS setup, the system shows information based on string one only. If you have more than one, they are defaulted from string one.

18.9. Battery Setup: LGS (BDS)

String View > Setup|Battery|LGS

Leibert Global Services (LGS) offers a service in which its Customer Response Center (CRC) remotely monitors your Alber BDS or MPM equipment and other facility devices around the clock. The CRC evaluates alarms and provides immediate telephone and e-mail assistance using a customer-defined response and escalation plan. For details about subscribing to the service, phone (800) 748-3666 or (800) SITEMON or e-mail LGS.monitoring@vertivco.com.

If you have subscribed to an LGS monitoring plan, complete the Battery Setup|LGS dialog box as follows.

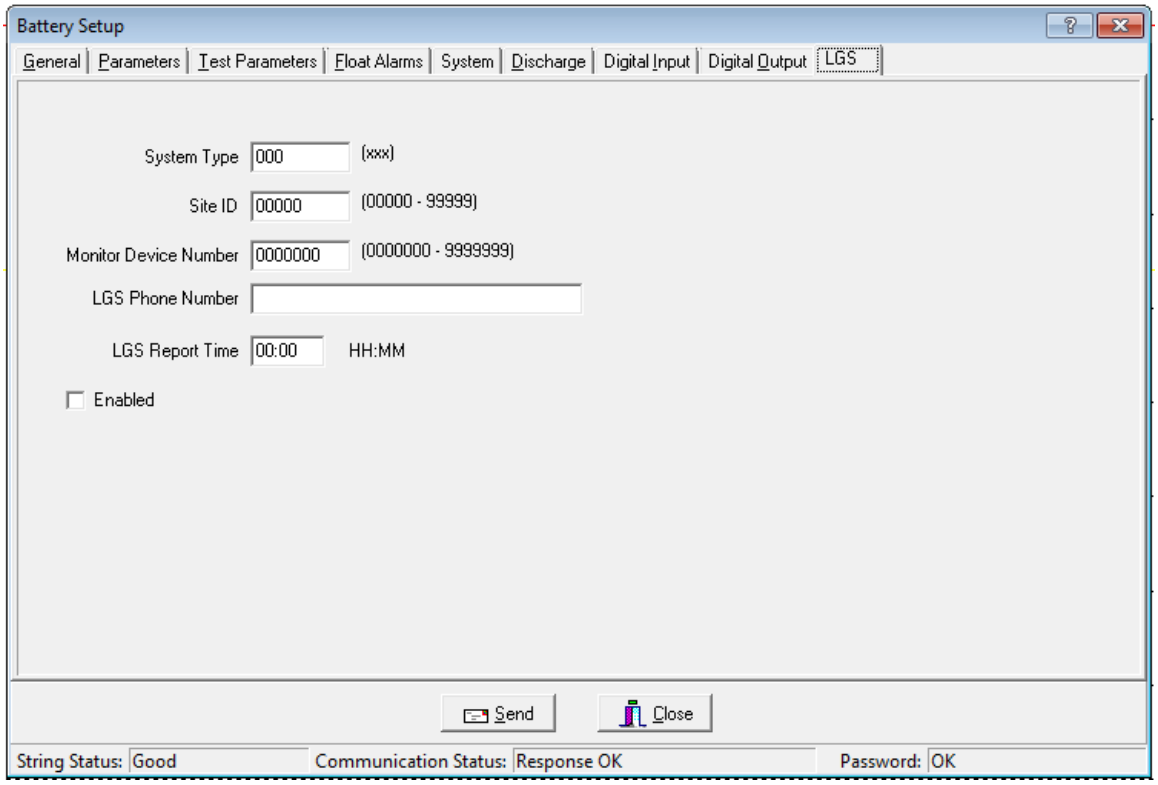


Figure 72. Battery Setup - LGS (BDS)

System Type - Type three characters to identify the device being monitored. For MPM-100, type MPM; for BDS-256, type 256; for BDS-40, type 040.

Site ID - Type the five character ID for customer site identification.

Monitor Device Number - Type the seven digit number used for customer device tracking.

LGS Phone Number - Type the telephone number that connects to the LGS remote monitoring service. This number is used for a daily communication test and alarm reporting.

LGS Report Time - Type the time the monitor calls in each day to confirm communication. Use the 24 hour clock; e.g., 13:45.

Enabled - Check this box to enable remote monitoring by LGS. Monitoring is enabled only after a monitoring plan has been purchased from LGS.

19. Selecting the Database Range

String Status > Setup|Database Range

To select a database range before connecting to a location, select Setup|Database Range. The Select Database Range dialog box appears.

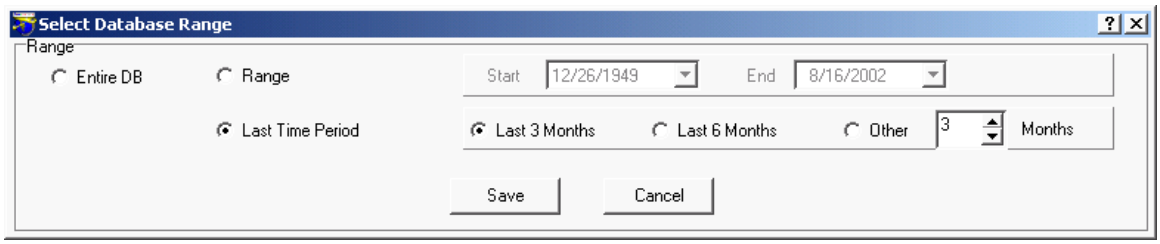


Figure 73. Select Database Range

Entire DB - Select to view all available data in the string database.

Range - To view data within a range of dates, click Range then select Start and End dates. To choose a date, click the date box drop-down button and click the calendar. To change months, click the left or right arrows on the calendar or press the Page Up / Page Down keys. To change years, hold the Ctrl key while pressing Page Up or Page Down.

Last Time Period - To select three or six months back from today's date, click Last Time Period then select **Last 3 Months** or **Last 6 Months**. Select **Other** for other month periods and choose a value. Close the dialog box to save the selections.

IMPORTANT NOTE: If no data appears on String View, select Entire DB to determine if data is available.

Save - Clicking Save saves the selected range for all databases, not just the database currently open. To close the dialog box without making any changes, click Cancel.

20. Connecting to a Battery Location

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

20.1. Connecting via Modem

Connection

Confirm Setup|System|Link is set for a modem connection. On the String Status screen, click the string to which you want to connect, then click Connection to call the number specified under Setup|System|Link. Upon connection, String View displays all real time data. If no data appears, check the Setup|Database Range setting.

20.2. Modem Hang Up

Connection *then* Hang up

When connecting via modem, sometimes you may want to disconnect before the BMDM connects to the string. To stop modem dial out after clicking **Connection**, click the Hang Up button on String Status or select Setup|Hang Up.

NOTE: If the BMDM connects and String View appears, closing the String View screen disconnects the modem.

20.3. Connecting via Network

Connection

Confirm Setup|System|Link is set for a network connection. On String Status, click the string to which you want to connect, then click **Connection** to connect to the IP address specified under Setup|System|Link. Upon connection, String View displays all real time data. If no data appears, check the Setup|Database Range setting.

20.4. Connecting via RS-232 Local Port

Connection

Confirm Setup|System|Link is set for a direct connection. On String Status, click the string to which you want to connect, then click **Connection**. If the site has been set up, String View displays all real time data. If the site was not set up, set up the new system.

21. Viewing Battery and Monitor Status

At program start, the String Status screen lists all available monitor systems. The program can sound an alarm, contact a pager, send a fax or email, or print alarm event details. When a monitor reports an alarm, an alarm detail box appears until you acknowledge it. The String Status column on the String Status screen lists the condition, and Update Date indicates alarm time. Historical Events displays the history and details about the alarm. When there is a new entry, click the flashing Historical Events button to display the history. This chapter describes these screens.

F3 - Press the F3 key to toggle between the string, battery, location, and customer status 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 real time readings.

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.

IMPORTANT NOTE: If no bar graph data appears on String View, go to the menu bar on String Status, click Setup|Database Range, then select Entire DB to determine if data is available.

21.1. Opening and Saving a Database

String Status > Open *or* File|Open

At start up, the BMDM opens the previously opened database. To open another database, select Open, highlight the desired database, and click Open. You do not need to close the currently open database before opening a new one.

String Status > File|Open Backup

The Open Backup selection works the same as Open. When the program opens an Access backup file, it converts it from a ZIP to an MDB file.

String Status > File|Save As

String Status > Backup database *or* File|Backup Database

To save an Access database as an MDB database file, select File|Save As. To save the database as a backup, select File|Backup Database, which saves the MDB file as a ZIP file. Refer to *Understanding Polling, Extraction and Backup*.

String Status > Close *or* File|Close
String Status > File|New

To close a database, select File|Close. To create a new database, select File|New.

21.2. String Status Screen

At start-up, the BMDM displays the String Status screen. The first time the program runs, no strings are listed. The communication and status fields summarize the polling status, string and location names, connection status, and errors.

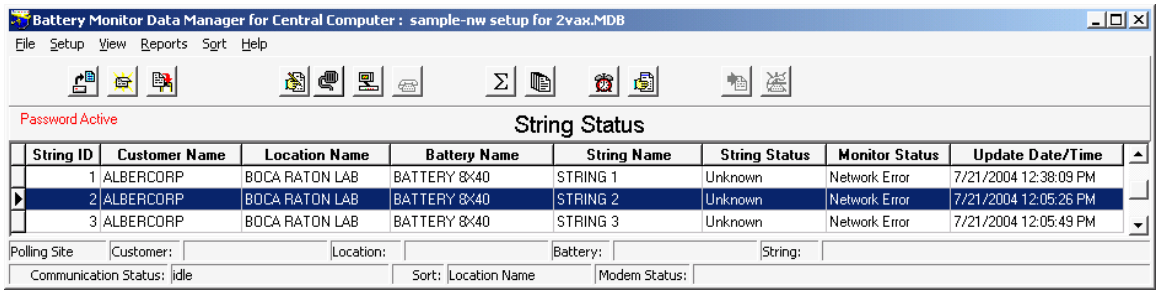


Figure 74. String Status

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 polling. 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, which indicates the string in alarm condition.

String Status - The String Status column reports six conditions on the Historical Events screen, no priority assigned, and eleven on the String Status screen, each assigned a priority. For example, if conditions Alarm and Warning exist, when the monitor calls, it reports Alarm because Alarm has higher priority than Warning. However, Warning is not lost. When you acknowledge and reset Alarm, the Warning status appears on disconnect.

Priority	Status	Meaning
1	Acknowledge	When acknowledge function is enabled, indicates an event has occurred that must be acknowledged, either through the program or by pressing the reset button.
2	Names do not match	Location, battery or strings names do not match between the hardware and database.
3	Names need to be set up	Location, battery or strings names are not programmed into the hardware.
4*	DCM Com Error	Communication error between DCM and BDS Controller.
5	Discharging	The battery is in discharge.
6*	Unknown	The system has not yet been called. (New string entry.)
7*	Discharge Occurred	Battery discharge occurred.
8*	Alarm	A battery parameter violated an alarm threshold.
9*	Warning	A resistance reading violated a warning threshold.
10*	Alarm Disabled	Alarm Disabled in Battery Setup.
11	Good	System within normal parameters.

* 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. 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 be hiding a problem. With no response, assumes the monitor is inoperative. For no dial tone or a busy line, attempts to poll a second time.
Active	Monitor answered. No problems reported.
Data Corrupt	After connecting to the monitor, you must click Clear Data Memory on Diagnostics|Memory.
Comm Error	During autopolling, if computer cannot establish communication after three tries, this message appears.
Line Busy	The phone number the modem dialed is busy.
No Answer	The phone number the modem dialed did not respond.

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

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

String Status > Sort|*column name*

The String Status screen sorts on String ID. To sort on a different column, select Sort then the column name, or click a column header. To move columns, click and drag a column header onto another column header.

String Status > Right click a string name
or String Status > View|String in Alarm *or* String in Discharge *or* String in Inactive

Right click on a string name on the String Status screen to display a pop-up menu. Click Strings in Alarm, Strings in Discharge or Strings in Inactive to display a list of the selected category. The Strings in Alarm screen is shown below. The Strings in Inactive and Strings in Discharge screens are similar.

Figure 75. String Status Viewing Selection

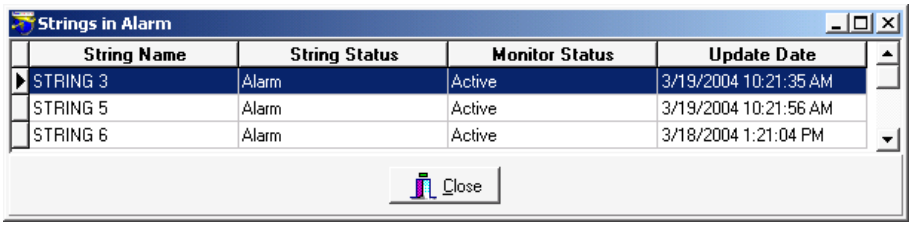


Figure 76. Strings in Alarm

String Status > Extract all data *or* String Status > Right click a string name | Extract data

The **Extract All Data** button and the **Extract Data** item on the pop-up menu are enabled if Auto Extract Data is selected and Disable Auto Polling / Auto Answering is not selected on Setup|Communication. The Extract All Data button polls all strings listed on the screen. Extract Data polls only the string highlighted. In both cases, the BMDM gets the string status and alarm events and extracts the voltage float data, resistance data, and discharge data.

String Status > Call all modem strings or

String Status > Right click a string name | Get String Status

The **Call All Modem Strings** button and the **Get String Status** item on the pop-up menu are enabled if any string is connected via modem and Auto Extract Data is selected and Disable Auto Polling / Auto Answering is not selected on Setup|Communication. The Call All Modem Strings button polls all strings listed on the screen. Get String Status polls only the string highlighted. In both cases, the BMDM gets the present string status and alarm events, but does not extract data.

String Status > Right click a string name | Acknowledge alarm

You may acknowledge alarms three ways. One way is to right click the mouse on the String Status screen and click Acknowledge Alarm on the pop-up menu. Refer to *Alarm Acknowledge* for details.

21.3. Report Alarm Event Screens

String Status > Show all alarm events

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.

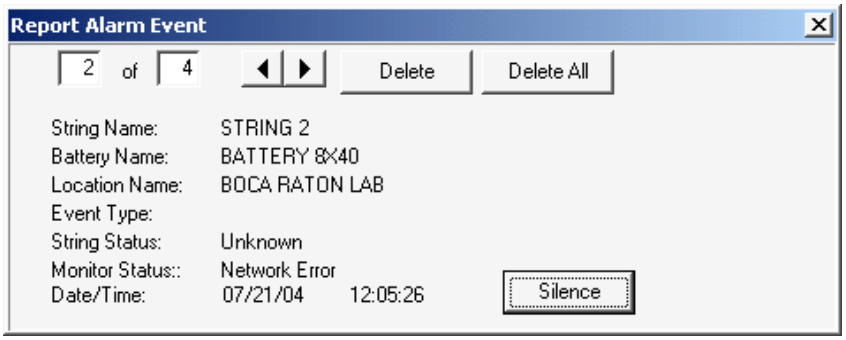


Figure 77. Report Alarm Event

The Print, Fax and 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. To stop the audible alarm if enabled, click **Silence**. Click Delete to remove the currently displayed alarm. Delete All removes all displayed alarms. The print, fax, and page event boxes close after the printer, fax machine or pager receives the alarm.

Clicking Show All Alarm Events displays the Report Alarm Event dialog box. You may view all events by clicking the left or right arrows on the box.

21.4. Summary Screen

String Status > Summary or View|Summary

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

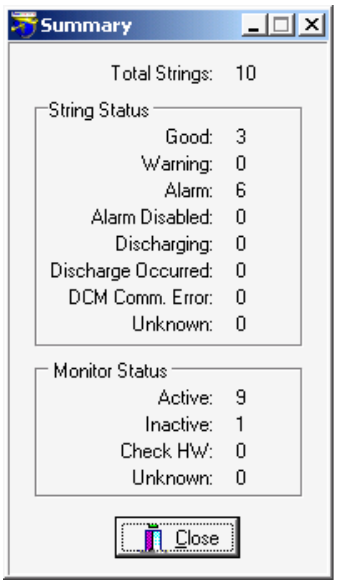


Figure 78. Summary (Battery Sites)

21.5. Historical Events Screen

String Status > Historical events or View|Historical Events

Note: View Alarm has a ringing clock

When a new event is added, the Historical Events button flashes. Select Historical Events to display the Historical Events screen, which lists reported events and the history of one or all strings. You may click the column header to sort on the column. To move columns, click and drag a column header onto another header.

String Status > View|Historical Events|View|Single String

To view a single string, select Single String on the Historical Events screen. On the Input Dialog box, choose a string name from the drop-down list, then click OK. The screen displays all the historical events for the selected string.

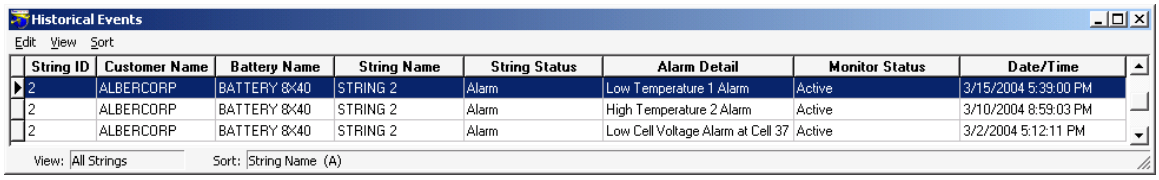


Figure 79. Historical Events

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.

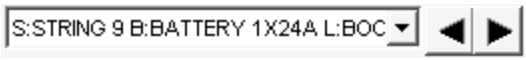
High Cell Voltage at String *n*, Cell *n*	High Intertier Resistance *n*
Low Cell Voltage at String *n*, Cell *n*	Discharge
High Resistance at String *n*, Cell *n*	Digital Input *n*
High Intercell Resistance at String *n*, Cell *n*	UPS Low Voltage
High Overall Voltage	UPS Line Fail
Low Overall Voltage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

21.6. String View Screens

From String Status, click Connection to display the String View screen.

String View > Cell voltage *or* Cell resistance *or* Intercell resistance

From the String Status screen, highlight the location name, then click Connection. After communication is established, the String View screen appears. The title bar displays S, B and L for string, battery, and location names. This chapter describes features common among the Cell Voltage, Cell Resistance, and Intercell Resistance screens, which are accessed by clicking the tabs. The Intercell Resistance tab appears for a BDS only after you request a resistance test.



To open a different string, choose a string name on the drop-down list or click the arrows on String View. Only MPM and BDS strings with the same phone number appear in the list. MPM strings with a MUX setting of zero do not appear.

String View > View|Undo Zoom

To view the level of an individual cell, refer to *Cell Voltage Box*. To perform a trend analysis, refer to *Trend Analysis*. To zoom in on the bar graph, place the cursor over the bars and drag a rectangle over the area of interest while holding the left mouse button. To restore to original size, click Undo Zoom.

21.7. Cell Voltage (String View Screen)

String View > Cell voltage (*default*)

The String View Cell Voltage screen bar graph shows the voltage of each cell or module within the battery. A readings summary appears at the bottom. The cells with the maximum and minimum values are indicated as Max(*n*) and Min(*n*). If current channel and temperature transducers are installed, these readings also appear. If you click a bar on the graph, the cell voltage value appears in the box near the top left.

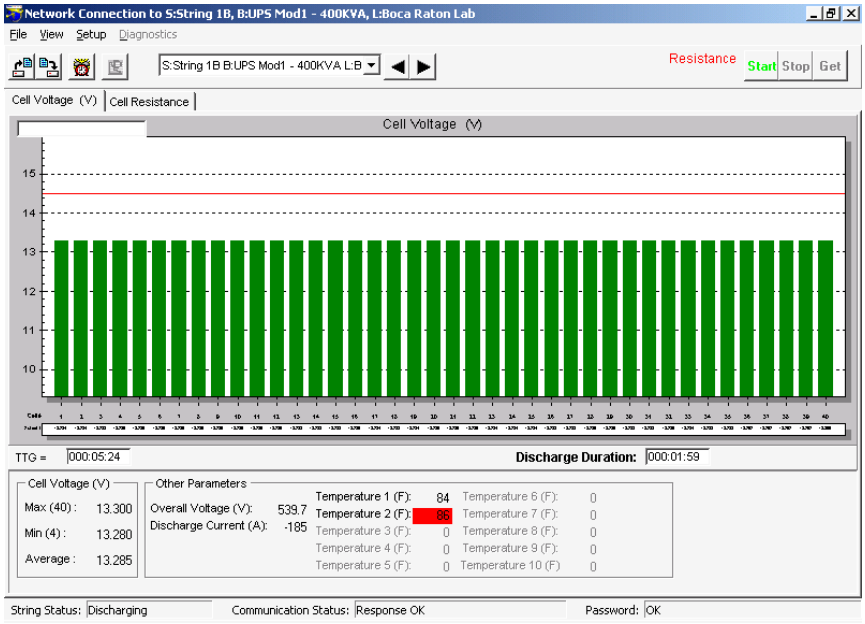


Figure 80. String View - Cell Voltages (MPM shown)

Clicking certain text in the lower portion of the String View screen displays screens related to the item clicked. For example, clicking Other Parameters - Overall Voltage displays the Overall Voltage Trend screen.

If the Peukert number is enabled for the MPM under Battery|Setup|Discharge, the screen displays the **TTG** (Time to Go) and **Discharge Duration** boxes. During discharge, TTG gives an estimate of the discharge time remaining, based on user-entered data. Discharge Duration indicates the time that has elapsed since the start of the discharge.

IMPORTANT NOTE: The TTG Time to Go is only an estimate.

When in discharge mode, if a cell goes negative, the respective bar on the bar graph is displayed in black.

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

Priority	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.

21.8. Cell Resistance and Intercell Resistance (String View Screens)

String View > Cell resistance *or* Intercell resistance

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

The Cell Resistance and Intercell Resistance screens display bar graphs. Click the Cell Resistance tab to transfer resistance readings from monitor to computer. It may take a few seconds for the bar graph to appear. If readings are available, the BMDM displays the latest set and saves them to the database with the date and time taken.

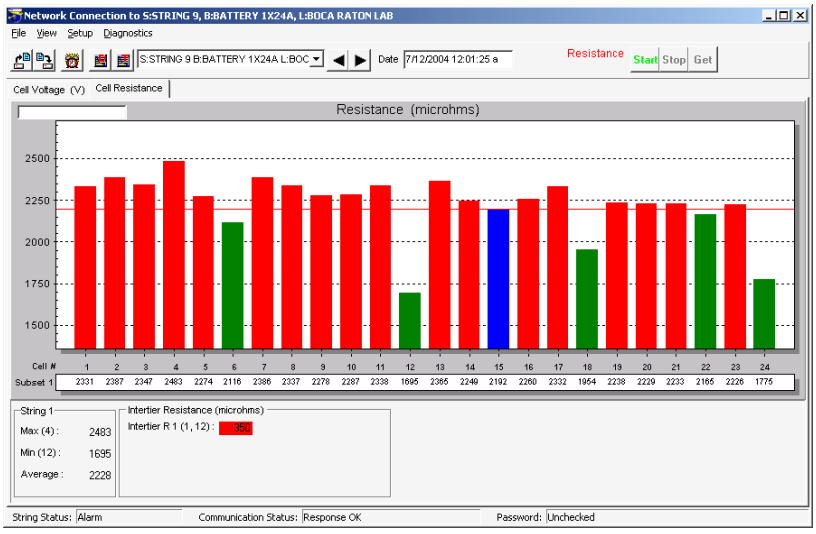


Figure 81. String View - Cell Resistance (MPM shown)

String View > Start resistance test *or* Stop resistance test *or* Get test results

To start a resistance test and capture new readings, click Start. After 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 summarizes resistance and intertier values. Intertier cells are indicated in black. To stop the test before completion, click Stop.

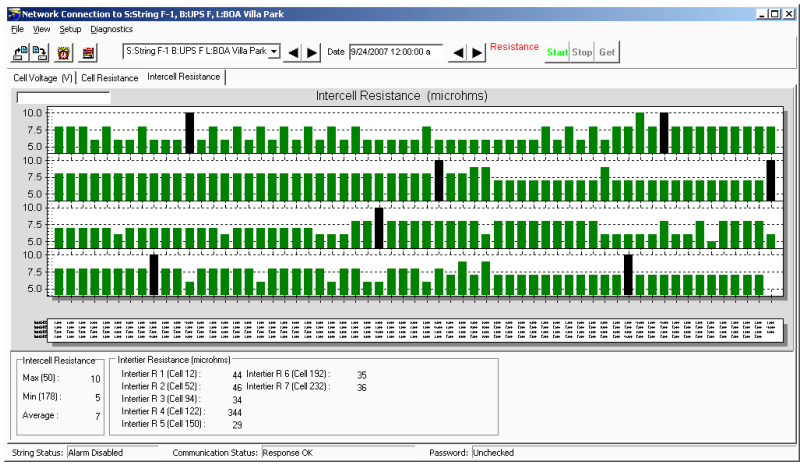


Figure 82. String View - Intercell Resistances (BDS only)

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

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. Refer to *Resistance Testing Multiple DCM Units*.

21.9. Historical Graphs

String View > Cell voltage *or* Cell resistance *or* Intercell resistance

When the BMDM is displaying a String View Cell Voltage, Cell Resistance or Intercell Resistance screen, you may save or view historical graphs.

String View > Save history record *or* File|Save history record

Save History Record - To save a history record of the graph and table values on the String View screen, click Save History Record. This captures the readings, stamped with the date and time taken.

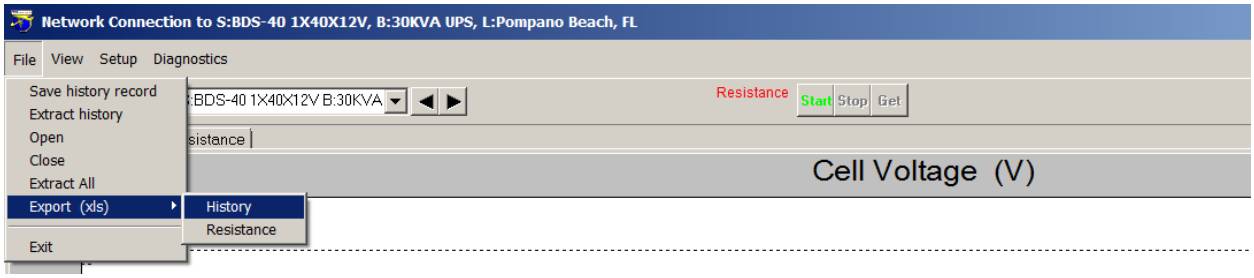


Figure 83. History Options and Record Date/Time Box

String View > Open history record *or* File|Open

Open - To display a historical graph and table on String View, click Open History Record, select a date/time, and click OK. The graph and table appear, with the historical record date/time box at the top right of the screen. You may step through historical records by clicking the left or right arrows.

String View > File|Close

Close - To close the history record and return to the active String View screen, click Close. (Do not click the X on the upper right corner.) The historical graph, record date/time box, and left/right arrows close.

String View > File|Extract History *then (optional)* File|Open|*date then* File|Close

Extract History - Click Extract History to have the computer extract historic float data for the string the computer is polling. To view the extracted data, click File|Open and select the date. If a date is not listed, no new data was extracted on that date.

String View > File|Extract All *then (optional)* File|Open|*date then* File|Close

Extract All - This function is similar to the Extract All Data button on String Status, except String View is displaying an active connection. Click Extract All to extract historic float data, resistance data, and discharge data for the string being polled. To view the extracted data, click File|Open and select the date. If a date is not listed, no new data was extracted on that date.

String View > File|Export (xls) *then History*
The **Export History (Voltage)** function allows you to export resistance data by date and time. To export history on resistance, from the main menu, click **File**, **Export** (xls) then History. The **Select Date/Time** window appears to select the date and time of the data to be exported. The file will be exported and saved to the following default folder: …\Alber\MPM Manager\Export\History_BDS-40 with the string configuration and the month, day, year and time. (for example; History_BDS-40 1X40X12V_02_06_12_08_15_00_am.xls). Click **OK** to export the file.

String View > File|Export (xls) *then Resistance*
The **Export Resistance** function allows you to export resistance data by date and time. To export history on resistance, from the main menu, click **File**, **Export** (xls) then Resistance. The **Select Date/Time** window appears to select the date and time of the data to be exported. The file will be exported and saved to the following default folder: …\Alber\MPM Manager\Export\Resistance_BDS-40 with the string configuration and the month, day, year and time. (for example; Resistance_BDS-40 1X40X12V_02_06_12_09_45_00_am.xls). Click **OK** to export the file.

21.10. Cell Voltage Box

String View > *Click a bar on the graph or Alt + Click a bar on the graph*

To display the numerical value of an individual cell on the String View Cell Voltage screen, click a bar on the graph. The cell voltage value appears in the box near the top left. To display the Cell Voltage box, hold the Alt key while clicking a bar. The Cell Voltage box opens to the right of the bar graph.

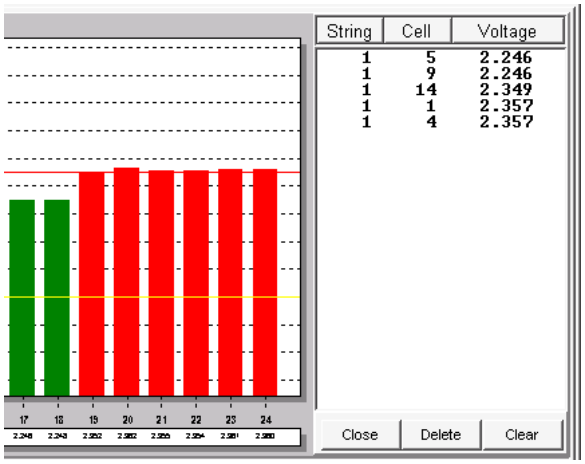


Figure 84. Cell Voltage Box

You may create a list of cells in the Cell Voltage box and monitor the continually updated voltages. This is convenient when monitoring a discharge. To add cells to the list, hold the Alt key and click a cell bar. To sort the list, click the String, Cell or Voltage column header. To remove a cell from the list, click the cell listing to highlight it, then click Delete. To remove all cells from the list, click Clear. To close the box, click Close.

21.11. Trend Analysis

String View > *Click a bar to make it gray; right click the bar;* Trend|Cell *or* Average

To perform a voltage, resistance or intercell resistance trend analysis for a cell, click a bar of interest on the graph to change it to gray, then right click the same bar to display a pop-up menu.

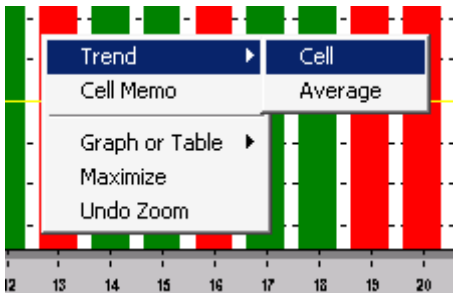


Figure 85. Trend Menu

On the pop-up menu, click **Trend** then **Cell** or **Average** to display the trend analysis graph. If the trend analysis box has active Previous/Next Parameter arrows, you may click them to view other cells. All trend analysis screens have a Print button.

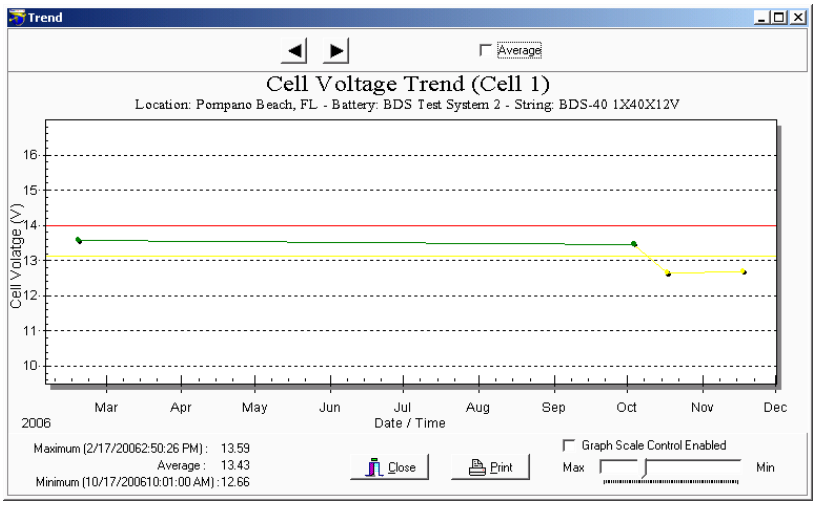


Figure 86. Trend - Cell Voltage (Typical of all Trend screens)

To use the **Graph Scale Control** to vary the y-axis scale on the graph, click the Graph Scale Control Enabled check box. This keeps the y-axis the same when viewing other cells. To determine a data point numerical value (in volts or ohms) and date and time for an event on the graph, click a dot on the graph. The value appears on the upper left. Right click a graph to change display features, such as font size, shadows, numeric precision or grid. The Average check box averages the readings.

21.12. Alarm Data

String View > View alarm *or* View|Alarm

The MPM or BDS monitor constantly checks threshold values set under Battery Setup. As long as alarms are enabled, the monitor creates a record of thresholds violated. Click View Alarm to display alarm screens.

String View > View alarm *or* View|Alarm *then, if not displayed,* Get current alarms *or* View|Current Alarm

The **Current Alarms** screen indicates Active or Latched for the alarm contacts. **Active** indicates a parameter is presently violating a threshold. The screen displays the alarm name and start time. **Latched** indicates the parameter returned to normal, but the alarm relay must be reset. The end time indicates when the alarm event changed to a latched state. Peak Value lists the highest or lowest value reached during the event. For latch to function, enable the latch 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.

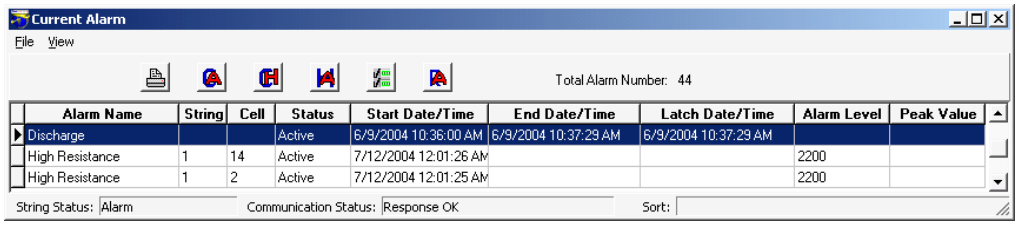


Figure 87. Current Alarm List

String View > View alarm *or* View|Alarm *then* Reset alarm *or* View|Reset Alarm

When you select 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.

String View > View alarm *or* View|Alarm *then* Get current historical alarms *or* View|Current historical alarm

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

String View > View alarm *or* View|Alarm *then* View historical alarms *or* View|Historical alarm

The **Historical Alarm** screen shows a history of alarms transferred to the computer database using Current Historical Alarm. Select Historical Alarm to display a list of alarm events that pertain to the battery and are saved in the database.

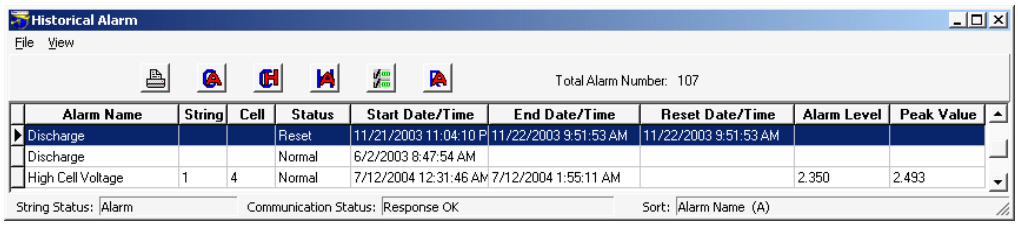


Figure 88. Historical Alarm List

String View > View alarm *or* View|Alarm *then* Select historical alarms *or* View|Selection

If any alarm records exist, select 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.

String View > View alarm *or* View|Alarm *then* File|Delete *or* File|Delete All

To delete an alarm from the database, highlight the alarm line, then select File|Delete. To delete all alarms for the string, select File|Delete All. If the Historical Alarm list is filtered using the Historical Alarm Selection box, selecting Delete All will delete all alarms in the database, not just those listed on the screen.

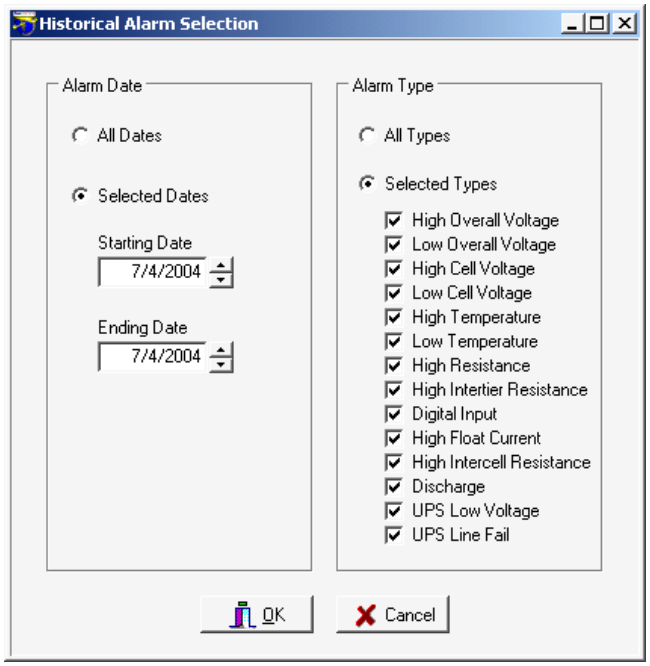


Figure 89. Historical Alarm Selection

21.13. Alarm Acknowledge

String View > View alarm *or* View|Alarm *then* Acknowledge alarm

If the alarm acknowledge options are selected on Setup|System|Reporting and Setup|Battery|General, the Acknowledge Alarm button appears on the Current Alarm screen, and, to indicate an alarm event, the String Status screen displays Acknowledge in the String Status column. You may acknowledge alarms three ways:

1. Press the alarm reset button on the MPM or BDS monitor, or
2. On the Current Alarm screen, click the Acknowledge Alarm button, or
3. On the String Status screen, right click the mouse and click Acknowledge Alarm on the pop-up menu.

21.14. Discharge Data

String View > View load test *or* View|Load test

String View > View discharge *or* View|Discharge

Click Load Test (MPM only) or Discharge to display the All Load Tests or All Discharges screens, which list records of load tests or discharges for the connected string. View Load Test lists discharges detected by user-programmed tests. View Discharge lists automatically detected discharges. If String Status on the bottom left of the String View screen indicates Discharging, Logging Discharge Data or R-test in Progress, View Discharge and View Load Test cannot be selected.

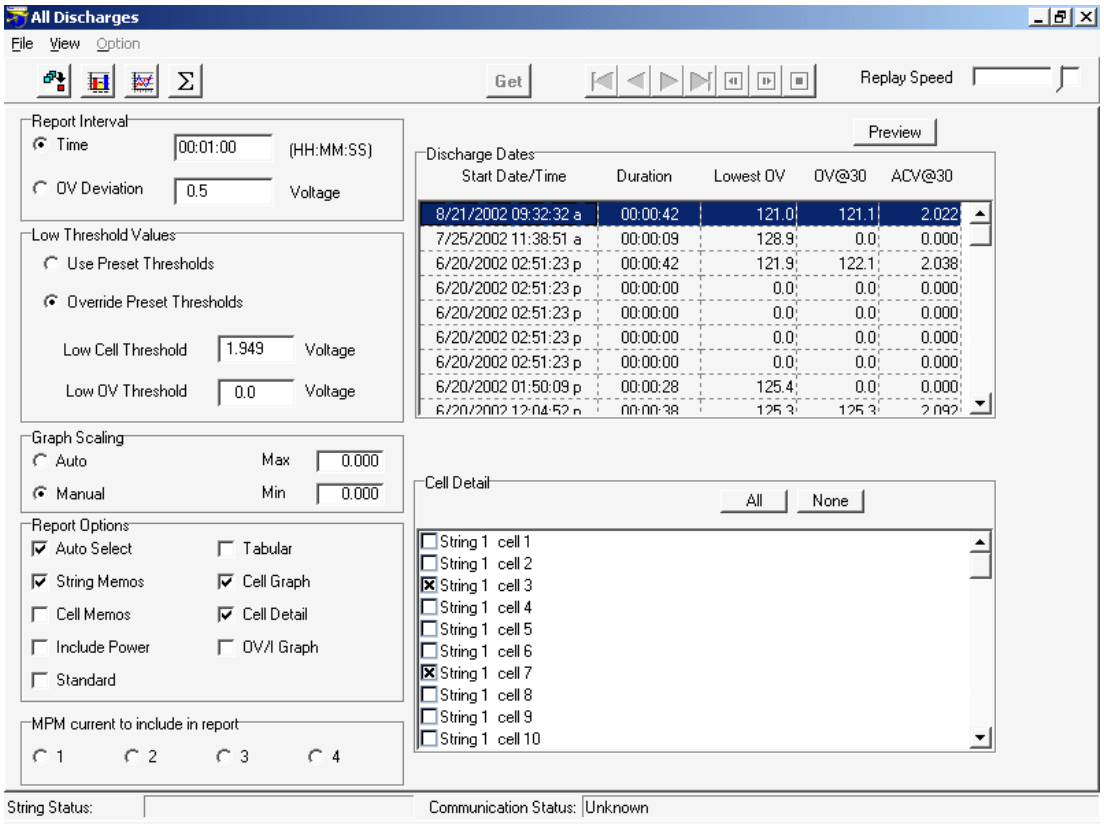


Figure 90. All Discharges (MPM shown)

The BDS and MPM All Discharges screens are similar, except the MPM screen has the MPM Current to Include in Report selection. The View|Load Test and View|Discharge screens are the same, except View|Load Test has the Start, Stop and Get buttons available.

Report Interval area - Click **Time** or **OV Deviation** and type a value in the box. The Report Interval determines the frequency of report sampling. If Time is selected, replay time advances in increments measured against real-time. For example, if 00:10 is entered, playback advances 10 seconds every second. If Overall Voltage is selected, playback advances each time the voltage changes. For example, if 0.1 is entered, playback advances each time a 100mv 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).

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

Click **Override Preset Thresholds** to ignore BMDM thresholds, then 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 area - Click **Auto** to default to automatic graph scaling, or click **Manual** and type the **Max** and **Min** graph scale values. Use Manual scaling when you want to maintain scaling to make it easier to compare several graphs.

Select **Auto Select** to automatically select cells listed on the right side that violate the thresholds. If you change the cell or OV thresholds, cells that meet the new criteria are selected. You may add cells to the report by selecting additional check boxes in the list.

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

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

Select **Standard** to create a standard report. Cells are listed by string, and strings are listed by time in a Cell = Value format.

Select **Tabular** to create a tabular report, which is the same as a standard report, but in a spreadsheet format, with Cells vs. Time.

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

Click **Cell Detail** to create a report that includes cell detail.

Click **OV/I Graph** 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.

The **Discharge Dates** columns list the Start Date/Time, Duration, Lowest OV, OV@30 and ACV@30 of all discharges. The **Lowest OV** column lists the lowest value reached during discharge. **OV@30** lists the overall voltage 30 seconds into discharge, and **ACV@30** lists the average cell voltage 30 seconds into discharge. Click the discharge for which the report will be generated. Only one discharge date may be selected for a report.

Cell Detail area - To manually select cells to include in the report, click the cells in the list 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.

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

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

String View > Start resistance test *or* Stop resistance test *or* Get test results

If View|Load Test was selected, to start a load test and capture new readings, click **Start**. After the Test in Progress message disappears, the Get button becomes active. Click **Get** to retrieve the readings and transfer them to the computer. To stop the test before completion, click **Stop**.

If View|Discharge was selected, to retrieve new discharge readings, click **Get** to display the readings and transfer them to the computer. You cannot start a discharge test from this screen.

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.

21.14.1. Discharge Replay

String View > View|Load test *or* Discharge *then* Discharge replay
or View|Discharge Replay

Click the Discharge Replay button to display the Discharge Replay screen, which shows the variations of cell levels over time.

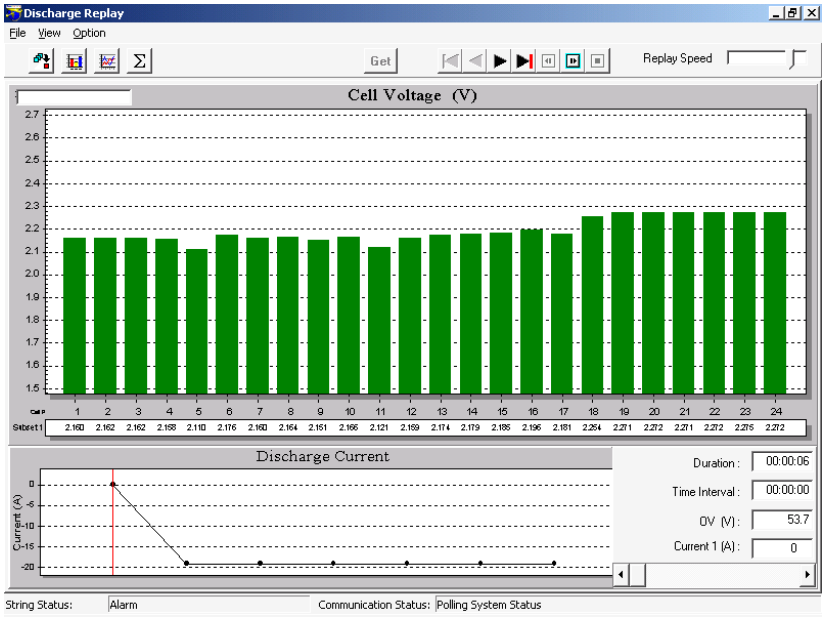


Figure 91. Discharge Replay

Play Buttons: Show First, Show Previous, Show Next, Show Last, Replay Backward, Replay Forward *and* Stop

The play buttons are at the top of the screen. Click Replay Forward to play the discharge. The display advances either by time or voltage at the rate selected. Move the Replay Speed slider at the upper right to increase or decrease replay speed.

You can click a point on the lower graph or move the Change Elapsed Time slider at the lower right to cause 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.

21.14.2. Discharge Curve

String View > View|Load test *or* Discharge *then* Discharge curve *or* View|Discharge Curve

Click Discharge Curve to display the Discharge Curve screen, which shows the relationship of the Overall Voltage, Discharge Current, and Cell Voltages on a graph.

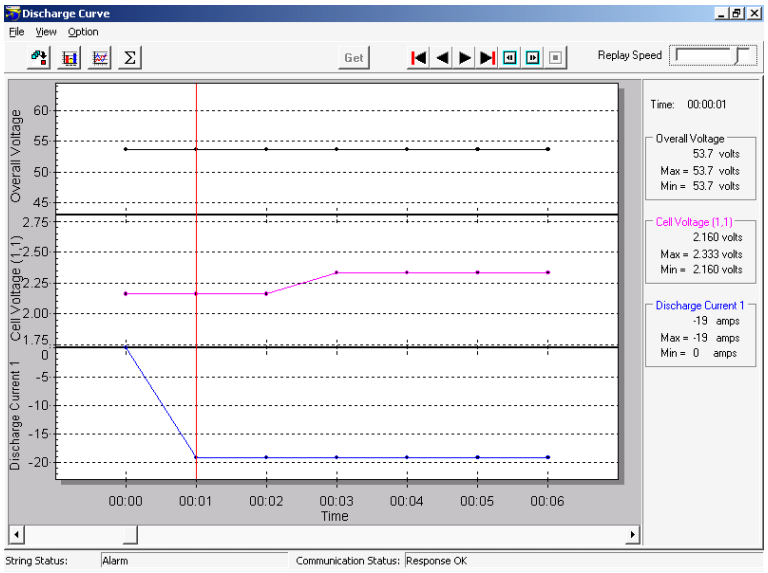


Figure 92. Discharge Curve

Play Buttons: Show First, Show Previous, Show Next, Show Last, Replay Backward, Replay Forward *and* Stop

The play buttons are at the top of the screen. Click Replay Forward to play the discharge. The display advances either by time or voltage at the rate selected. Move the Replay Speed slider at the upper right to increase or decrease replay speed.

You can click a point on the graph or move the Change Time slider on the bottom to display readings for the time selected. The Overall Voltage, Cell Voltage and Discharge Current values are to the right of the graph.

String View > View|Load test *or* Discharge *then* View|Discharge Curve|Option|Curve Option

On the Discharge Curve screen, select Option|Curve Option to display the Curve Option dialog box, which lets you select up to three parameters for viewing.

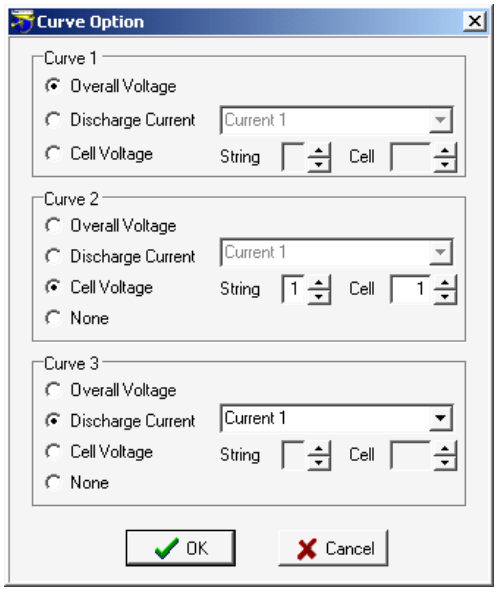


Figure 93. Curve Option

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

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

21.14.3. Summary

String View > View|Load test *or* Discharge *then* Summary *or* View|Summary
Select Summary to display the Summary screen.

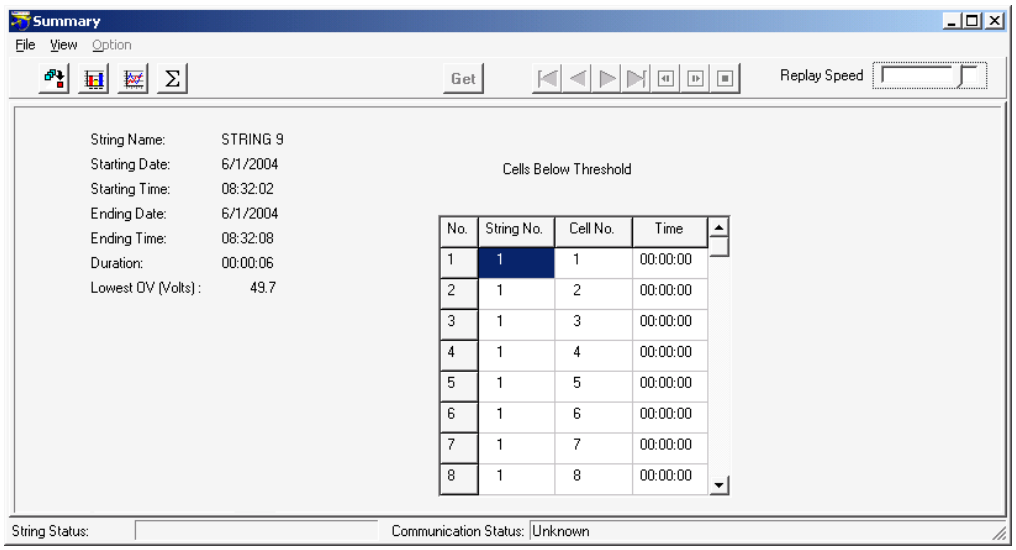


Figure 94. Summary (Discharges)

This screen summarizes the following information.

The **String Name** selected on the String Status screen.

The **Starting Date** and **Starting Time** the discharge or load test began.

The **Ending Date** and **Ending Time** the discharge or load test stopped.

The **Duration** of the test.

The **Lowest OV (Volts)** reached during the discharge or load test.

If any cells went below the threshold level during the test, **Cells Below Threshold** displays a table that lists the String Number, Cell Number, and Time the cell went below threshold.

21.15. Cell Memo / String Memo

Cell Memo or String Memo saves notes for a cell or string to the database using a Local, Central or Service computer. 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 database and monitor memory; the memo is removed from monitor memory if manually imported or the Central computer performs an automatic data extraction.

String View > *Click a bar to make it gray, then right click the bar* | Cell Memo *or* View|Cell Memo

To create a cell memo, click a bar on the graph to change it to gray, then right click the bar. On the pop-up menu, click Cell Memo. On the Cell Memo dialog box, 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, select Entire String. To save the memo, click Save. If Entire String was checked, when you select Cell Memo and click New for another cell, the installation date, model number, and serial number appear.

To determine which cells have cell memos assigned, press the F5 key. Cell bars with memos assigned display in blue.

String View > View|String Memo

To create a string memo, click String Memo. On the String Memo dialog box, type a global memo that applies to the entire string. To save the memo, click Save. 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.

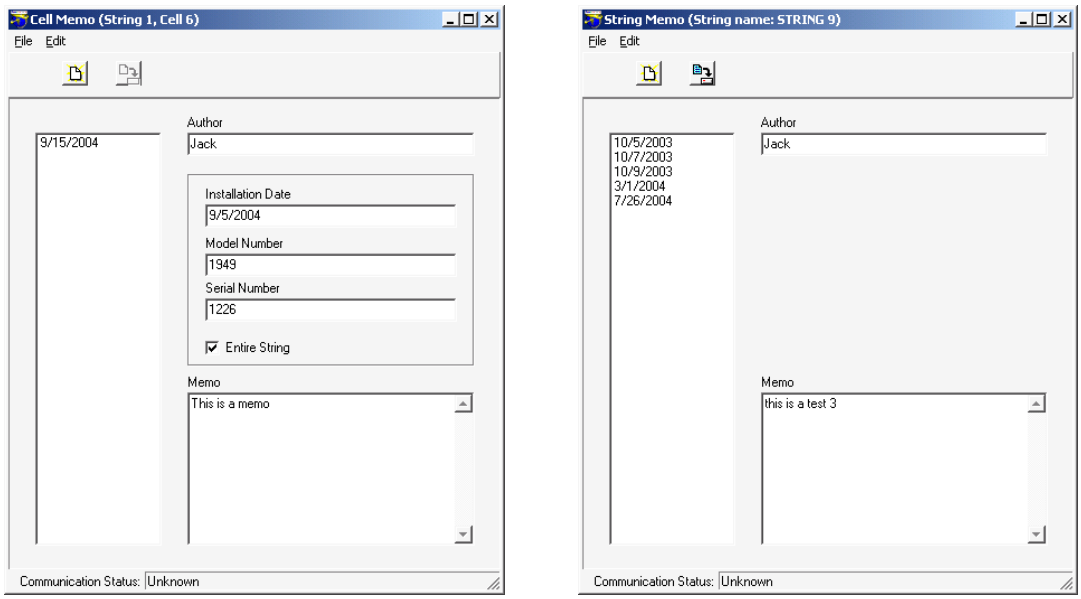


Figure 95. Cell Memo and String Memo

22. Using the Report Generator

The BMDM Report Generator uses BMDM data files to create reports. After a BMDM-controlled system reads voltage or resistance, the data is saved, and it is this data, presented in report format, that battery monitoring personnel use to analyze battery system performance. The Report Generator displays and prints text and graphs and saves customized reports in an archive ZRF format that protects against changes. You may also view and print ZRF files using the Archive Reader program.

String View > View|Reports|*item*

View|Reports accesses eleven Report Generator setup boxes. Use these boxes to create Detail and Trend reports. Choose a Detail report to generate a report on an entire string by date. Choose Trend to report on an individual cell or cells, temperature or overall voltage over a range of dates.

Some report dialog boxes let you select data sets. A **data set** is a set of historical float voltages, resistance readings, alarm readings and/or discharge data for a string. A data set is for a single date and time, and all data is displayed in one report.

After you select all the options on a Setup dialog box, click the **Preview** button to create a report and display it on the Preview screen. Refer to *Using the Preview Screens*.

22.1. Detail Cell Voltage Report

String View > View|Reports|Detail|Cell Voltage

To create a Detail Cell Voltage report, click Cell Voltage. The Detail Cell Voltage Setup box appears.

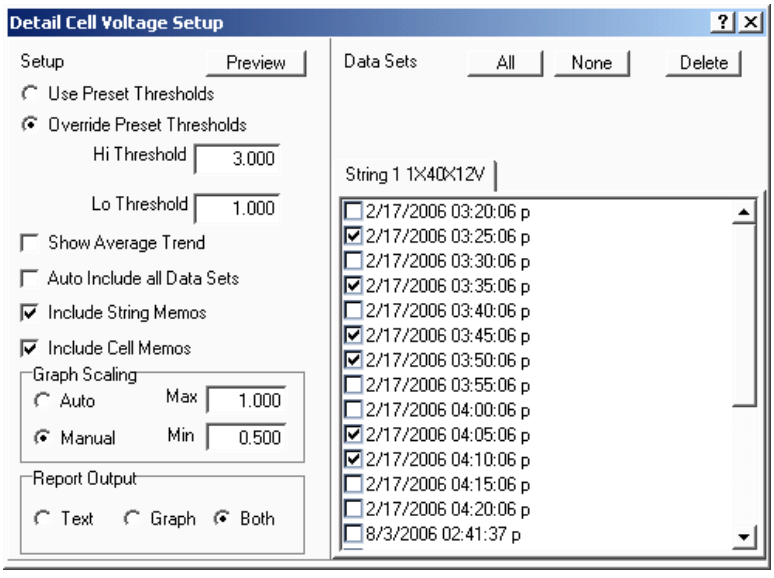


Figure 96. Detail Cell Voltage Setup

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

To ignore BMDM thresholds, click **Override Preset Thresholds**, then type values in the **Hi Threshold** and **Lo Threshold** boxes.

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

Select **Auto Include All Data Sets** to automatically select string data sets listed on the right side that violate high or low thresholds. If you change 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.

Select **Include String Memos** or **Include Cell Memos** to include string or cell memos.

Graph Scaling area - Click **Auto** to default to automatic graph scaling, or click **Manual** and type the **Max** and **Min** graph scale values. Use Manual scaling when you want to maintain scaling to make it easier to compare several graphs.

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

Data Sets area - To manually select string data sets to include in the report, click the data sets in the list 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**. If the selected range contains no data, no dates appear under Data Sets.

22.2. Detail Cell Resistance Report

String View > View|Reports|Detail|Cell Resistance

To create a Detail Cell Resistance report, click Cell Resistance. The Detail Cell Resistance Setup box appears.

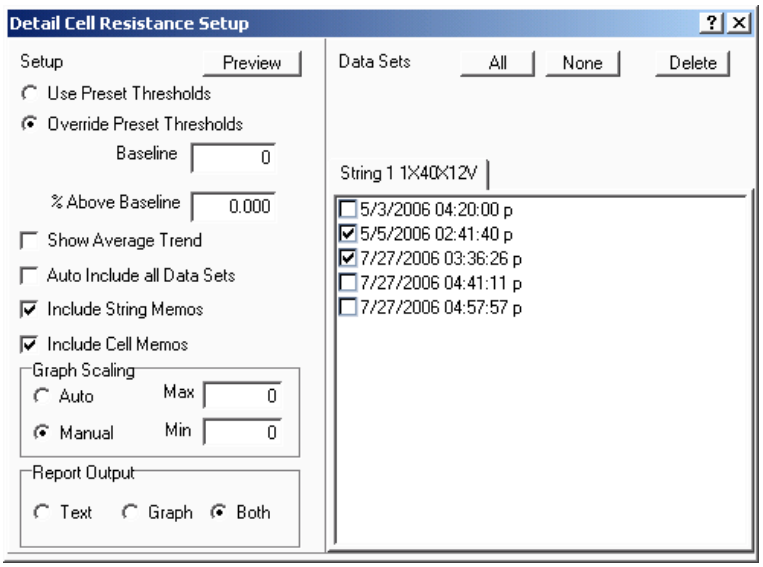


Figure 97. Detail Cell Resistance Setup

The items on the Detail Cell Resistance Setup box are the same as those on the Detail Cell Voltage Setup box (refer to *Detail Cell Voltage Report*), with the following exceptions.

To ignore BMDM thresholds, click **Override Preset Thresholds**. In the **Baseline** box, type the resistance 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.

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

22.3. Detail Intercell Resistance Report

String View > View|Reports|Detail|Intercell Resistance

To create a Detail Intercell Resistance report, click Intercell Resistance. The Detail Intercell Resistance Setup box appears.

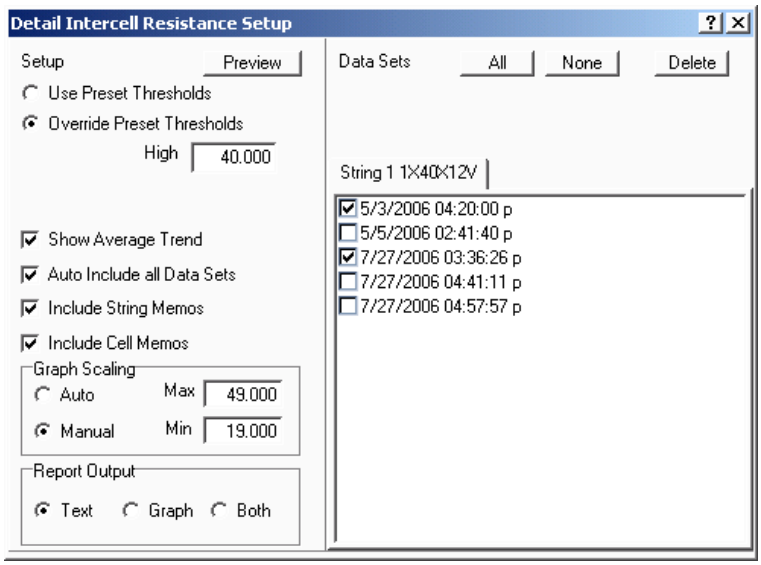


Figure 98. Detail Intercell Resistance Setup

The items on the Detail Intercell Resistance Setup box are the same as those on the Detail Cell Voltage Setup box (refer to *Detail Cell Voltage Report*), with the following exceptions.

To ignore BMDM thresholds, click **Override Preset Thresholds**, then type a high intercell resistance value in the **High** box.

22.4. Trend Cell Voltage Report

String View > View|Reports|Trend|Cell Voltage

To create a Trend Cell Voltage report, click Cell Voltage. The Trend Cell Voltage Setup box appears.

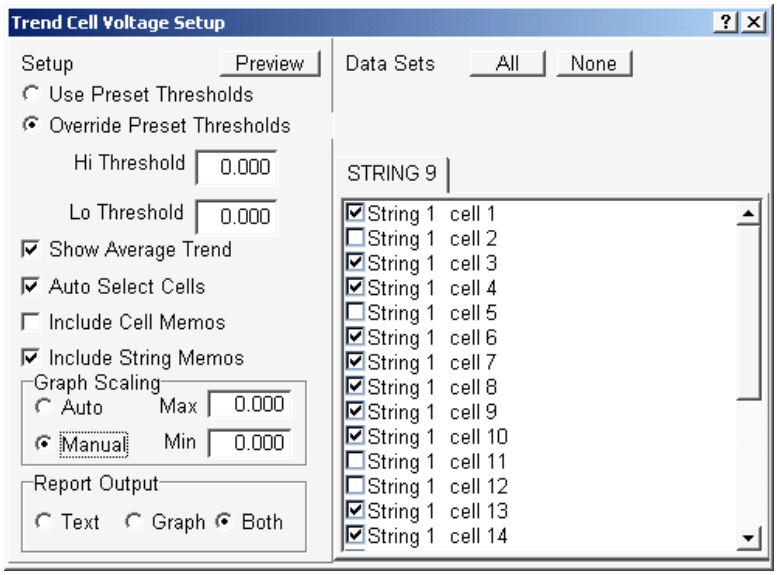


Figure 99. Trend Cell Voltage Setup

Click **Use Preset Thresholds** to use values set in the database.

Click **Override Preset Thresholds** to ignore BMDM thresholds, then type values in the **Hi Threshold** and **Lo Threshold** boxes.

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

Select **Auto Select Cells** to automatically select cells listed on the right side that violate high or low thresholds. If you change 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.

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

Graph Scaling area - Click **Auto** to default to automatic graph scaling, or click **Manual** and type the **Max** and **Min** graph scale values. Use Manual scaling when you want to maintain scaling to make it easier to compare several graphs.

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

Data Sets area - To manually select cells to include in the report, click the cells in the list 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 was used with an MPM, the list shows string and cell. If a BDS was used, the list shows cell only. If the selected range contains no data, no cells appear under Data Sets.

22.5. Trend Cell Resistance Report

String View > View|Reports|Trend|Cell Resistance

To create a Trend Cell Resistance report, click Cell Resistance. The Trend Cell Resistance Setup box appears.

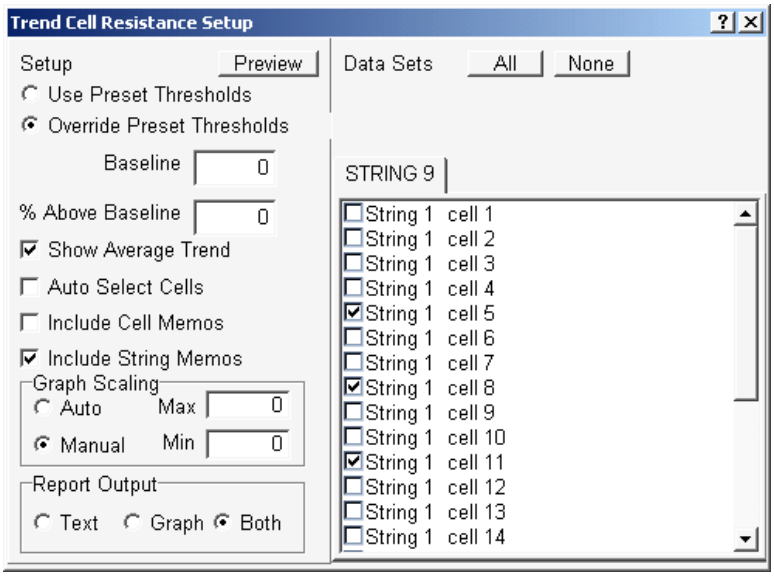


Figure 100. Trend Cell Resistance Setup

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

To ignore BMDM thresholds, click **Override Preset Thresholds**. In the **Baseline** box, type the resistance 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.

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

22.6. Trend Intercell Report

String View > View|Reports|Trend|Intercell

To create a Trend Intercell report, click Intercell. The Trend Intercell Resistance Setup box appears.

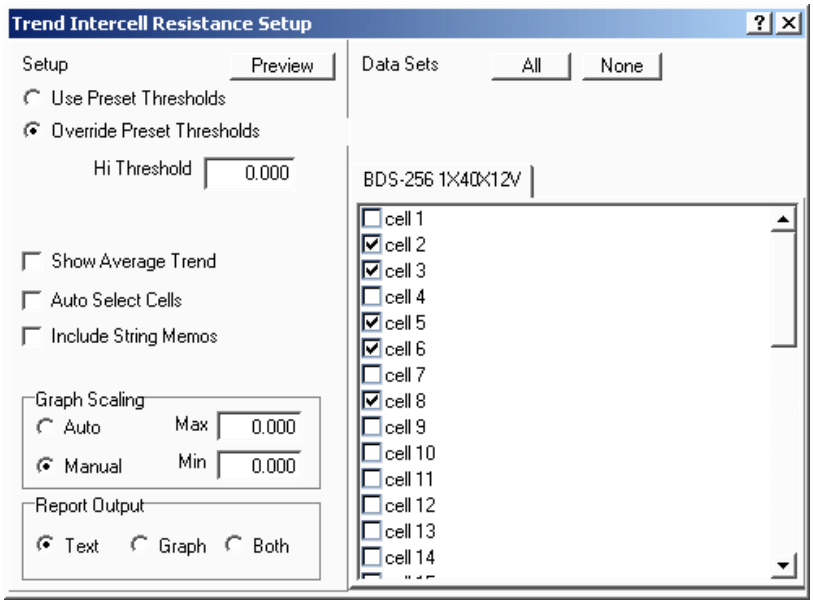


Figure 101. Trend Intercell Resistance Setup

The items on the Trend Intercell Resistance Setup box are the same as those in *Trend Cell Voltage Report*, except that Trend Intercell Resistance Setup does not have check boxes for Low Threshold or for Include Cell Memos.

22.7. Trend Overall Voltage Report

String View > View|Reports|Trend|Overall Voltage

To create a Trend Overall Voltage report, click Overall Voltage. The Trend Overall Voltage Setup box appears.

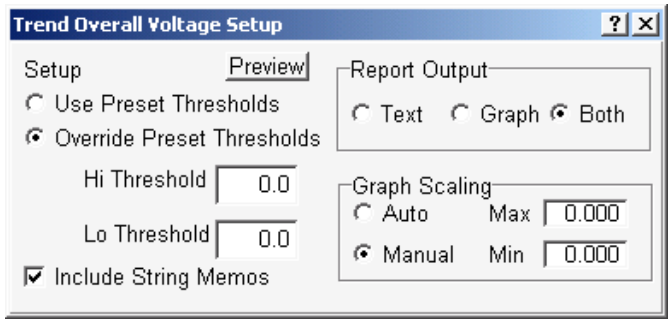


Figure 102. Trend Overall Voltage Setup

Click **Use Preset Thresholds** to use values set in the database.

Click **Override Preset Thresholds** to ignore BMDM thresholds, then type values in the **Hi Threshold** and **Lo Threshold** boxes.

Select **Include String Memos** to include string memos.

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

Graph Scaling area - Click **Auto** to default to automatic graph scaling, or click **Manual** and type the **Max** and **Min** graph scale values. Use Manual scaling when you want to maintain scaling to make it easier to compare several graphs.

22.8. Trend Temperature Report

String View > View|Reports|Trend|Temperature

To create a Trend Temperature report, click Temperature. The Trend Temperature Setup box appears.

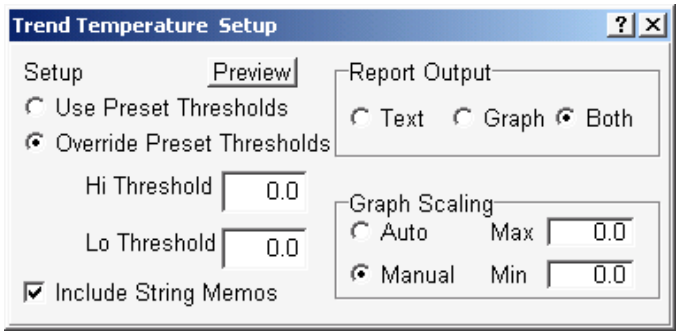


Figure 103. Trend Temperature Setup

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

22.9. Trend Intertier Report

String View > View|Reports|Trend|Intertier

To create a Trend Intertier report, click Intertier. The Trend Intertier Setup box appears.

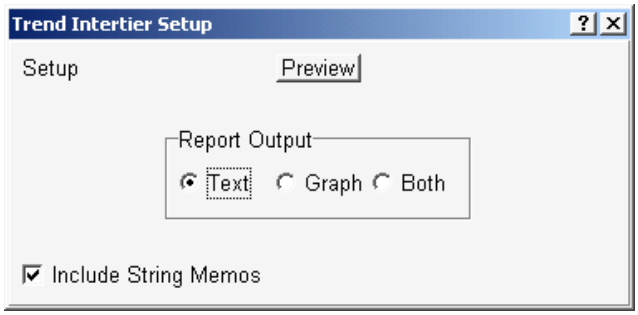


Figure 104. Trend Intertier Setup

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

Select **Include String Memos** to include string memos.

22.10. Discharge Report

String View > View|Reports|Discharge

To create a Discharge report, click Discharge. The Discharge Setup box appears. Options selected on Discharge Setup are saved by the battery name.

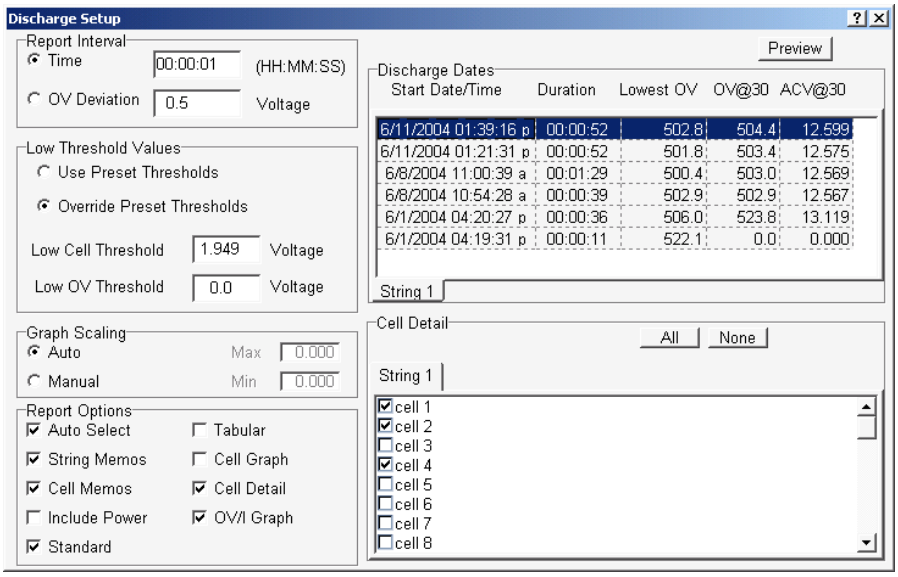


Figure 105. Discharge Setup

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

Low Threshold Values area - Click **Use Preset Thresholds** to use values set in the BMDM program when the test was run. Click **Override Preset Thresholds** to ignore BMDM thresholds, then type values in the **Low Cell Threshold** and **Low OV Threshold** boxes. Any measurement below these values will be in violation.

Graph Scaling area - Click **Auto** to default to automatic graph scaling, or click **Manual** and type the **Max** and **Min** graph scale values. Use Manual scaling when you want to maintain scaling to make it easier to compare several graphs.

Select **Auto Select** to automatically select cells listed on the right side that violate thresholds. If you change 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.

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

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

Select **Standard** to create a Standard report. Cells are listed by string, and strings are listed by time in a Cell = Value format.

Select **Tabular** to create a Tabular report, which is the same as a standard report, but in a spreadsheet format, with Cells vs. Time.

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

Click **Cell Detail** to create a report that includes cell detail.

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

The **Discharge Dates** columns list the Start Date/Time, Duration, Lowest OV, OV@30 and ACV@30 of all discharges. The **Lowest OV** column lists the lowest value reached during discharge. **OV@30** lists the overall voltage 30 seconds into discharge, and **ACV@30** lists the average cell voltage 30 seconds into discharge. Click the discharge for which the report will be generated. Only one discharge date may be selected for a report.

Cell Detail area - To manually select cells to include in the report, click the cells in the list 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.

22.11. Alarm Report

String View > View|Reports|Alarm

To create an Alarm report, click Alarm. The Alarms Setup box appears. Options selected on Alarms Setup are saved by the battery name.

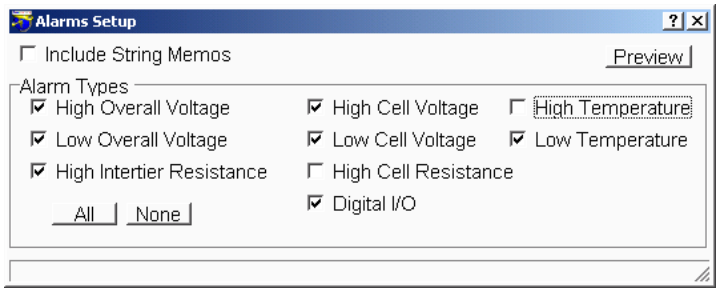


Figure 106. Alarms Setup

Select **Include String Memos** to include string memos in the report.

Alarm Types area - 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. If Digital I/O is selected, the system generates an alarm if a digital input is selected on the battery setup digital output screen.

22.12. Summary Report

String Status > Summary report *or* String View > View|Reports|Summary [*see text*]

To create a Summary report that includes data only for the string to which the system is connected, click View|Reports|Summary (String View screen). To create a Summary report for all strings in the system, click the Summary Report button (String Status screen). The Summary Setup box appears. A report generated using the Summary Report button may be more than 100 printed pages long.

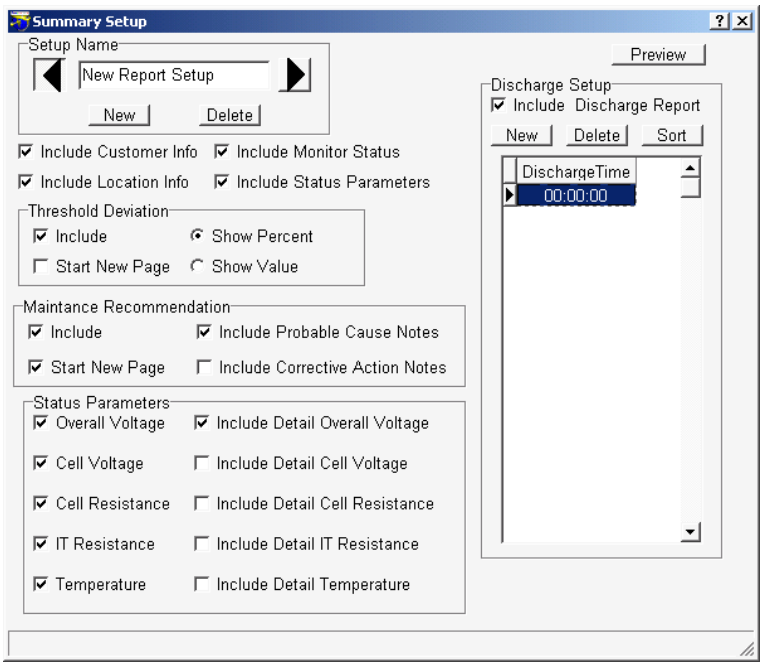


Figure 107. Summary Setup

Setup Name area - You can save the options and discharge times 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 to save the template. To view existing templates, click the arrows. To delete a template, display it and click Delete. Although the same name can be used for different templates, you may want to use a unique name for each template.

Select **Include Customer Info** and **Include Location Info** to include the customer and location names, addresses, and contact information in the report.

Select **Include Monitor Status** to print Last Known Status, which lists string name, monitor status string status, and the date and time of the last known status.

Select **Include Status Parameters** to print Parameter Status as of Last Reading, which lists the following if they are checked under Status Parameters: overall voltage, low and high cell voltage and cell resistance, highest intertier resistance, and average temperature.

Threshold Deviation area - Select **Include** to include the threshold deviation report. Select **Start New Page** to insert a page break before the report. Select **Show Percent** or **Show Value** to have deviations shown as percent change or actual values. Only cells that exceed threshold values are listed.

Maintenance Recommendation area - Select **Include** to include the maintenance recommendation report. Select **Start New Page** to insert a page break before the report. Select **Include Probable Cause Notes** and **Include Corrective Action Notes** to include text that attempts to resolve the types of violations found, such as high resistance. Only cells with violations are listed.

Status Parameters area - Select **Overall Voltage**, **Cell Voltage**, **Cell Resistance**, **IT (Intertier) Resistance** or **Temperature** to list these items in Parameter Status as of Last Reading. You must also select the Include Status Parameters check box.

Select **Include Detail Overall Voltage**, **Include Detail Cell Voltage**, **Include Detail Cell Resistance**, **Include Detail IT Resistance** or **Include Detail Temperature** to print these sections, which have graphs of each item in violation. Items with Normal status do not print.

Discharge Setup area - Select the **Include Discharge Report** check box to print a discharge report. To add a discharge duration time to the list, Click New then type a new time in the highlighted 00:00:00 in the **Discharge Time** list. To sort the times, click Sort. To remove a time from the Discharge Time list, click the time to highlight it, then click Delete.

For a description of the items in Discharges in the report, refer to *Using the Web Report Generator*.

23. Using the Preview Screens

[Previously described Setup screen] > Preview

After all report parameters are selected, to view the report on a report preview 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.

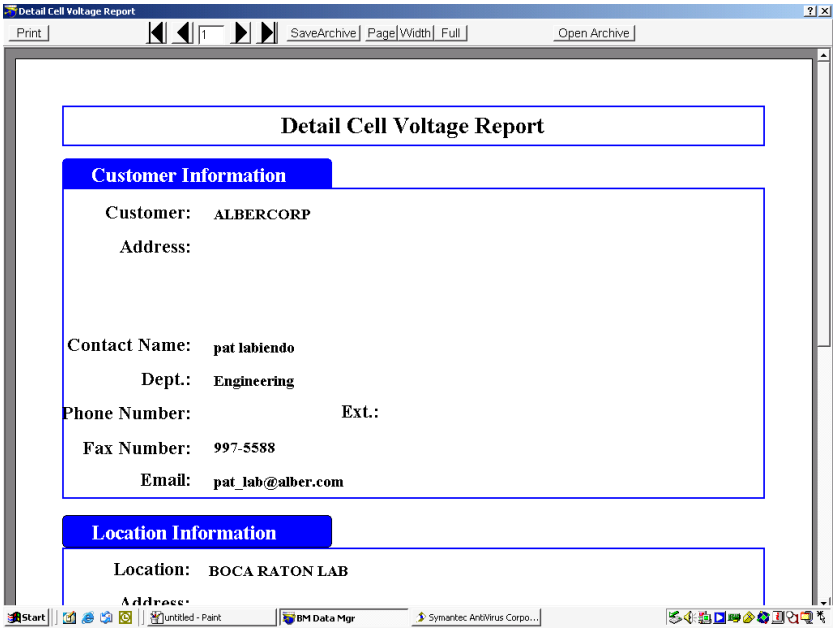


Figure 108. Preview (Typical Screen)

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, Cell Graph, and OV/I Graph.

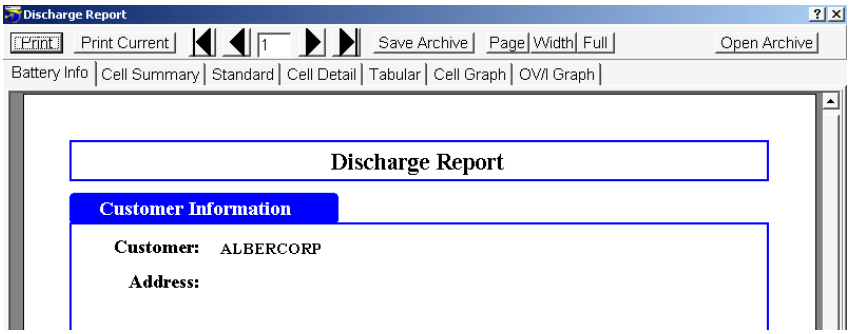


Figure 109. Preview (Discharge Report)

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.

23.1. Saving a Report in Archive (ZRF) Format

Preview screen > Save Archive

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, click **Save Archive**. In the Save Archive dialog box, select the subdirectory, type the file name, then click Save. Reports are saved in the folder last opened, unless a different folder is selected.

23.2. Printing a Report

Preview screen > Print

To print the report displayed, click Print; 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. To print a single page, do not select Current Page. Instead, select Pages and type the page number in the box.

23.3. Opening an Archive File

Preview screen > Open Archive

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**, 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.

23.4. Archive Reader Program

The Archive Reader, distributed with the Report Generator, is used to view and print ZRF files when the Report Generator program is unavailable. It is typically sent with archive files when these files are sent to locations that do not have the Report Generator. You may freely copy and distribute the Archive Reader when required. The Report Generator is a licensed product and may not be duplicated for multiple site use. You may download the Archive Reader from the Vertiv Corporation Web site at www.vertivco.com and copy it to a CD for distribution with ZRF files.

24. Using the Web Report Generator

Every 24 hours, the Web Report Generator automatically creates and saves an executive summary report as a PDF file at Program Files\Alber\MPM Manager\Web\SystemSummary. New reports overwrite previous reports automatically or when you manually generate a report. You may view the executive summary report by connecting via the Web to albermonitor.com.

24.1. Setting Up the Web Report

String Status > *highlight a name then* Reports|Setup

To enable automatic Web report generation, select the Detail Executive Report Enable check box on Setup|Preferences. To set up report format, highlight a string name on String Status, then click Reports|Setup to open the Technician Detail Summary Report Setup dialog box.

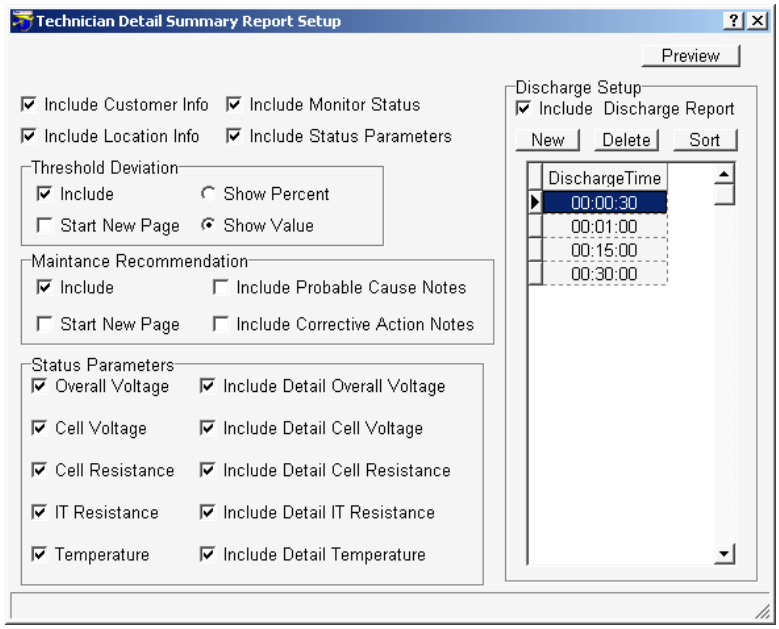


Figure 110. Technician Detail Summary Report Setup

Select **Include Customer Info** and **Include Location Info** to include the customer and location names, addresses, and contact information in the report.

Select **Include Monitor Status** to print Last Known Status, which lists string name, monitor status, string status, and the date and time of the last known status.

Select **Include Status Parameters** to print Parameter Status as of Last Reading, which lists the following if they are checked under Status Parameters: overall voltage, low and high cell voltage and cell resistance, highest intertier resistance, and average temperature.

Threshold Deviation area - Select **Include** to include the threshold deviation report. Select **Start New Page** to insert a page break before the report. Select **Show Percent** or **Show Value** to have deviations shown as percent change or actual values. Only cells that exceed threshold values are listed.

Maintenance Recommendation area - Select **Include** to include the maintenance recommendation report. Select **Start New Page** to insert a page break before the report. Select **Include Probable Cause Notes** and **Include Corrective Action Notes** to include text that offers solutions for the types of violations found, such as high resistance. Only cells with violations are listed.

Status Parameters area - Select **Overall Voltage**, **Cell Voltage**, **Cell Resistance**, **IT (Intertier) Resistance** or **Temperature** to list these items in Parameter Status as of Last Reading. You must also select the Include Status Parameters check box.

Select **Include Detail Overall Voltage**, **Include Detail Cell Voltage**, **Include Detail Cell Resistance**, **Include Detail IT Resistance** or **Include Detail Temperature** to print these sections, which have graphs of each item in violation. Items with Normal status do not print.

Discharge Setup area - Select the **Include Discharge Report** check box to print a discharge report. To add a discharge duration time to the list, Click New then type a new time in the highlighted 00:00:00 in the **Discharge Time** list. To sort the times, click Sort. To remove a time from the Discharge Time list, click the time to highlight it, then click Delete.

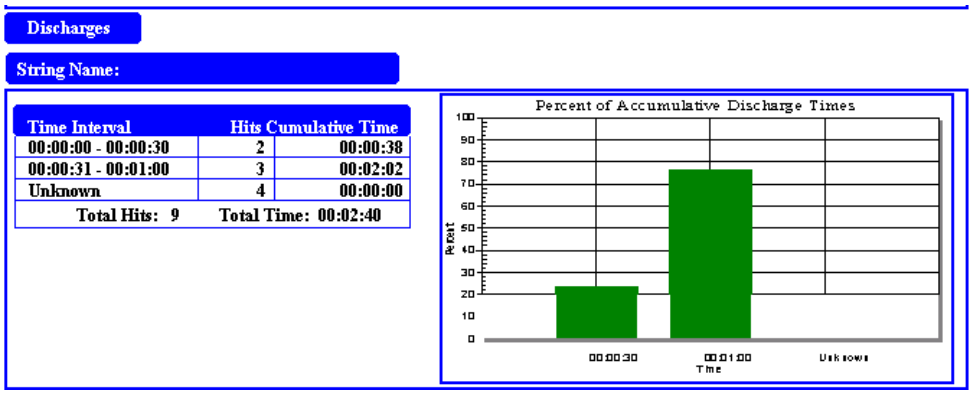


Figure 111. Technician Report - Discharges Area

The Discharges area on the report has a table and graph. The **Time Interval** column lists discharge duration limits. For example, if the time listed is 00:00:00 - 00:00:30 and the **Hits** column shows 2, then there were two discharges that lasted somewhere between 0 and 30 seconds. In the preceding figure, the cumulative (total) time of the two discharges was 38 seconds.

The graph in the **Percent of Accumulative Discharge Times** classifies the various discharge durations. In the above figure, 24% of the total discharge time were discharges of zero to 30 seconds, and 76% were discharges 31 seconds to one minute.

After selecting all options, click the **Preview** button to create and display a report. If you click Save Archive on the Preview screen, you can save to the Reports subdirectory as a ZRF file and not overwrite the automatically generated report in the SystemSummary subdirectory. For more on the Preview screen buttons, refer to *Using the Preview Screens*.

24.2. Generating an Executive Summary Report

String Status > Reports|Generate

If enabled on Setup|Preferences, the Web Report Generator automatically generates the executive summary report every night after autopolling is done. To manually generate a report, highlight a name on the String Status screen, then click Reports|Generate. At the Generate Executive Reports box, click Yes. The Auto Generating Technician Detail Summary Report dialog box appears while the reports are being generated.

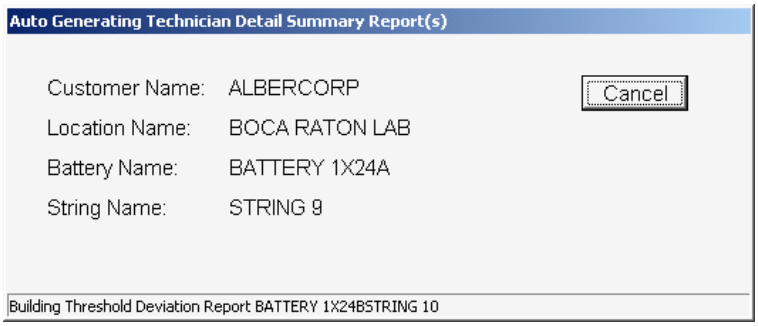


Figure 112. Auto Generating Technician Detail Summary Report

The report is saved in the SystemSummary subdirectory, which is created when the BMDM program is installed. To view the new report, use a program such as Adobe Acrobat® Reader and navigate to Program Files\Alber\MPM Manager\Web\ SystemSummary. Click on the PDF file name to open the report.

New executive summary reports automatically overwrite previous reports every 24 hours or when you manually generate reports by selecting Reports|Generate.

25. Calibration

String View > Setup|Calibration

To ensure reliability of readings, Vertiv Corporation 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.

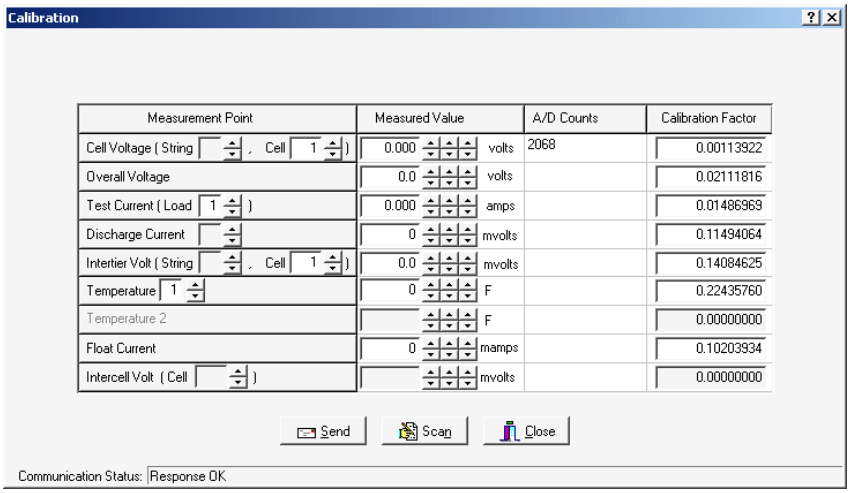


Figure 113. Calibration Setup (MPM)

The BDS Calibration dialog box differs slightly. It has arrows to select other DCM's and does not have a Test Current cell selector. Overall Voltage and Intercell Volt are not available for the BDS-40.

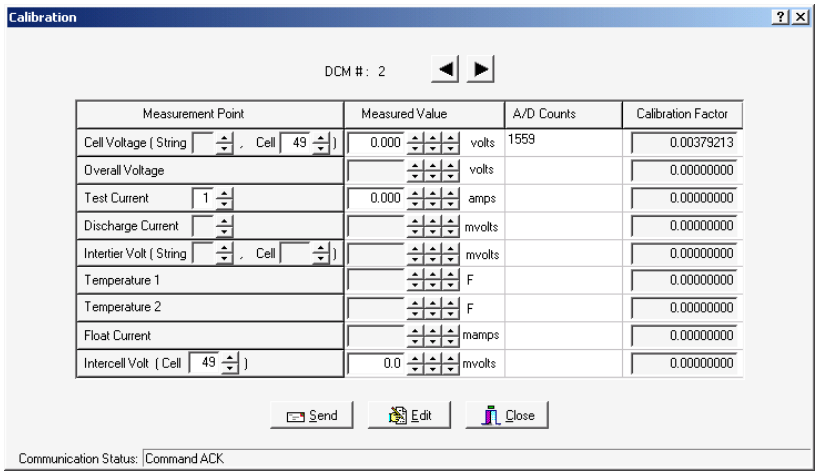


Figure 114. Calibration Setup (BDS)

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.

Scan / Edit is a toggle action button. Clicking **Edit** allows editing of the Calibration Factors. Clicking **Scan** disables editing. Clicking a Measured Value field displays A/D counts.

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 Vertiv Corporation in the calibration of this equipment.

26. MPM Diagnostics

String View > Diagnostics|*Item*

The diagnostics are used for production testing, but may help troubleshoot 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.

26.1. Rebooting and Power Up Diagnostics (MPM)

String View > Setup|Reboot Firmware

To reboot the MPM from the Data Manager, select Reboot Firmware. This does a "warm reset" of the MPM. At power-up, the unit performs diagnostics for about two minutes. If the unit fails any test other than failure to detect a dial tone, the Error LED blinks. Identify the failing parameters by using the *Self Test* diagnostic.

26.2. Self Test (MPM)

String View > Diagnostics|Self Test

Self Test reads an MPM status register and displays the parameter status on the 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.

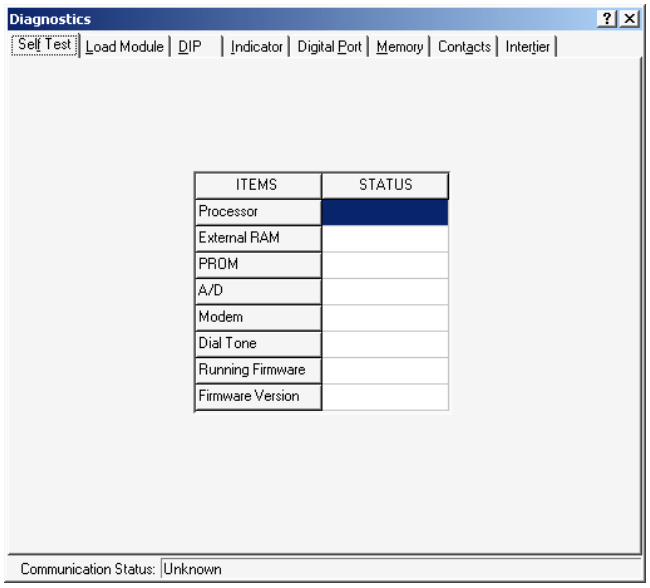


Figure 115. Diagnostics - Self Test (MPM)

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.

26.3. Load Module (MPM)

String View > Diagnostics|Load Module

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.

The Load Module also has a diagnostic that can confirm the direction of the current transducer.

To test each load connection, open Load Module Diagnostics, select Load Module, then click the Test Current tab on the dialog box. 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 a long time. The load module can overheat and damage hardware if not allowed to cool between tests. The load module automatically turns off after 10 seconds.

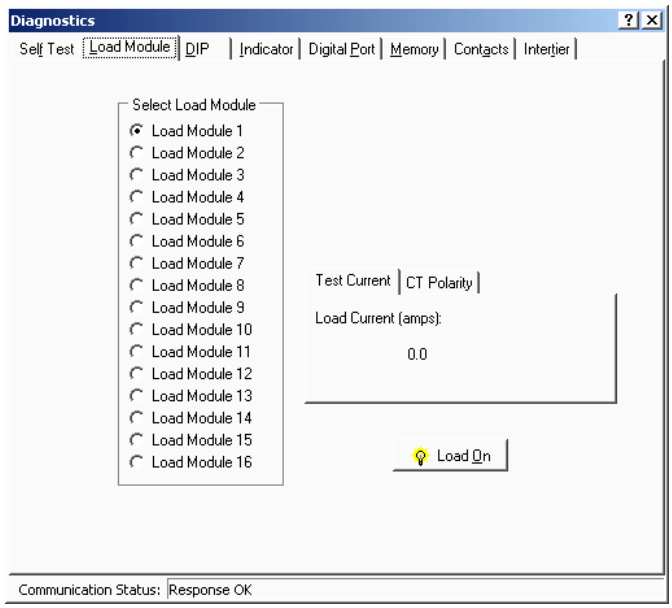


Figure 116. Diagnostics - Load Module - Test Current (MPM)

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

26.4. DIP Switch (MPM)

String View > Diagnostics|DIP Switch

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. This diagnostic allows remote checking of switch settings. To open the diagnostic, select DIP Switch. 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.

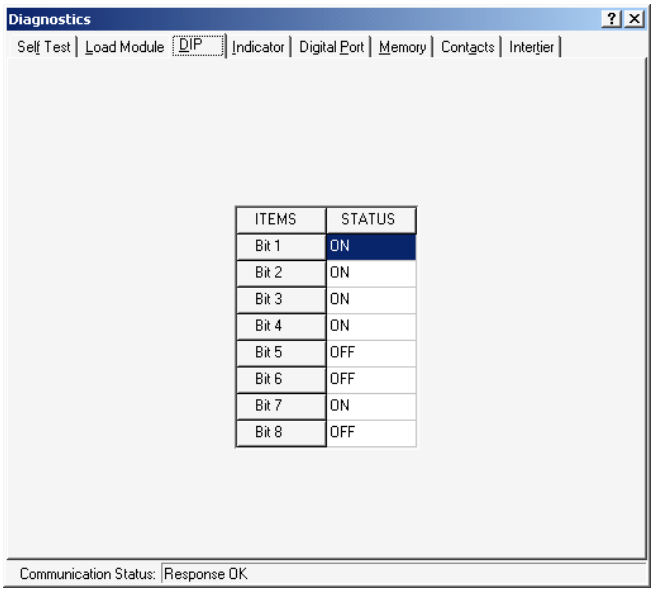


Figure 117. Diagnostics - DIP Switch (MPM)

26.5. Indicator (MPM)

String View > Diagnostics|Indicator

This diagnostic tests front panel LED operation. To open Indicator Diagnostics, select Indicator. To activate an LED, click an LED name then On.

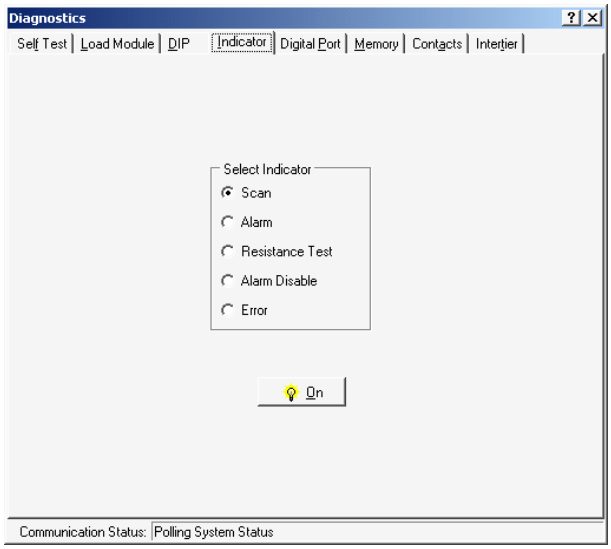


Figure 118. Diagnostics - Indicator (MPM)

26.6. Digital Port (MPM)

String View > Diagnostics|Digital Port

The Digital Port diagnostic checks the status of the digital inputs. If the system is connected to external contacts, this diagnostic can check each contact. To open Digital Port Diagnostics, select Digital Port. The screen displays the status of the inputs. An ON status means a contact is closed.

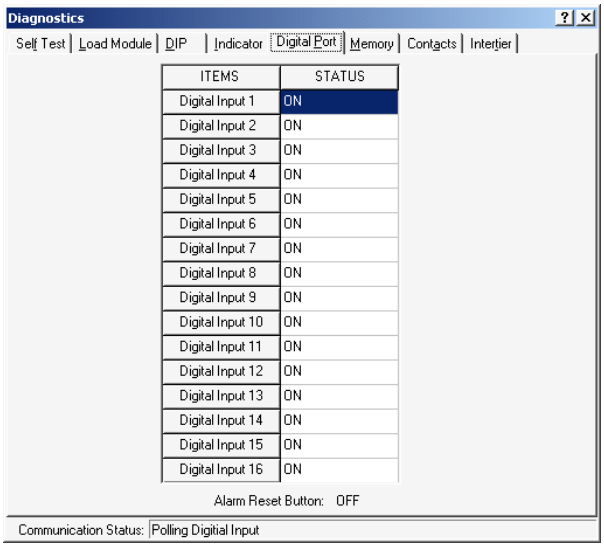


Figure 119. Diagnostics - Digital Port (MPM)

26.7. Memory (MPM)

String View > Diagnostics|Memory

To open Memory Diagnostics, select Memory.

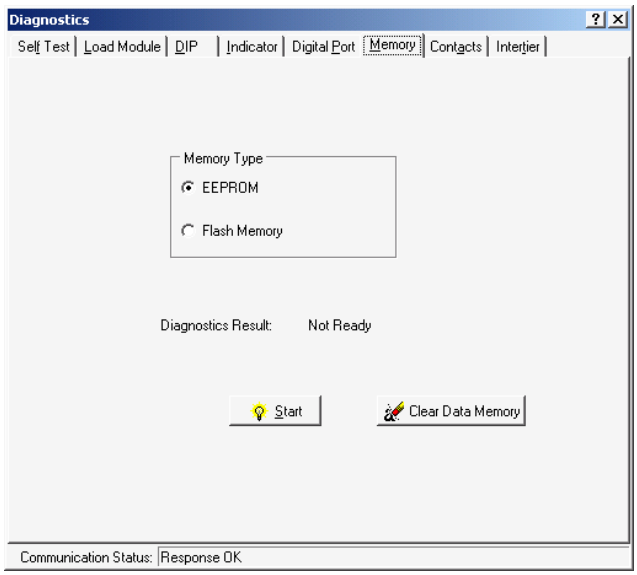


Figure 120. Diagnostics - Memory (MPM)

The Memory diagnostic checks nonvolatile monitor memory: E^2 (EEPROM) and Flash. E^2 memory stores calibration and setup information and data, such as Discharge, Alarm and Resistance test data. Flash memory stores MPM firmware uploads. Firmware can be upgraded on-site or remotely via modem.

To test memory, select **EEPROM** or **Flash Memory**, then click **Start**. During EEPROM testing, communication is briefly lost, then a status result indicates pass or fail. During Flash Memory testing, the integrity of the upgraded firmware file is checked; after clicking Start, select a file to compare to the contents in Flash memory. Flash testing takes several minutes.

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

26.8. Contacts (MPM)

String View > Diagnostics|Contacts

This diagnostic checks the external alarm contacts, charger contacts, and optional contacts for proper connection. To open Alarm Contacts Diagnostics, select Contacts. Under Select Contact, click Parameter Alarm, Charger Control or Contact 1, 2 or 3, then click On. You can confirm contact operation by verifying a device connected to the contacts turns on and off.

CAUTION: The charger contact turns the charger off until it is re-energized or until the diagnostic is exited.

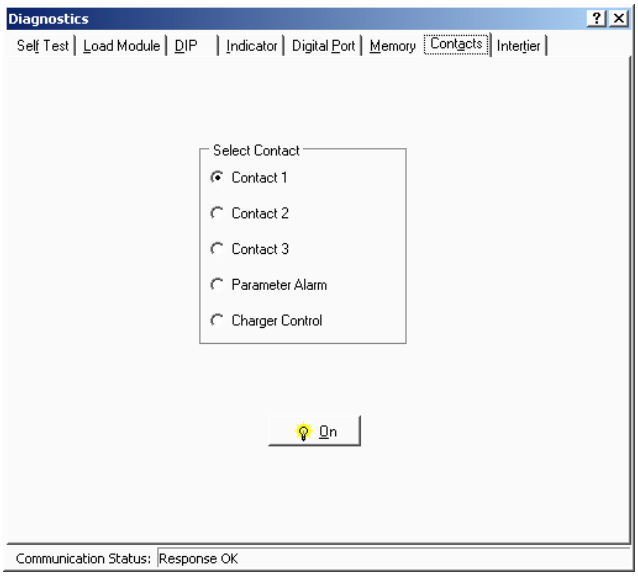


Figure 121. Diagnostics - Alarm Contacts (MPM)

26.9. Intertier (MPM)

String View > Diagnostics|Intertier

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 Intertier.

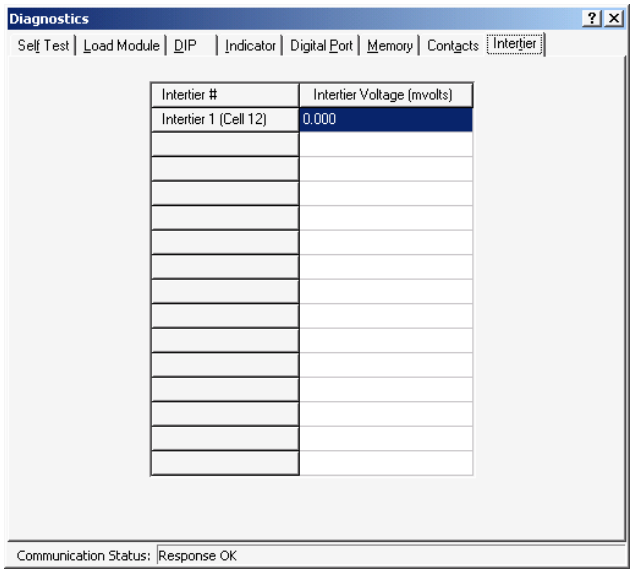


Figure 122. Diagnostics - Intertier (MPM)

You may define up to eight intertiers for the MPM 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).

27. BDS Diagnostics

String View > Diagnostics|*Item*

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

27.1. Rebooting and Power Up Diagnostics (BDS)

String View > Setup|Reboot Firmware

To reboot the BDS from the Data Manager, select Reboot Firmware. This does a "warm reset" of the BDS. At power-up, the unit performs diagnostics for about two minutes. If a failure occurs, identify the failing parameters by using the *Self Test* diagnostic.

27.2. Self Test (BDS)

String View > Diagnostics|Self Test

Self Test reads BDS and DCM status registers and displays the parameter status on the 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.

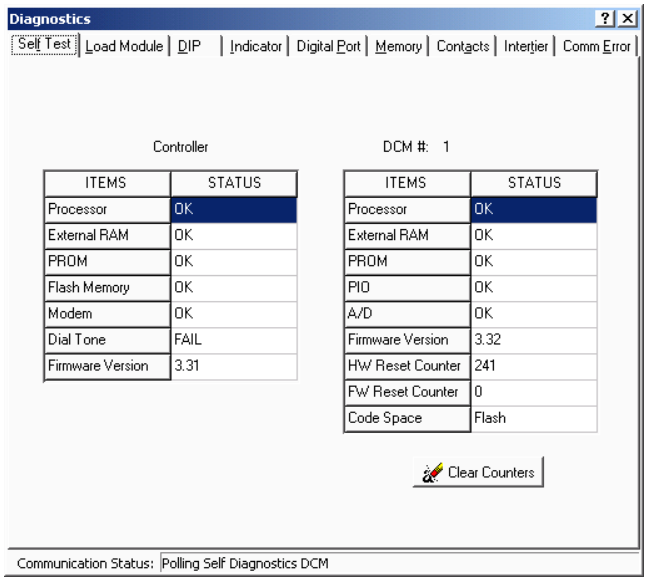


Figure 123. Diagnostics - Self Test (BDS)

Items in the Self Test Diagnostics box are described below alphabetically. If available, click the left or right arrows to view settings for other DCM units.

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

Code Space (DCM) - 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.

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

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

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

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

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.

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

Modem (BDS Controller) - Verifies the modem echoes commands.

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

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

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

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

27.3. Load Module (BDS)

String View > Diagnostics|Load Module

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.

The Load Module also has a diagnostic that can confirm the direction of the current transducer.

To test each load connection, open Load Module Diagnostics, select Load Module, then click the Test Current tab on the dialog box. Select the DCM for the desired load module. You can turn on each load step and confirm the current for that step.

IMPORTANT NOTE: If the screen displays only Load Module buttons 1 to 5, this indicates the DIP switch in the DCM is set so the internal load bank is selected. This is an incorrect state on newer DCM units. On older multiboard DCM units, this condition is normal if the unit actually has an internal load bank. Confirm the setting before proceeding. View the Diagnostics DIP screen. If Bank 2, Bit 1 Status is ON, this is incorrect for newer hardware. The ON status is valid only for older hardware with internal load banks.

WARNING: When testing, do not leave the load module on for a long time. The load module can overheat and damage hardware if not allowed to cool between tests. The load module automatically turns off after about 10 seconds.

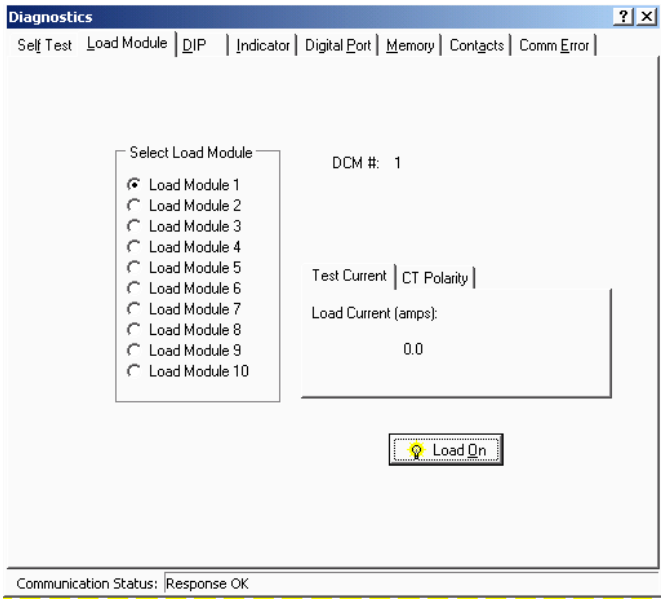


Figure 124. Diagnostics - Load Module - Test Current (BDS)

Under Select Load Module, select a load module, then click **Load On**. To stop the test, click **Load Off**. Click the arrows to select other DCM units.

To run the diagnostic that can confirm the direction of the current transducer (CT), click the CT Polarity tab on the dialog box. Select the DCM for the desired load module.

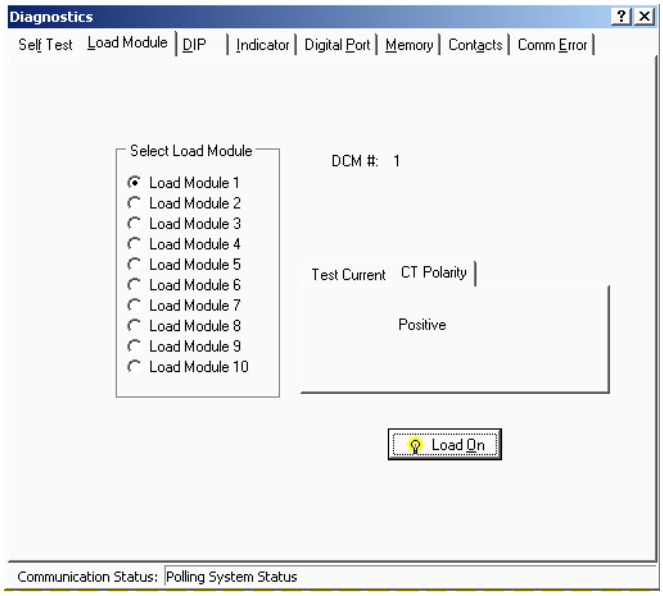


Figure 125. Diagnostics - Load Module - CT Polarity (BDS)

Under Select Load Module, select a load module, then click **Load On**. When the test finishes, the dialog box indicates Correct if the CT is oriented in the proper direction. If Incorrect is displayed, reverse the direction of the CT and perform the test again to confirm proper orientation.

27.4. DIP Switch (BDS)

String View > Diagnostics|DIP Switch

The DIP Switch diagnostic confirms each position of the DIP switches inside the BDS and DCM. This diagnostic allows remote checking of switch settings. To open the diagnostic, select DIP Switch. The diagnostic indicates each switch position. Click the left or right arrows to select other DCM units.

NOTE: The DIP switches are factory set and are not usually changed by the user.

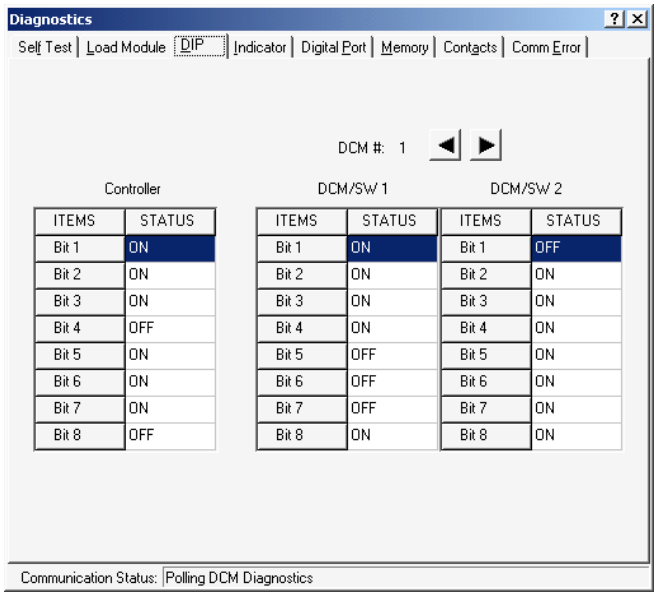


Figure 126. Diagnostics - DIP Switch (BDS)

27.5. Indicator (BDS)

String View > Diagnostics|Indicator

This diagnostic tests front panel LED operation. To open Indicator Diagnostics, select Indicator. To activate an LED, click an LED name then On.

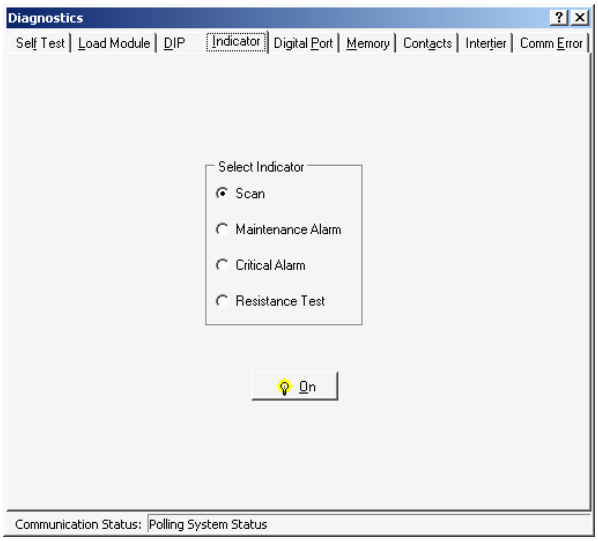


Figure 127. Diagnostics - Indicator (BDS)

27.6. Digital Port (BDS)

String View > Diagnostics|Digital Port

The Digital Port diagnostic checks the status of the digital inputs. If the system is connected to external contacts, this diagnostic can check each contact. To open Digital Port Diagnostics, select Digital Port. The screen displays the status of the inputs. An ON status means a contact is closed.

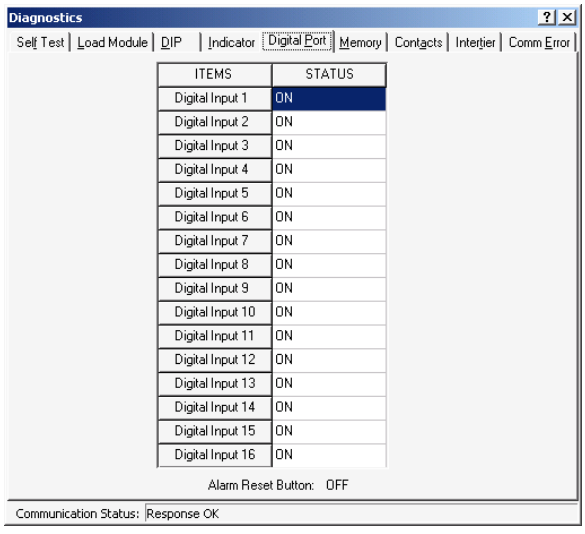


Figure 128. Diagnostics - Digital Port (BDS)

27.7. Memory (BDS)

String View > Diagnostics|Memory

To open Memory Diagnostics, select Memory.

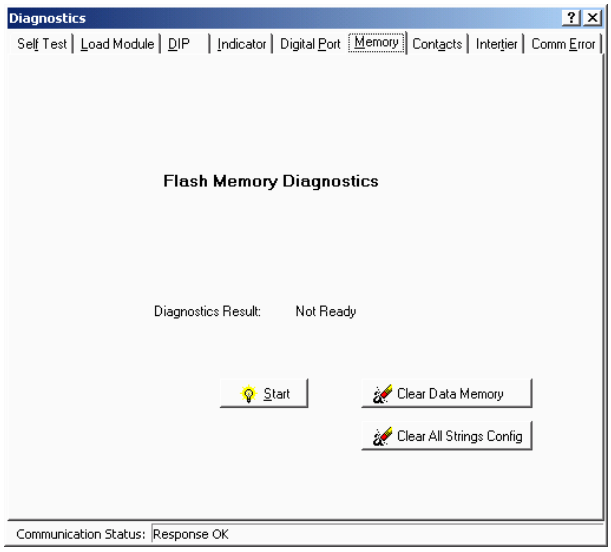


Figure 129. Diagnostics - Memory (BDS)

The Memory diagnostic checks Flash memory for the integrity of the upgraded firmware file. Flash memory stores BDS firmware uploads. Firmware can be upgraded on-site or remotely via modem. To run this test, click **Start** and select a file to compare to the contents in Flash memory. This test takes several minutes.

SRAM memory stores calibration and setup information and data, such as Discharge, Alarm and Resistance test data. To clear all measured data stored in nonvolatile SRAM memory, click **Clear Data Memory**. To clear configuration settings for all strings in the BDS Controller hardware, click **Clear All Strings Config**.

27.8. Contacts (BDS)

String View > Diagnostics|Contacts

This diagnostic checks the external critical and maintenance alarm contacts and the optional contacts for proper connection. To open Alarm Contacts Diagnostics, select Contacts. Under Select Contact, 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.

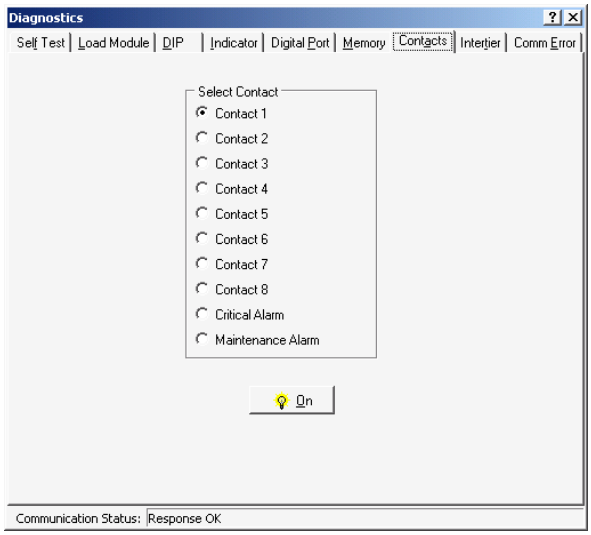


Figure 130. Diagnostics - Alarm Contacts (BDS)

27.9. Intertier (BDS)

String View > Diagnostics|Intertier

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 Intertier.

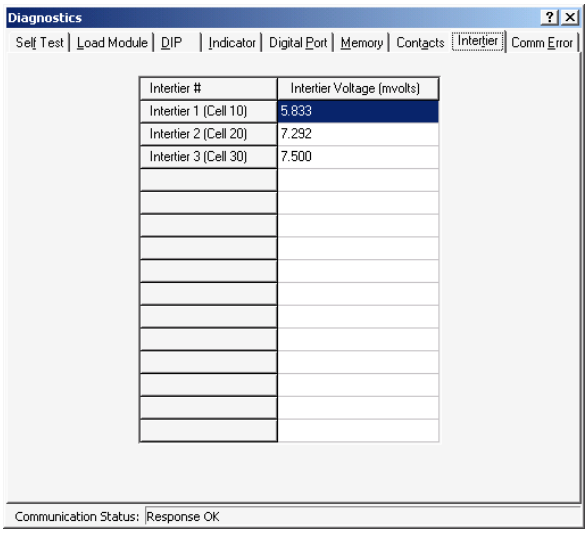


Figure 131. Diagnostics - Intertier (BDS)

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).

27.10. Communication Error (BDS)

String View > Diagnostics|DCM Comm Error

When communication integrity between the BDS and DCM fails, 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 area - Click **Start** 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 means 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.

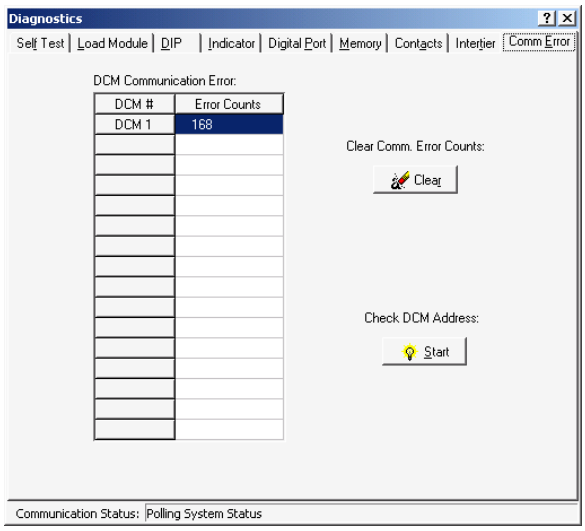


Figure 132. Diagnostics - Communication Error (BDS)

Clear Comm Error Counts area - Click **Clear** to reset the Error Counts values to zero.

27.11. Resistance Testing Multiple DCM Units

String View > Cell Resistance *or* Intercell Resistance *tab* > Diagnostics|R-Test in a DCM

A BDS resistance test checks all the DCM units connected to the BDS. To test a specific DCM, click the Cell Resistance or Intercell Resistance tab then select R-Test in a DCM. On the Select DCM box, click the button for the DCM you want to test. To capture new readings, click OK.

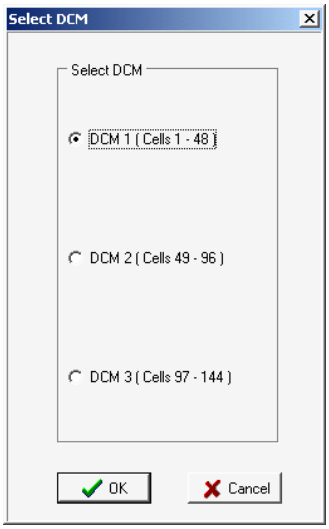


Figure 133. Select DCM

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

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

After a few minutes, 'test in progress' 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 intertier values measured. To stop the test before completion, click **Stop**.

Diagnostics does not transfer resistance readings to the permanent database. Be certain to record the needed results before closing these screens.

28. Upgrades

String View > Setup|Upgrade Firmware *or* Upgrade DCM Firmware

E^2 (electrically erasable) memory on the MPM and SRAM memory on the BDS Controller store calibration, setup information, and actual test data. On both units, flash memory is 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.

The latest upgrades and upgrade instructions are on the Web at www.vertivco.com.

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

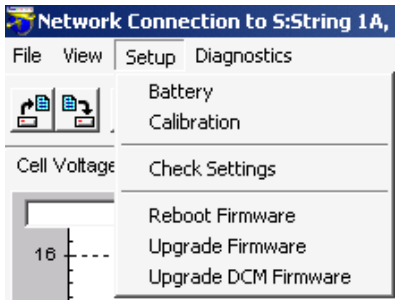


Figure 134. Setup Menu Showing Upgrade Options (BDS)

29. Commissioning Assistant

View|Reports|Commissioning Report

The Commissioning Assistant creates a report that is extremely helpful if technical support must be provided for your system. Similar to a setup wizard, the assistant helps you commission a string by instructing you to perform certain functions and record the results. You may also use the assistant to exchange equipment and recommission the string. Some assistant screens appear only if certain equipment or options are selected.

NOTE: Each commissioning assistant screen has complete instructions at the top of the screen. The instructions in this chapter are only meant to supplement the instructions on the screens. Be certain to follow the instructions on each screen.

After completing the commissioning assistant, send the saved report with a file name **.CMS** extension as an email attachment. Emailing the report to startup@vertivco.com is mandatory, as the report is an integral part of the product warranty.

29.1. Starting the Assistant for a New String

Connecting to a string for the first time opens the commissioning assistant Welcome screen.

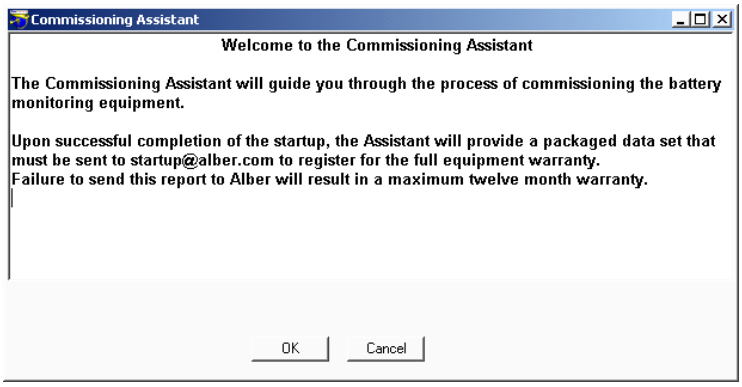


Figure 135. Commissioning Assistant Welcome

To commission the string, click OK on the Welcome screen to display the MPM or BDS Monitor Pre-Power Check List. If you click Cancel, the Welcome screen displays until you acknowledge the Pre-Power Check List or you click the Existing System Ignore button.

29.2. Monitor Pre-Power Check List

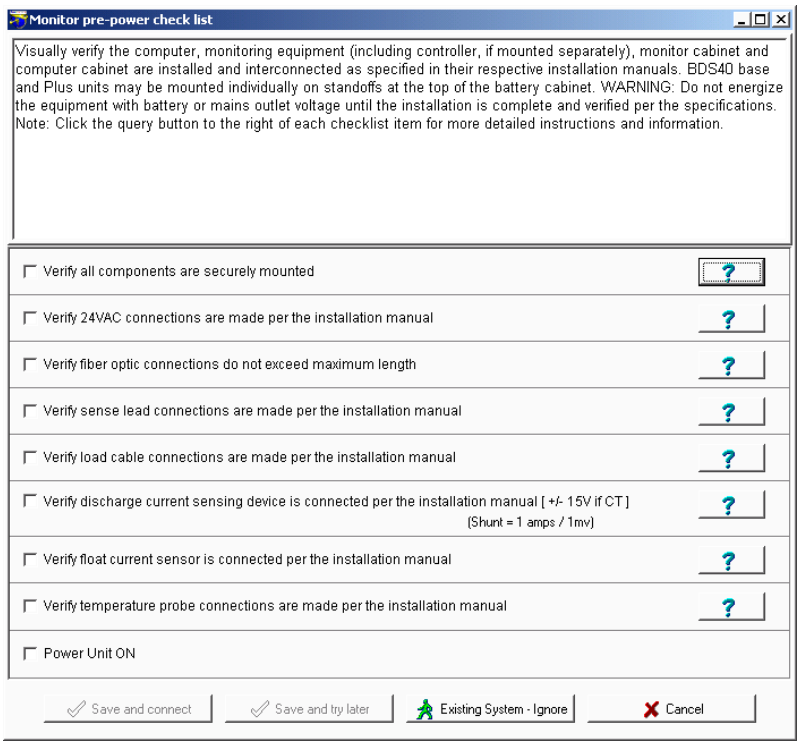


Figure 136. Monitor Pre-Power Screen (typical)

The text at the top of the Monitor Pre-Power Check List depends upon the Help (question mark) button clicked. The screen is similar for the MPM and BDS monitors. As you complete each item, check the box before the item. When all boxes are checked, connect to the string by clicking the Save and Connect button. To save a partially completed check list and connect later, click Save and Try Later.

If the string was previously commissioned, click Existing System - Ignore to connect to the string. The remaining commissioning assistant screens will not appear.

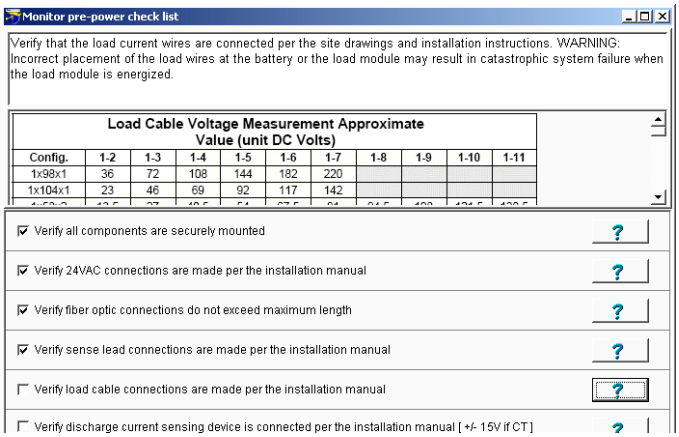


Figure 137. Monitor Pre-Power Load Cable Help Screen

To display a table that shows the voltages between the load cables for configurations, click the question mark on the "Verify load cable connections are made…" line.

29.3. Starting the Assistant for an Existing String

View|Reports|Commissioning Report

This section describes how to start the assistant for a string that is partially or fully commissioned or for which you want to exchange equipment. To open the assistant, first connect to the string. On the String View screen, select View|Reports|Commissioning Report to display one of the Open Commissioning Assistant screens. These screens appear for a commissioned string or a partially commissioned string if Continue Later was clicked during a commissioning session.

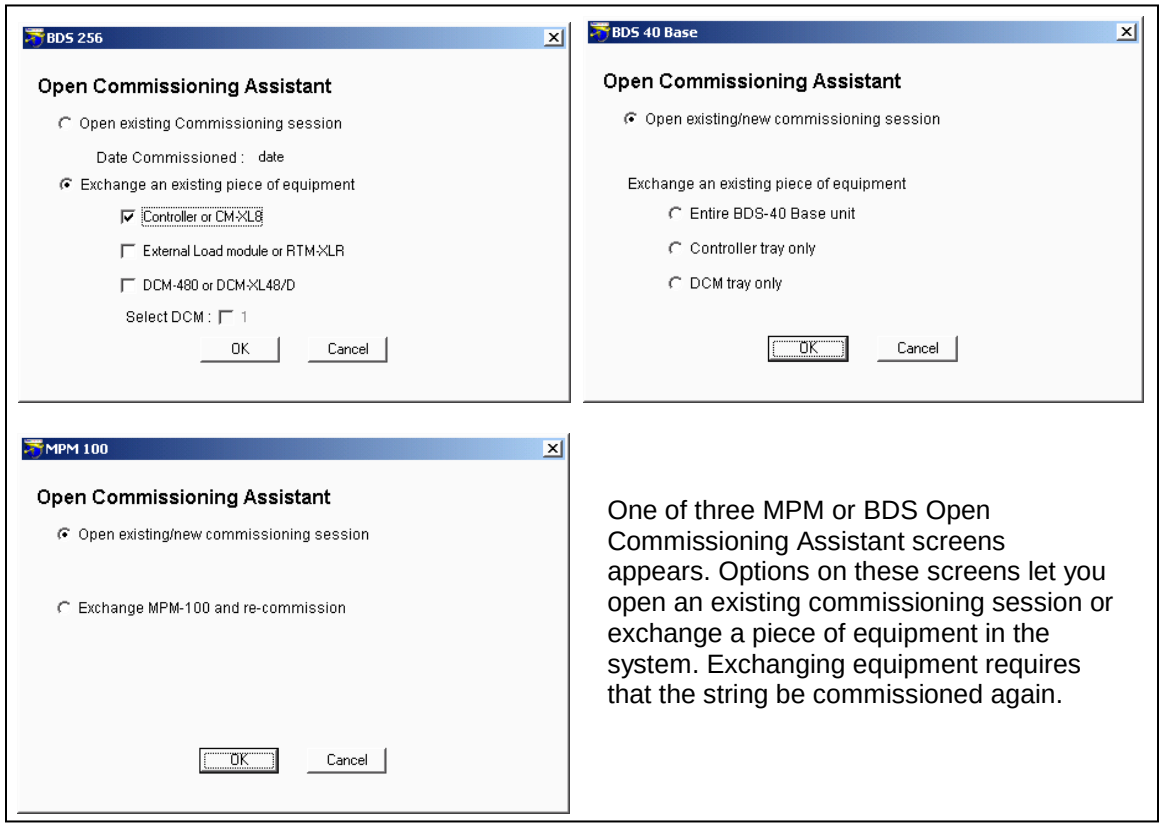


Figure 138. Open Commissioning Assistant

To continue with a session, click the Open Existing/New Commissioning Session option button then click OK. If replacing hardware on a previously commissioned string, click the Exchange Equipment option button, then check a box for the equipment being exchanged. For units with multiple DCM's, select the appropriate DCM check box. After making selections, click OK.

29.4. Completing the Commissioning Assistant

After opening the commissioning assistant, complete the remaining screens as described in the following sections.

29.4.1. Commissioning Agent Screen

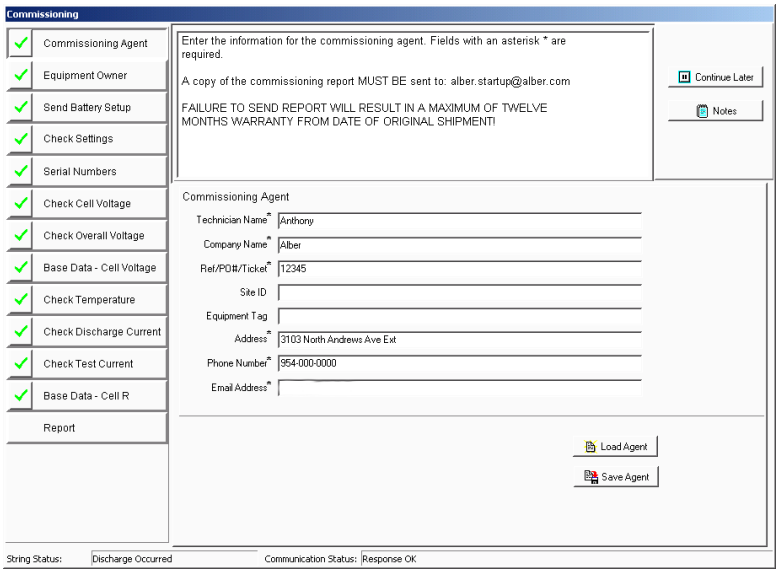


Figure 139. Commissioning Agent (Comm Asst)

Click the Commissioning Agent button. Complete the following fields: Technician Name, Company Name, Reference/PO No./Ticket No., Site ID, Equipment Tag, Address, Phone Number, and Email Address. Note that fields for which information is mandatory are marked with an (*) asterisk.

To save the technician name, company name, address, telephone number, and email address for future commissioning reports, click Save Agent. To place previously saved agent data into these fields, click Load Agent. You may save only one set of agent data.

To add a note to the report, click the Notes button, type the text into the Agent Notes dialog box, then close the box. The text will appear in the Agent Notes section in the report. The Notes button on the other screens accesses this same Agent Notes dialog box.

29.4.2. Equipment Owner Screen

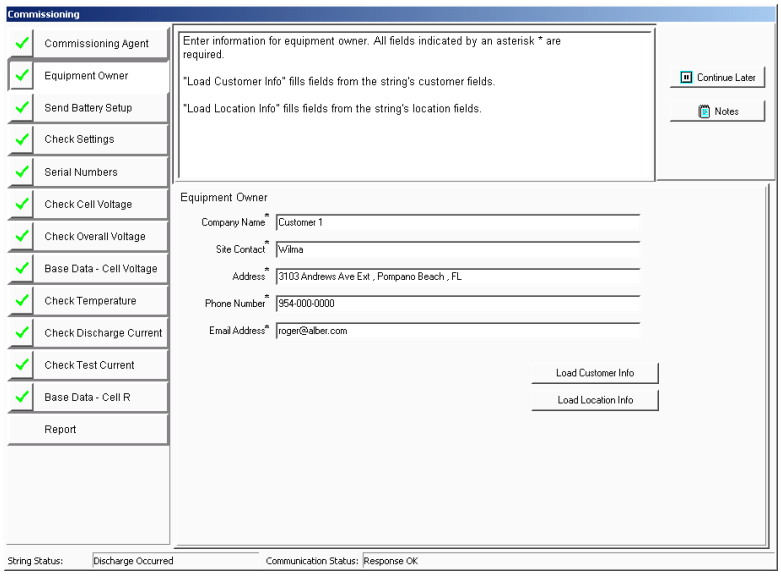
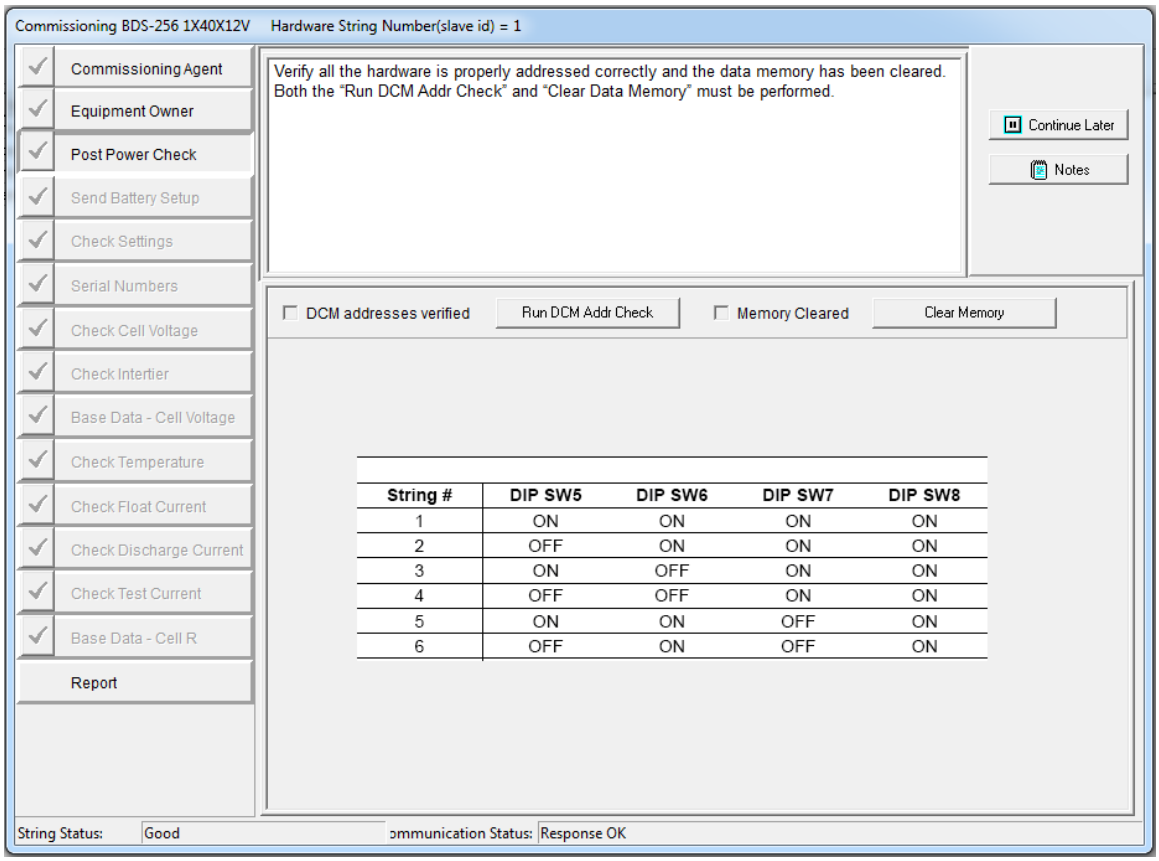


Figure 140. Equipment Owner (Comm Asst)

Click the Equipment Owner button. Complete the following fields: Company Name, Site Contact, Address, Phone Number, and Email Address. Note that fields for which information is mandatory are marked with an (*) asterisk. Optionally, to load the data saved under Setup|System|Customer or under Setup|System|Location into the fields, click the Load Customer Info or Load Location Info buttons.

29.4.3. Post Power Check Screen



String #	DIP SW5	DIP SW6	DIP SW7	DIP SW8
1	ON	ON	ON	ON
2	OFF	ON	ON	ON
3	ON	OFF	ON	ON
4	OFF	OFF	ON	ON
5	ON	ON	OFF	ON
6	OFF	ON	OFF	ON

Figure 141. Post Power Check Screen (BDS-256 only) (Comm Asst)

Click the Post Power Check button. Verify the DCM addresses by clicking "Run DCM Addr Check" button then, at the "Running DCM Address Check" message click **Yes** to check all DCM addresses. Also, clear the data memory by clicking the "Clear Memory" button then, at the "Clear Monitor Memory" message click **Yes** and the memory is cleared. After verification, the DCM Addresses Verified box is automatically checked.

Note: The MPM does not have dip switch settings.

29.4.4. Send Battery Setup Screen

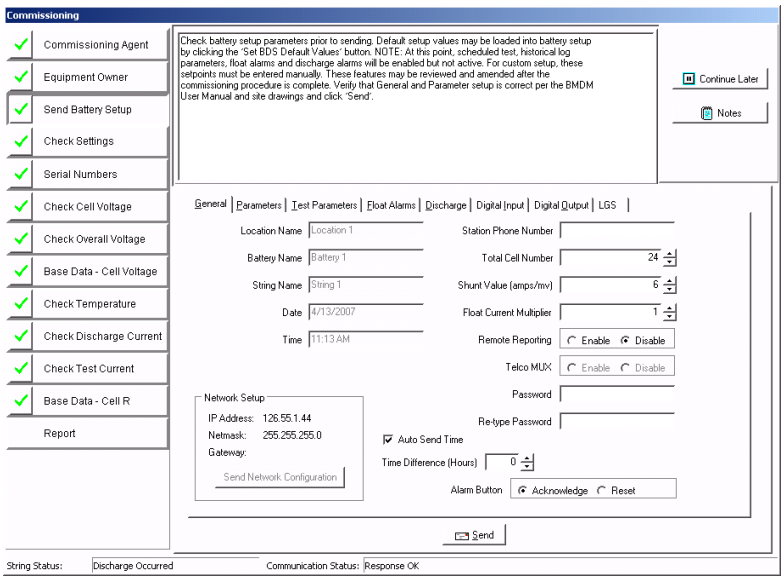


Figure 142. Send Battery Setup (Comm Asst)

Click the Send Battery Setup button. Verify the values displayed on the screen, make changes if necessary, then click Send to transfer the settings to the monitor. Note that event recording is ignored and the system doesn't alarm during commissioning. Alarms are disabled until the base resistance thresholds are sent. If using string current for discharge detection, the minimum value that can be entered is 5 percent of the shunt value.

29.4.5. Check Settings Screen

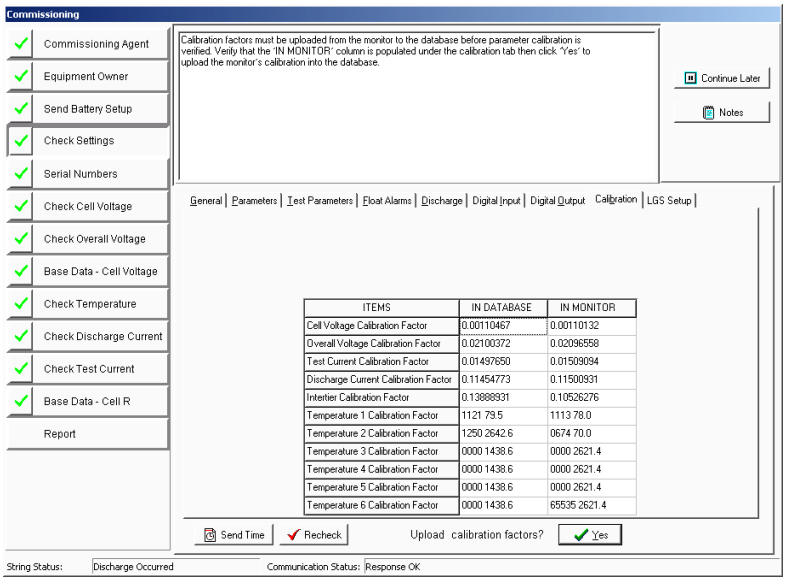


Figure 143. Check Settings (Comm Asst)

Click the Check Settings button. Confirm the values, then click Yes to upload the calibration constants from the monitor to the database. If you click Recheck, the screen refreshes. NOTE: Only the calibration constants are uploaded.

29.4.6. Serial Numbers Screen

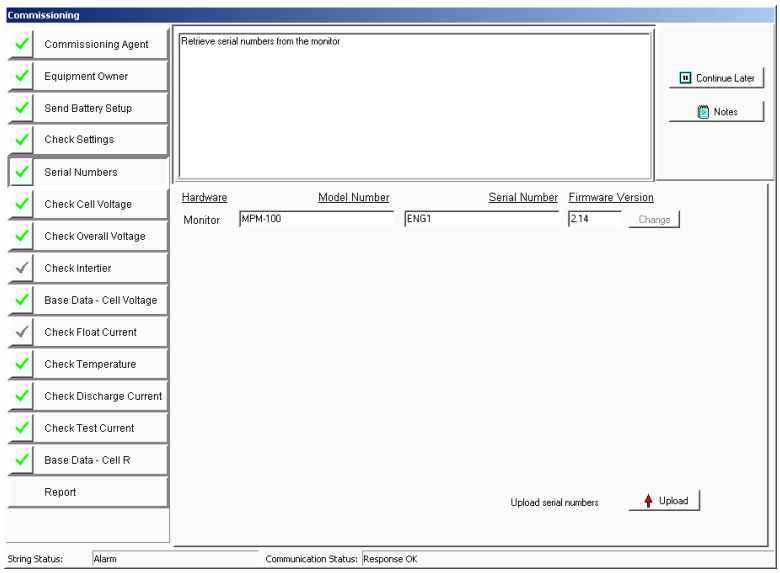


Figure 144. Serial Numbers (Comm Asst)

Click the Serial Numbers button. To upload the serial numbers and firmware revisions from the connected hardware, click the Upload button. If the data is incorrect, click in the field to type the correct data and click the Change button to send the data to the hardware. The RTM and ELM serial numbers must be typed in manually.

29.4.7. Check Cell Voltage Screen

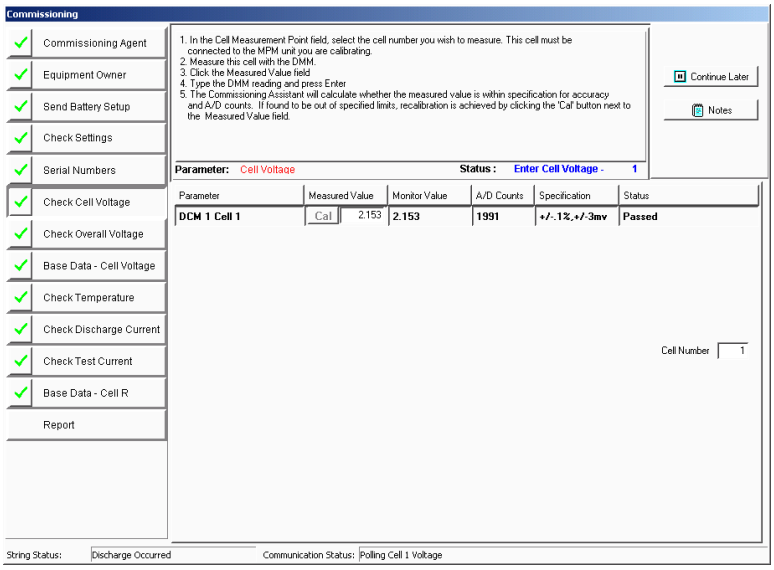


Figure 145. Check Cell Voltage (Comm Asst)

Click the Check Cell Voltage button. Measure the voltage across the cell indicated, type the value in the Measured Value field, then press <Enter>. If the measured value agrees with the calculated value in the monitor, the Status area indicates Passed. If it fails, calibrate the monitor to the measured value by clicking the Cal button. Note that, if there is a more convenient cell to measure, you may change the Cell Number to any cell within the DCM.

29.4.8. Check Overall Voltage Screen

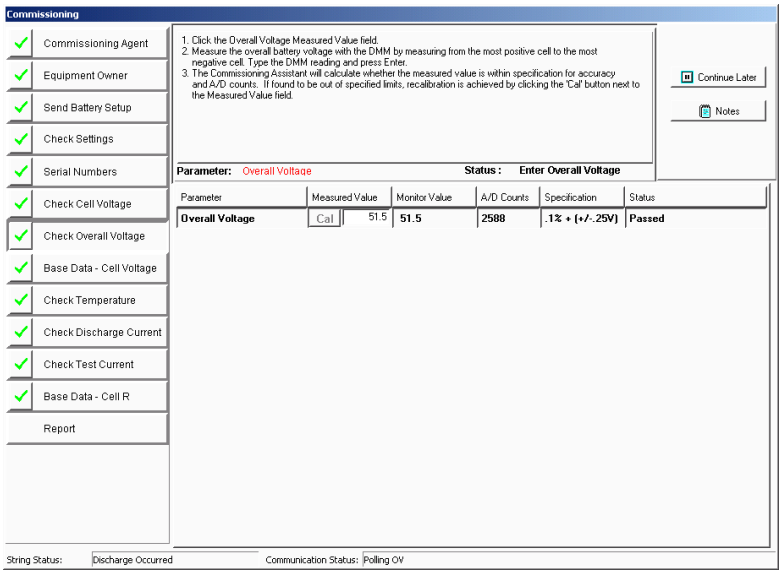


Figure 146. Check Overall Voltage (Comm Asst)

Click the Check Overall Voltage button. (Not used with BDS-40.) Measure the overall voltage, type the value in the Measured Value field, then press <Enter>. If the measured value agrees with the calculated value in the monitor, the Status area indicates Passed. If the measured value fails, calibrate the monitor to the measured value by clicking the Cal button.

29.4.9. Check Intertier Screen

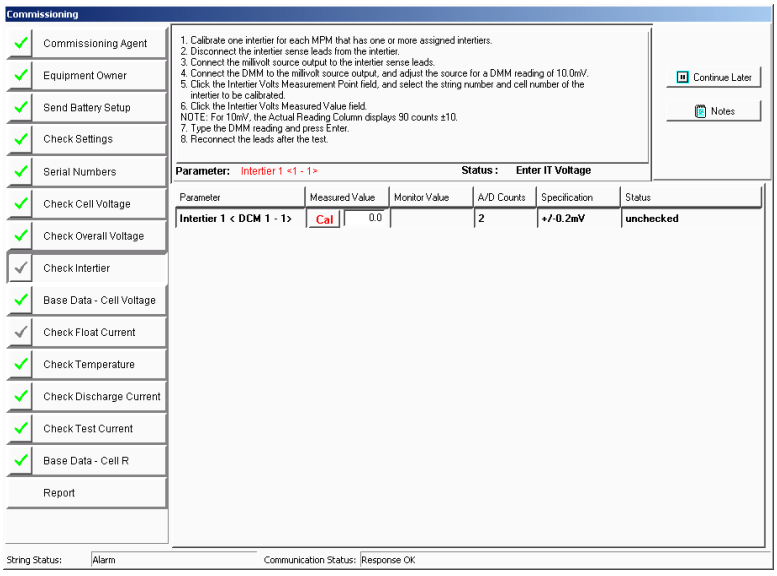


Figure 147. Check Intertier (Comm Asst)

Click the Check Intertier button. Measure the intertier voltage, type the value in the Measured Value field, then press <Enter>. If the measured value agrees with the calculated value in the monitor, the Status area indicates Passed. The list dynamically changes to show all intertiers and charger cables. You only have to verify one intertier per DCM. If the measured value fails, calibrate the monitor to the measured value by clicking the Cal button.

29.4.10. Base Data - Cell Voltage Screen

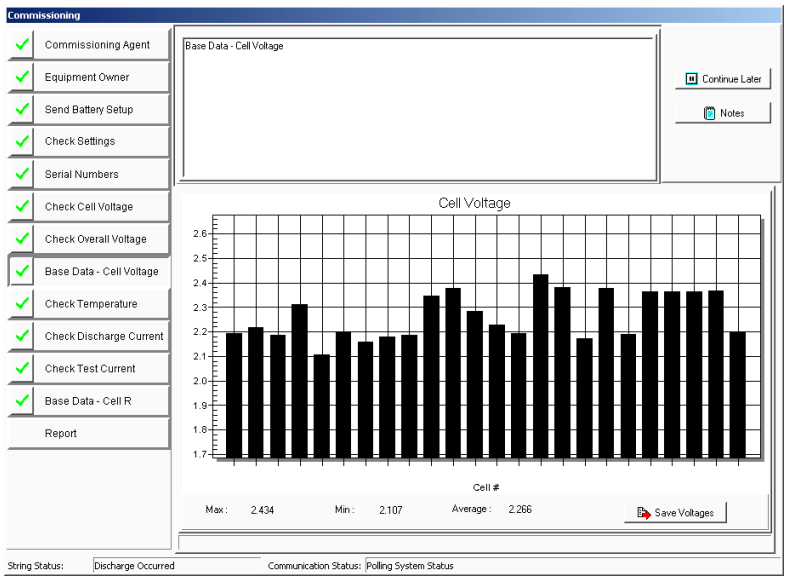


Figure 148. Base Data - Cell Voltage (Comm Asst)

Click the Base Data - Cell Voltage button. Data on this screen readily identifies wiring problems. To save the data, click the Save Voltages button. The voltage data is saved as the baseline float voltage readings, and the baseline voltages appear in the commissioning report.

29.4.11. Check Float Current Screen

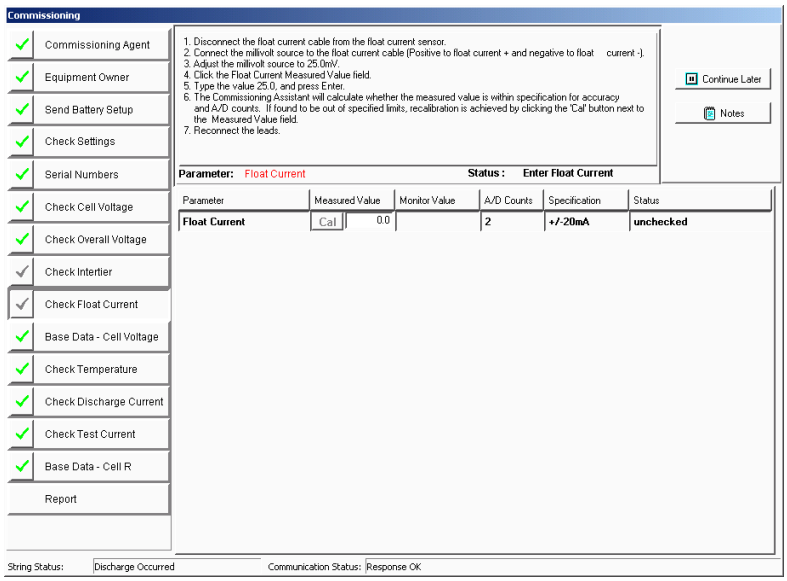


Figure 149. Check Float Current (Comm Asst)

Click the Check Float Current button. Type the float current value in the Measured Value field, then press <Enter>. If the measured value agrees with the calculated value in the monitor, the Status area indicates Passed. If the measured value fails, calibrate the monitor to the measured value by clicking the Cal button.

29.4.12. Check Temperature Screen

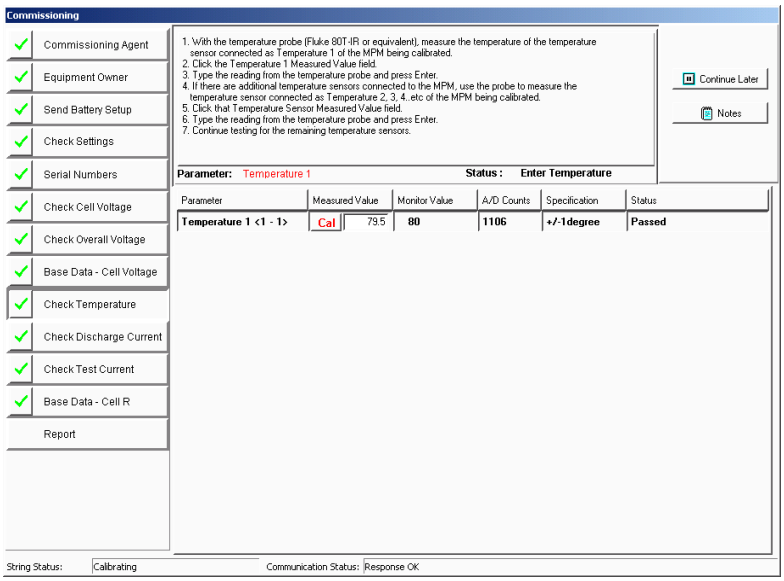


Figure 150. Check Temperature (Comm Asst)

Click the Check Temperature button. Type the ambient temperature value in the Measured Value field. If the measured value agrees with the calculated value in the monitor, the Status area indicates Passed. If the measured value fails, calibrate the monitor to the measured value by clicking the Cal button.

29.4.13. Check Discharge Current Screen

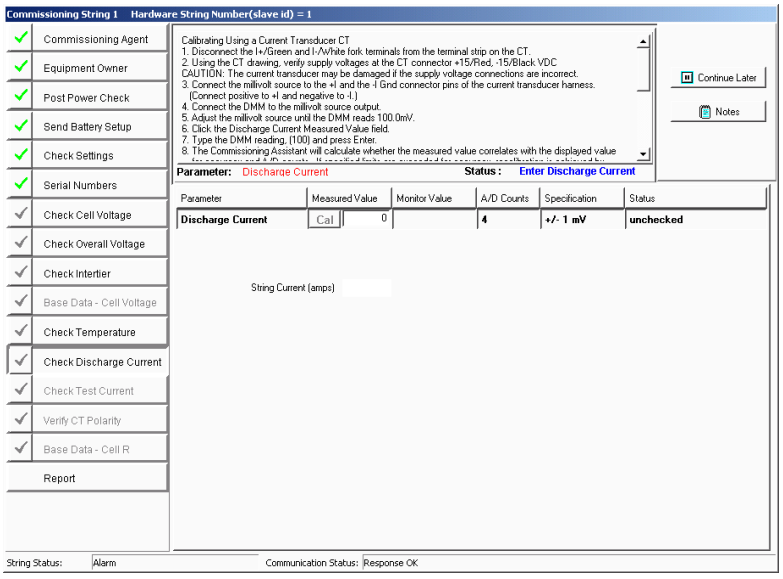


Figure 151. Check Discharge Current (Comm Asst)

Click the Check Discharge Current button. Verify the ±15VDC voltage supply is connected to the current transducer. Type the discharge current value in the Measured Value field. The String Current (amps) field displays the millivolt value times the shunt value as amps. If the measured value agrees with the calculated value in the monitor, the Status area indicates Passed. If the measured value fails, calibrate the monitor to the measured value by clicking the Cal button.

29.4.14. Check Test Current Screen

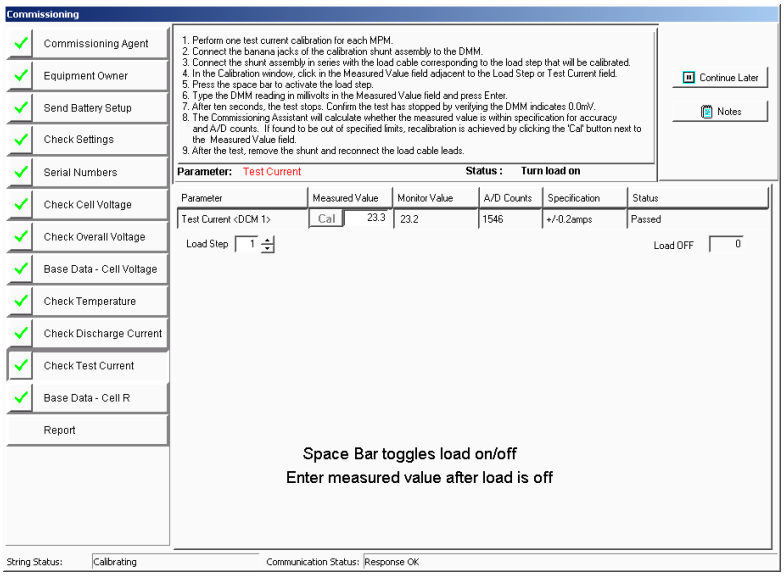


Figure 152. Check Test Current (Comm Asst)

Click the Check Test Current button. Before running this test, verify that all the voltages across the load wires are correct. Failure to do this may result in severe damage to the load module.

Select a load step from the Load Step spin box. Press the <Space Bar> to turn on the load, and measure the load current. Type the value in the Measured Value field, then press <Enter>. If the measured value agrees with the calculated value in the monitor, the Status area indicates Passed. If the measured value fails, calibrate the monitor to the measured value by clicking the Cal button.

29.4.15. Check Intercell Screen (BDS Only)

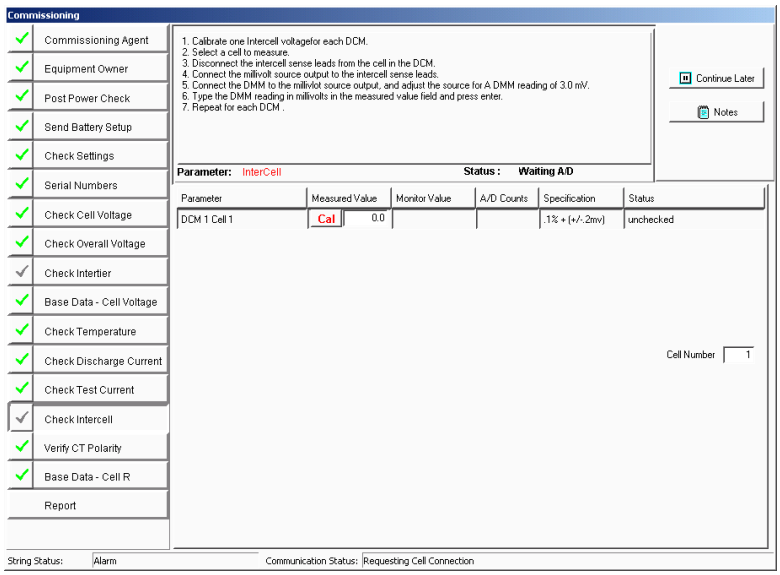


Figure 153. Check Intercell (Comm Asst)

Click the Check Intercell button. In the Cell Number box, type the cell number for the cell you wish to measure. This is only for dual reading systems, such as the BDS-256XL.

29.4.16. Base Data - Cell Resistance Screen

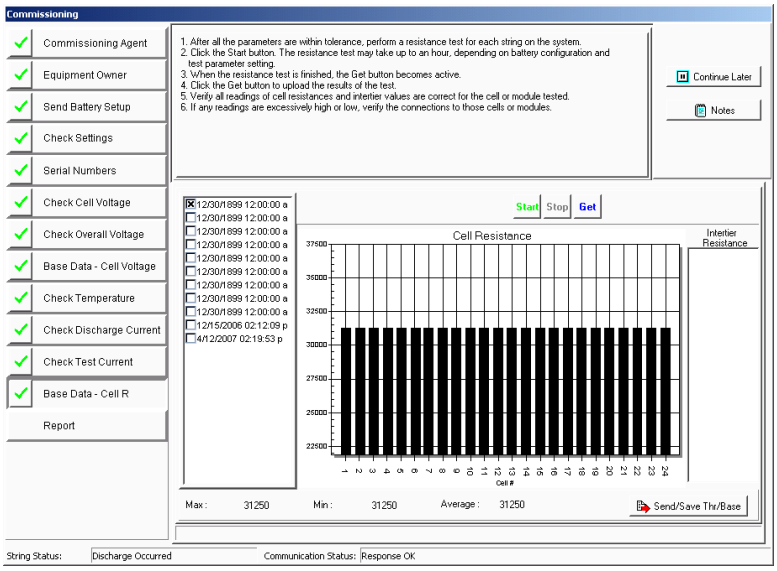


Figure 154. Base Data - Cell Resistance (Comm Asst)

Click the Base Data Cell R button. If necessary, click the Start button to perform a resistance test. Then, check a box in the left column to select a test that will be used to establish alarm levels and be stored as baseline data. Click the Send/Save/Thr/Base button. On the next screen, accept the defaults or make changes if required, then click OK.

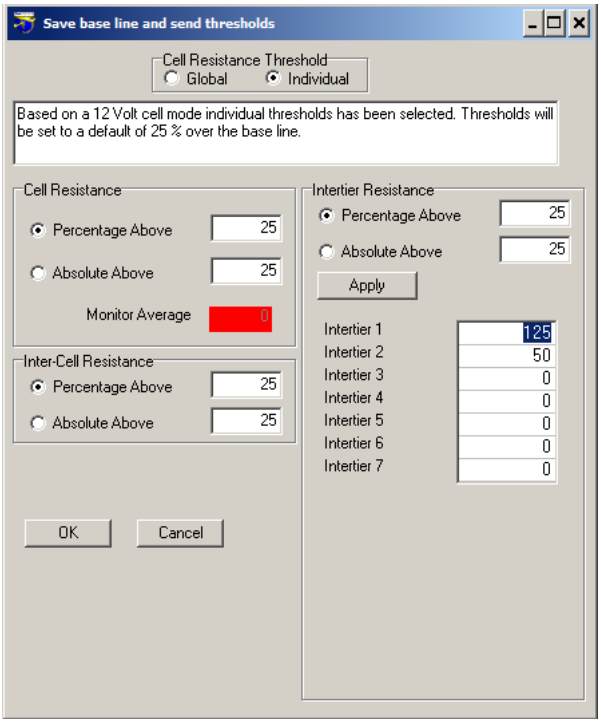


Figure 155. Save Base Line and Send Thresholds Data – Cell/Intertier/Inter-Cell Resistance (Comm Asst)

Based on a 12 volt cell mode, individual threshholds have been selected.
Note: Thresholds will be set to a default of 25 percent over the base line.
When making changes to the Intertiers, click **Apply** to save the updated values.

29.4.17. Report Screen

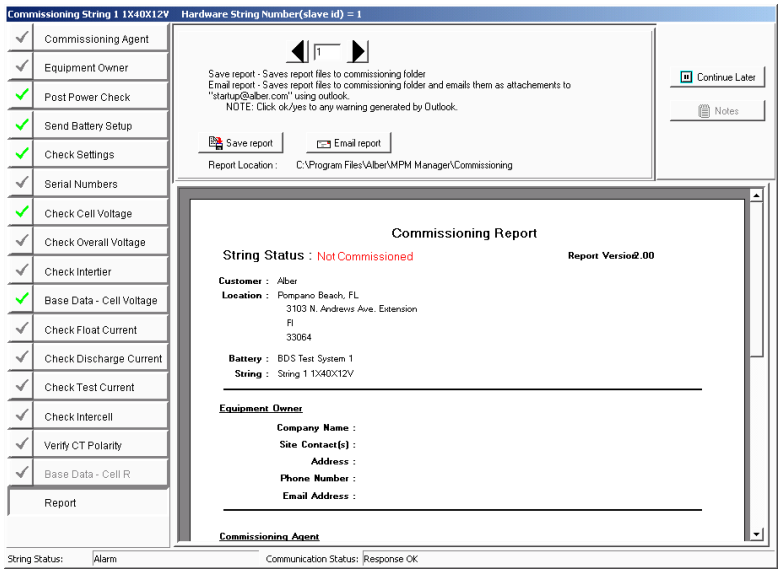


Figure 156. Report (Comm Asst)

Click the Report button. Text on the screen displays the path and folder where the report is saved. To view pages in the report, click the left or right arrows. To save the report as a CMS file in the Commissioning folder, click Save Report. To save and email the report to Alber, click the Email Report button. The CMS file is password protected and cannot be opened.

29.4.18. Preventive Maintenance Report Form

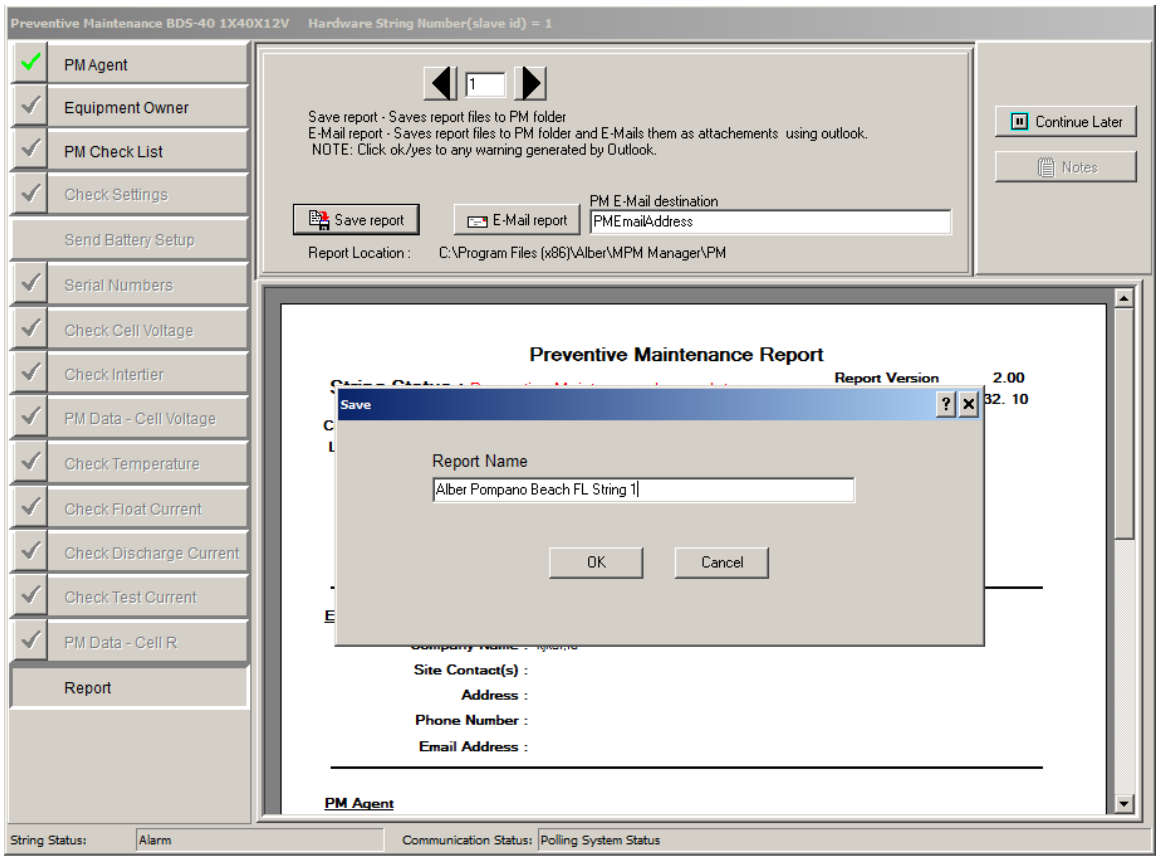


Figure 157. Report (Preventive Maintenance) Form

The Preventive Maintenance Report saves customer data by default in the following fields:

- Equipment Owner name
- Site ID
- Ref PO # Ticket
- Equipment Tag

The field names can be modified on the form. The modified field names from the form will show the new names in the report name.

Once the new field names are entered, click **Save Report**.

Click **OK** to save the new preventive maintenance report.

29.5. Emailing a Report

The completed Commissioning Agent report must be sent to Alber as an email attachment for warranty and customer service purposes. To send the report, open your email editor and attach the report CMS file to the email. The CMS file resides in the Program Files\ Alber\MPM Manager\Commissioning folder. In the subject line, type "BMDM commissioning report" or similar text. In the email, note your company name and contact information. Send the email with the CMS file to startup@vertivco.com.

29.6. Retrieving a Commissioning Report

View|Reports|Commissioning Report

To view a report, connect to the string then click View|Reports|Commissioning Report on the Main Menu. Do not edit completed report screens unless the string is being commissioned again.

29.7. Printing a Commissioning Report

The completed CMS report file cannot be printed. However, there are two printing options.

A PDF file stored in the same Commissioning folder as the CMS file can be printed as a one page document. This summary report is immediately accessible upon partial or full commissioning of a string. The file name starts with CAR and ends with PDF. The printed page can serve as confirmation that the string was commissioned.

After Alber receives a complete CMS commissioning file, Alber generates a PDF file of the report and emails it back to the originator. This PDF file, which may be printed, is a multipage document that details the commissioning of the system.

30. Error Codes

The following error messages may appear when running the BMDM program.

CODE	MESSAGE	SITUATION
1	The database cannot be saved. Hard drive could be full.	When copying a database to a working database
2	Empty database not found.	When backing up a database
5	Database Not Found. <Database File Name>	When opening a database
6	Data import error (DDetail Table). Please try again.	When importing discharge data
7	Data import error (DSummary Table). Please try again.	When importing discharge data
100	The name chosen has already been used. It must be unique.	The user set up two locations using the same name or ID
101	There are more than 1000 strings.	In the local computer, there are more than 16 locations set up.
102	Location name, battery name and string name do not match. Actual location name is <LocationName>. Actual battery name is <BatteryName>. Actual string name is <StringName>.	In direct connection, compare location ID in monitor and in database
103	SERVICE cannot be deleted.	The user tries to delete Service location
104	Invalid name.	Input invalid location name in location setup
105	String not found in <Database table name>.	Search location
106	String ID not found in <Database table name>.	Search location
107	The telephone number of string <StringName> is not set.	
108	The pager number of string <StringName>is not set.	
109	Number of strings or configuration is not set properly.	
110	You have to setup customer info before setup location info.	
111	You have to setup location info before setup battery info.	
112	You have to setup battery info before setup string info.	
113	Location name, battery name and string name do not exist. Location name is <LocationName>. Battery name is <BatteryName>. String name is <StringName>.	
114	Invalid input.	
115	The number of data set is <SetNum>. More than one data set must exist before a trending analysis can be performed.	
116	Invalid IP address.	
117	Invalid netmask address.	
118	Invalid gateway address.	
200	No response on Polling/Answer Port Modem.	When initializing modem
201	No response on Answer Port Modem.	When initializing modem
202	The currently selected COM Port, COM <ComPortNum>, does not exist. Press OK and choose a different port.	When initializing COM port

CODE	MESSAGE	SITUATION
203	The currently selected COM Port, COM <ComPortNum>, is already in use by another program. Press OK and choose a different port.	When initializing COM port
204	The currently selected Com Port, Com <ComPortNum>, is not available. Press OK and choose a different port.	When initializing COM port
205	No response from Modem/Cable Multiplexer.	When connecting modem/cable multiplexer
206	Comm Error: No response for sending "Stop Scan" command 3 times.	
207	Comm Error: No response for sending "Start Scan" command 3 times.	
208	Comm Error: No response for sending "Load Off" command 3 times.	
209	Comm Error: No response for sending "Send DCM #" command 3 times.	
300	Upgrade failed: No response for sending code 3 times.	When sending frames
301	Upgrade failed: Not responding.	Check firmware location (PROM or flush memory) in the beginning of firmware upgrade
302	Upgrade failed: Code confirm failed.	
400	Resistance test failed: 60 minute time-out.	Manual R-test is not completed in 60 minutes
401	Data format error. The data may be saved for a different MPM configuration.	When reading resistance or historical data
402	The raw count equals 0. Please check hardware.	During calibration
403	Data import error (Encode date/time). Please try again.	When importing alarm data
404	Wrong overall voltage data.	Got invalid overall voltage in discharge data
405	Subset <SubsetNum> does not have an initial value.	When viewing discharge curves, found invalid subset
406	Subset <SubsetNum> does not have a final value.	When viewing discharge curves, found invalid subset
407	Discharge data cannot be shown due to invalid Date/Time.	
500	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
501	Two password entries are not identical. Please enter again.	
502	Password must have five characters.	
1000	The string name exists. It must be unique.	
1001	The battery name exists. It must be unique.	
1002	The location name exists. It must be unique.	
1003	The customer name exists. It must be unique.	

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