

BatteryShop Manual

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Getting started with Cadex BatteryShop 7.1

Welcome to Cadex BatteryShop

Cadex BatteryShop™, created by Cadex Electronics Inc., is a two-way Battery Maintenance System (BMS) for Microsoft® Windows® systems to control and monitor battery service operations using Cadex battery analyzers from a computer with the minimum required setup.

Cadex BatteryShop can be used with the following Cadex battery analyzers:

- Cadex 7000 C-Series with firmware version 1.10 or higher
- Cadex 7000 Series with firmware version 6.12 or higher
- Cadex 7000 using firmware version 3.53 or higher

Cadex BatteryShop is optimized for servicing and tracking batteries efficiently using one or more Cadex battery analyzers. The Cadex BatteryShop database contains C-Code parameters for hundreds of battery models, which can be called up, with a few clicks. New battery models can be added to the database as needed. Basic, specialty, or customized battery-service programs for the analyzers can be selected and run with ease.

The batch-servicing feature allows fast simultaneous servicing of hundreds of batteries of the same model. The database can also be set up to provide information about customers, manage service records and print out reports.

For management of battery fleets, each battery can be tagged with a unique ID that allows precise tracking and efficient data entry for servicing.

A bar code scanner can be used with Cadex BatteryShop's battery ID labels to input unique battery IDs or with the manufacturer's battery model label to input battery model information.

The contents of this manual are also available as online Help from within Cadex BatteryShop. Press F1 from most dialogs within BatteryShop to launch context-sensitive Help.

Computer Requirements

- Dedicated computer for Cadex BatteryShop (not used to run other programs)
- Windows XP Professional SP2 (32-bit) or Windows 2000 Professional SP4.
- 1 GHz or better CPU.
- 256 MB required for one connected analyzer; 512 MB required for more than one connected analyzer.
- At least 250 MB free hard drive space required after installing all software.
- One serial port for each Cadex battery analyzer. Cadex 7000 C-Series analyzers can also connect via USB port on the PC or via USB 2.0 hub connected to PC.
- If using USB 2.0 hubs, ensure that the USB 2.0 hubs have "Transaction Translator" support.
- Color monitor 1024x768 or better, 16-bit color minimum; mouse & keyboard.
- A standard printer is required for report printing and for correct operation of BatteryShop. Consider installing a [PDF Printer](#)¹ as the default printer if a standard printer is unavailable.
- A label printer is required for label printing. [DYMO](#)² LabelWriter is recommended for use with Cadex BatteryShop. Cadex recommended labels support a max. of 12 characters for barcode printing. For Battery IDs longer than 12 characters, the end-user must supply a label printer and labels with support for long Battery ID barcode printing.
- UPS device recommended when collecting real-time data.
- Web Update requires a working Internet connection.

Note: Cadex recommended labels support a maximum of 12 characters for barcode printing. For Battery IDs longer than 12 characters, the end-user must supply a label printer and labels with support for long Battery ID barcode printing.

1. <http://www.dopdf.com/>

2. http://global.dymo.com/enUS/Categories/LabelWriter_Printers.html

Getting ready to use Cadex BatteryShop

IMPORTANT: BatteryShop must meet [System Requirements](#) to allow Cadex 7000 C-Series battery analyzers to connect via USB cable. However, it is **strongly recommended** that all Cadex battery analyzers **connect to the PC via Serial cable**.

Before you can use Cadex BatteryShop, you must install the software, and set up the program and battery analyzers to work together:

Installing Cadex BatteryShop

Before installing Cadex BatteryShop...

- 1 You must have Microsoft Internet Explorer (IE) 5.5 (or greater) installed before you can install Cadex BatteryShop. This ensures that all the latest Windows components required by Cadex BatteryShop are installed in your system. A copy of Internet Explorer 5.5 is included on the Cadex BatteryShop CD.
- 2 You must configure the default printers for service reports and labels before running Cadex BatteryShop the first time. Failure to do so will cause problems for the Setup Wizard and will result in printing problems for Cadex BatteryShop. See topic [Installing label and report printer drivers](#) for more details.

Running Setup on Windows XP or Windows 2000

- 1 Logon as a user with Administrative privileges.
- 2 Insert the Cadex BatteryShop CD.
- 3 Double-click the **setup.exe** file on the CD, and then follow the on-screen prompts. The default installation location is C:\Program Files\Batshop, but you can specify another drive and/or folder.

If the setup program prompts you to update system files, choose Yes and allow the system to reboot. In this case, the setup program should restart automatically.

If the setup program does not start automatically, you must restart it by double-clicking setup.exe on the CD.

- 4 Launch BatteryShop the first time and walk through the Setup Wizard to provide all required information. This will generate a configuration file that allows other user profiles to use BatteryShop in the way that it was set-up by the Administrator. See topic [Setting up Cadex BatteryShop using the Setup Wizard](#) for more details.
- 5 Exit BatteryShop and logon as a user with User level privileges.
- 6 Launch BatteryShop and connect to Analyzers to confirm that BatteryShop is running as configured by the Administrator.

Note: The Administrator must ensure that all users who will use BatteryShop have at least User level privileges.

To upgrade from an earlier version of BatteryShop

If you have an earlier version of Cadex BatteryShop installed on your computer, the setup program will detect it automatically.

- 1 Logon as a user with Administrative privileges.
- 2 Insert the Cadex BatteryShop CD.
- 3 Double-click the **setup.exe** file on the CD, and then follow the on-screen prompts.

When the setup program detects the previous version of BatteryShop, click **Yes** to proceed with the upgrade. The setup program automatically backs up your old BatteryShop database, and then copies your data to the new database file after it installs the latest version of Cadex BatteryShop. The Cadex BatteryShop database file has the file name **bs.mdb** and is located in the **\Batshop\Db** directory. See Appendix topic [Database naming conventions](#) for details.

When the setup program backs up an existing database file, it copies it to **bs_100x_y.mdb** in the same directory, where x is the database version, and y is the number of times that version of the database has been updated.

The default installation location is **C:\Program Files\Batshop**, but you can specify another drive or folder.

If the setup program prompts you to update system files, choose **Yes** and allow the system to reboot. In this case, the setup program should restart automatically.

If the setup program does not start automatically, you must restart it by double-clicking **setup.exe** on the CD.

If you have any problems installing Cadex BatteryShop, see the *ReadMe.txt* file on the Cadex BatteryShop CD. If you want to uninstall BatteryShop, follow the [uninstall instructions](#).

To uninstall BatteryShop and go back to the previous version of BatteryShop

After installing the most current BatteryShop, you decide that you want to keep using the old BatteryShop because you find that the current BatteryShop does not support old-format matrices.

Note: It is strongly recommended that you use the most current version of BatteryShop because it offers new features including Advanced [Learn](#).

- 1 Logon as a user with **Administrative privileges**.
- 2 Use Windows Explorer, **Start > Programs > Accessories > Windows Explorer**, to locate the directory where the BatteryShop database folder is located. This is **C:\Program Files\Batshop\Db** by default.
- 3 Within the **BatShop\Db** folder look for a file named as **bs_nnnn_m.mdb**, where 1000<nnnn<9999 and 1<m<k (**k** is some positive integer). Sample backup BatteryShop database names appear in the following table with the BatteryShop version:

<u>Backup BatteryShop Database Names</u>	<u>BatteryShop Version</u>
bs_1013_1.mdb	BatteryShop 7.0.0.22
bs_1012_1.mdb	BatteryShop 6.1.2.0
bs_1011_1.mdb	BatteryShop 6.0.3.0
bs_1010_1.mdb	BatteryShop 6.0.1.0
bs_1010_1.mdb	BatteryShop 6.0.0.22
bs_1009_1.mdb	BatteryShop 5.1
bs_1009_1.mdb	BatteryShop 5.0
bs_1008_1.mdb	BatteryShop 4.21
bs_1007_1.mdb	BatteryShop 4.1 SP3
bs_1007_1.mdb	BatteryShop 4.1 SP2
bs_1006_1.mdb	BatteryShop 4.1 SP1
bs_1005_1.mdb	BatteryShop 4.1
bs_1004_1.mdb	BatteryShop 4.0
bs_1003_1.mdb	BatteryShop 2.5 – 3.0
bs_1002_1.mdb	BatteryShop 2.01

- 4 Copy the **\Batshop\Db** folder to **C:\Temp**
- 5 Uninstall the current BatteryShop:
 - a. Launch the **Control Panel: Start > Settings > Control Panel**
 - b. Double-click on **Add/Remove Programs** to Launch the Add/Remove Programs window.
 - c. Locate **Cadex BatteryShop ...** in the list
 - d. Choose **Change/Remove** button for that row in the list.
 - e. Choose **Custom** for the **Uninstall Method** and choose **Next**.
 - f. Choose **Select All** to remove listed **Private Files** and choose **Next**.
 - g. Choose **Select All** to remove listed **System Files** and choose **Next**.
 - h. Choose **Select All** to remove listed **Directories** and choose **Next**.
 - i. Choose **Select All** to remove listed **Registry Keys** and choose **Next**.
 - j. Choose **Select All** to edit listed **Registry Keys** and choose **Next**.
 - k. Choose **Finish** to perform uninstall.
 - l. Choose **Yes to All** to remove **Shared Components**.
- 6 Close the **Control Panel**.
- 7 **Install** the previous version of the BatteryShop.
- 8 **Copy** the required backup BatteryShop database from **C:\Temp\Db** to **\BatShop\Db**.
- 9 **Rename** bs.mdb to **bsOrig.mdb**.
- 10 **Rename** **\BatShop\Db\bs_mmmm_n.mdb** to **\BatShop\Db\bs.mdb**.
- 11 **Launch** BatteryShop and confirm that the database has all battery models records (some with matrices) and service records.

Setting up battery analyzers

Each analyzer must be set up correctly for use with Cadex BatteryShop. This simple procedure involves using the menu system on the analyzer.

If connecting a Cadex 7000 C-Series or Cadex 7000 Series battery analyzer to Cadex BatteryShop, you can also specify certain analyzer settings from Cadex BatteryShop.

Set up a C7000 battery analyzer for use with Cadex BatteryShop

Once a C7000 battery analyzer is set up for use with Cadex BatteryShop, all front panel controls are disabled except the MENU key.

- 1 Press the **MENU** key on the C7000 battery analyzer.
- 2 Press **▲** or **▼** to scroll to **SYSTEM SETUP** (on the analyzer display screen), and then press **ENTER**.
- 3 Press **▲** or **▼** to scroll to **OUTPUT DEVICES**, and then press **ENTER**.
- 4 Press **▲** or **▼** to scroll to **SERIAL PORT DEVICE**, and then press **ENTER**.
- 5 Press **▲** or **▼** to scroll to **BATSHOP**, and then press **ENTER**.
- 6 Press **ENTER** again to confirm your selection.
- 7 Press **ESC** twice to return to the global display.

Set up a Cadex 7000 C-Series or Cadex 7000 Series battery analyzer for use with Cadex BatteryShop

- 1 From the global display, press **MENU** key on the battery analyzer.
- 2 Press **▲** or **▼** to scroll to SYSTEM SETUP, and then press **ENTER**.
- 3 Press **▲** or **▼** to scroll to SERIAL PORT DEVICE, and then press **ENTER**.
- 4 Press **▲** or **▼** to scroll to BATTERYSHOP, and then press **ENTER**.
- 5 Press **▲** or **▼** to scroll to **YES**, if necessary, and press **ENTER**.
- 6 Press **ESC** twice to return to the global display.

Set a C7000 battery analyzer for stand-alone use

- 1 Press the **MENU** key on the C7000 battery analyzer.
- 2 Press **▲** or **▼** to scroll to SYSTEM SETUP (on the analyzer display screen), and then press **ENTER**.
- 3 Press **▲** or **▼** to scroll to OUTPUT DEVICES, and then press **ENTER**.
- 4 Press **▲** or **▼** to scroll to SERIAL PORT DEVICE, and then press **ENTER**.
- 5 Press **▲** or **▼** to scroll to any setting other than BATSHOP, and then press **ENTER**.
- 6 Press **ENTER** again to confirm your selection.
- 7 Press **ESC** twice to return to the global display.

Set a Cadex 7000 C-Series or Cadex 7000 Series battery analyzer for stand-alone use

- 1 From the global display, press **MENU** key on the battery analyzer.
- 2 Press **▲** or **▼** to scroll to SYSTEM SETUP, and then press **ENTER**.
- 3 Press **▲** or **▼** to scroll to SERIAL PORT DEVICE, and then press **ENTER**.
- 4 Press **▲** or **▼** to scroll to any setting other than BATTERYSHOP, and then press **ENTER**.
- 5 Press **▲** or **▼** to scroll to YES, if necessary, and press **ENTER**.
- 6 Press **ESC** twice to return to the global display.

For more information about serial port device settings on the Cadex 7000 C-Series or Cadex 7000 Series, see the User's Manual for the battery analyzer.

Set analyzer program options

- 1 Ensure Cadex BatteryShop has connected to the battery analyzer for which you want to set analyzer options. Consult the Appendix on how to Connect to battery analyzers.
- 2 Right-click the bottom half of the icon representing the analyzer for which you want to set options.
- 3 Click **Analyzer Options** on the menu that appears. The Analyzer Options dialog box appears.
- 4 Enter these settings:

Automatic OhmTest.

Select (check) this option if you want the battery analyzer to perform an OhmTest every time it runs a charge cycle.

Note OhmTest is always performed as part of the QuickTest, Learn, and LifeCycle programs regardless of this setting.

Self-Discharge Rest Period (hrs).

Enter Self-Discharge Rest Period

Click the up- or down-arrow button to set the number of hours to allow a battery to [self-discharge](#) between the first and second [capacity](#) readings of a Self-Discharge Test.

Charge Optimization.

Click the down-arrow button and select an option:

Time. Choose this option to minimize the amount of time required to charge a battery.

Capacity. Choose this option to maximize the percentage [capacity](#) for the charged battery.

Ni dT/dt Charge Termination

Click the down-arrow button and select an option to stop charging a Ni-based battery when temperature change per time exceeds one of the available settings.

Maximum number of cycles for LIFECYCLE Program

Click the up- or down-arrow button to set the maximum number of cycles for LIFECYCLE Program.

The default value is 5000. The maximum value is 20000.

OhmTest Setpoints:

[NiCd.](#)

[NiMH.](#)

[SLA.](#)

[Li](#)

[LiPh.](#)

Runtime Program Parameters:

Percent 1

Enter Runtime Phase 1 setting

Set the load (up to 100% -- with default set to 100%) for the Receive phase of the Runtime program:

Type the desired number in the text box.

OR

Click the up- or down-arrow button to scroll through the numbers.

Percent 2

Enter Runtime Phase 2 setting

Set the load (up to 100% -- with default set to 50%) for the Transmit phase of the Runtime program:

Type the desired number in the text box.

OR

Click the up- or down-arrow button to scroll through the numbers.

Percent 3

Enter Runtime Phase 3 setting

Set the load (up to 100% -- with default set to 10%) for the Standby phase of the Runtime program:

Type the desired number in the text box.

OR

Click the up- or down-arrow button to scroll through the numbers.

Minutes 1.

Enter Runtime Phase 1 time

Set the duration (up to 59 minutes – with default set to 1 minute) for the Receive phase of the Runtime program:

Type the desired number in the text box.

OR

Click the up- or down-arrow button to scroll through the numbers.

To skip this phase entirely, set the time to 0.

Minutes 2.

Enter Runtime Phase 2 time

Set the duration (up to 59 minutes – with default set to 1 minute) for the Transmit phase of the Runtime program:

Type the desired number in the text box.

OR

Click the up- or down-arrow button to scroll through the numbers.

To skip this phase entirely, set the time to 0.

Minutes 3.

Enter Runtime Phase 3 time

Set the duration (up to 59 minutes – with default set to 18 minutes) for the Standby phase of the Runtime program:

Type the desired number in the text box.

OR

Click the up- or down-arrow button to scroll through the numbers.

To skip this phase entirely, set the time to 0.

- 5 Click **Download** to copy the settings to the battery analyzer.
- 6 Click **Save** to save the settings to the PC so that the next time that the form is opened, these settings will be remembered. Choosing Save will not copy the settings to the analyzer.
- 7 Click **Close**.

Connecting battery analyzers to the computer

To connect a single battery analyzer to your computer

You can connect a battery analyzer to your computer in two ways:

- To a COM port on your computer using the Serial RS-232 cable terminated with DB-25 plugs that are shipped with Cadex BatteryShop. Consult the Appendix on how to [Connect Cadex battery analyzers to a COM port](#).
- To a USB port on your computer, if you have one. Consult the Appendix on how to [Connect Cadex battery analyzers to a USB port](#).

To connect more than one battery analyzer to your computer

You can connect more than one battery analyzer to your computer in two ways:

- Using a multiport adapter installed in your computer. Consult the Appendix on how to [install a RocketPort adapter for your version of Windows](#).
- Using a USB expansion module connected to a USB port on your computer. Consult the Appendix on how to [Connect Cadex battery analyzers to a USB port](#).

Setting up Cadex BatteryShop

The first time you run Cadex BatteryShop, the Setup Wizard starts. This Wizard helps you customize Cadex BatteryShop to work with your particular setup of battery analyzers and printers. If your setup changes at any time, you can run the Wizard again to change Cadex BatteryShop settings, or you can use the Cadex BatteryShop menus to change individual settings.

Before you work with Cadex BatteryShop, you must install printer drivers for label and report printers, even if you do not intend to print labels or reports.

Refer to required topic for details:

- [Install label and report printer drivers](#)
- [Set up Cadex BatteryShop using the Setup Wizard](#)
- [Set the serial ports connected to battery analyzers](#)
- [Select the language for Cadex BatteryShop menus, dialog boxes, and messages](#)
- [Set up Service labels](#)
- [Set up Battery ID labels](#)
- [Set up service reports](#)
- [Enter information about your site](#)
- [Set system options](#) for any of the following:
 - print service labels and reports automatically
 - detailed data analysis reminder
 - turn On/Off database security
 - retire battery if Target Cap. not met
 - capture data after service completion
 - activate daily data-log
 - activate real-time service data capture to the database
 - set analyzer icon size
 - configure visible Analyze Battery pages
 - activate Serial Number Entry for Analyze Battery – Quick Entry
 - activate auto print Battery ID labels for Quick Entry
 - set Target Capacity for Quick Entry
 - turn On/Off “Other Software” interface links
 - customize Database Backup frequency and location
 - specify Proxy Server settings if you access the Internet via a Proxy Server
- turn On/Of database security

Installing label and report printer drivers

Whether or not you intend to create service labels, battery ID labels, or reports, you must install both a standard printer driver (set as default printer) and a label printer driver for Cadex BatteryShop to work correctly.

Cadex BatteryShop is compatible with any Windows-compatible standard printer. Consult your printer manual for information on setting up your standard printer.

If you do not have a standard printer, you must still install a printer driver and set this as the default printer for Cadex BatteryShop to work correctly. Windows comes with a large database of drivers for standard printers from which you can select a driver to install.

Printer Drivers for the Dymo 400 LabelWriter are approved for use with Cadex BatteryShop. These drivers are included on the Dymo CD. [The latest driver for the Dymo LabelWriter](#) is available on the [DYMO](#) website (www.dymo.com).

After installing the Dymo printer driver, configure the printer driver to use Paper Size *30334*, Print Quality *Barcode and Graphics*, and Print Density *Normal*.

If you plan to use a Windows' label printer from an alternate manufacturer, please insure that you have the correct Windows' printer drivers and that the printer supports a label size that has at least 1.5 inches horizontal and 1-inch vertical dimensions.

To install the LabelWriter printer for your version of Windows, see the Appendix on [Dymo LabelWriter](#).

Setting up Cadex BatteryShop using the Setup Wizard

- 1 If the Setup Wizard does not start by itself when Cadex BatteryShop is launched:
 - a. Click **System Setup**.
 - b. Click **Setup Wizard**.
- 2 Read the information on the first screen, and then choose **Next**.
- 3 Verify that the site information displayed is correct. To change site information:
 - a. Click **Site Info**.
 - b. Enter site details in the dialog box that appears. See topic [Entering information about your site](#) for details.
 - c. Click **OK**.
- 4 Click **Next**.
- 5 Select the COMM (serial) ports to which battery analyzers are connected:
 - a. Click **Ports Map**.
 - b. Select the serial ports to which battery analyzers are connected in the Ports Configuration Map that appears. See topic [Setting the serial ports connected to battery analyzers](#) for details.
 - c. Click **OK**.
- 6 Click **Next**.
- 7 Set up the format and printer for battery ID labels:
 - a. Click **Battery ID Label**.
 - b. Use the Battery ID Label Designer dialog box to set up battery ID label formatting. See topic [Setting up Battery ID labels](#) for details.
 - c. Click **OK**.
- 8 Click **Next**.
- 9 Set up the format and printer service labels:

- a. Click **Service Label**.
 - b. Use the Service Label Designer dialog box to set up service label formatting. See topic [Setting up Service labels](#) for details.
 - c. Click **OK**.
- 10** Click **Next**.
- 11** Set up the format and printer for service reports:
- a. Click **Service Report**.
 - b. Use the Service Report Designer dialog box to set up service report formatting. See topic [Setting up service reports](#) for details.
 - c. Click **OK**.
- 12** Click **Next**.
- 13** Choose a time period from the list to determine your default battery Service-Due period.
- 14** Click **Next**.
- 15** Click these system settings to select (check) or clear them according to your requirements:
- a. **Auto Print Service Label**. Select (check) this option if you want a service label to print automatically every time a battery service is completed.
 - b. **Auto Print Service Report**. Select (check) this option if you want a service report to print automatically every time a battery service is completed.
 - c. **Save Daily Log**. Select (check) this option if you want Cadex BatteryShop to create a daily log. This feature logs all analyzer messages for 24 hours. The daily log file is overwritten every 24 hours at midnight.
 - d. **Detailed Analysis Data Reminder**. Select (check) this option if on completion of a battery service you want to be reminded to open the Real-Time Status dialog box and export the service data to a file. Consult the index to learn how to export real-time battery service data.
- 16** Click **Next**.
- 17** Click **Finish**.

Setting the serial ports connected to battery analyzers

Note [BatteryShop will limit analyzer connections to the license version of BatteryShop purchased.](#) If you find that you cannot move COM Ports to the Ports to search for list, you will need to upgrade your BatteryShop license version. Please contact a Cadex sales representative to purchase an upgrade license.

- 1 Click **System Setup**, and then click **Ports Map**. The Ports Map dialog box appears.
- 2 Move all serial ports to which you have connected battery analyzers from the **Ports not to search for** list to the **Ports to search for** list:
Click the double left arrow (◀◀) to move all ports to the **Ports to search for** list.
OR
- 3 Select the serial ports to move from the **Ports not to search for** list:
To select one port, click that port. The port is highlighted.
To select ports listed consecutively ports, click the first port in the list, hold down **Shift** key, and then click the last port in the list. All ports between the first and last are highlighted.
To select additional ports, hold down the **Ctrl** key while clicking the ports.
- 4 Click the single left arrow (◀) or double-click the required port to move the ports to the Ports to search for list.
- 5 Move serial ports in the Ports to search for list to which you have NOT connected battery analyzers to the Ports not to search for list:
Click the double right arrow (▶▶) to move all ports to the Ports not to search for list.
OR
- 6 Select the serial ports to move from the **Ports to search for** list:
To select one port, click that port. The port is highlighted.
To select ports listed consecutively ports, click the first port in the list, hold down **Shift** key, and then click the last port in the list. All ports between the first and last are highlighted.
To select additional ports, hold down the **Ctrl** key while clicking the ports.
- 7 Click the single right arrow (▶) or double-click the required port to move the ports to the **Ports not to search for** list.
- 8 Click **OK**.

Selecting the language for Cadex BatteryShop menus, dialog boxes, and messages.

- 1** Click **System Setup**, and then click **Language**. The Select Language dialog box appears.
- 2** Click the language in which you want dialog box and command text to appear.
- 3** Click **OK**.

Note The Cadex BatteryShop online Help file is available in English only.

Setting up labels and service reports

Cadex BatteryShop has three label and report designers that you can use to customize the appearance of your battery-ID labels, service labels, and service reports. You also use these designers to set your label and report printers. Default printers must be selected in order for Cadex BatteryShop to function correctly even if you do not intend to print labels or reports.

If you are using Windows NT, you must set label and report formats and default printers for each User Profile under which Cadex BatteryShop is used.

See the following topics for details

[Setting up Service labels.](#)

[Setting up Battery ID labels.](#)

[Setting up service reports.](#)

Setting up Service labels

Before you set up your customized service label format, you must install the correct label printer driver. See section on [Installing label and report printer drivers](#) for details.

- 1 Click **System Setup**, and then click **Service Label**. The Service Label Designer dialog box appears displaying the default service-label format.
- 2 On the **File** menu, click **Printer Setup**.
- 3 Enter these settings in the dialog box that appears:
 - Name.** Click the down-arrow button and, from the list that appears, select the DYMO LabelWriter label printer. If the Dymo LabelWriter label printer does not appear on the list, you must close Cadex BatteryShop and install the appropriate printer driver before you continue setting up Service or Battery-ID labels.
 - Size.** Ensure that **30334 2-1/4 in x 1-1/4 in** appears in this box. If it does not, click the down-arrow button and select it from the list that appears.
 - Orientation.** Ensure that the Portrait option is selected.
- 4 Click **OK**.
- 5 To customize the service-label format, click the **Label Caption** menu, and then click **Use Custom Label**. The Custom Label form appears in the Service Label Designer.
- 6 Under Label Field, select (check) the fields you want to appear on your customized service label. Clear any fields you do not want to include on the label.

If the checked fields do not appear in the Designer Area, click the **Label Caption** menu, and then click **Set Default Positions**. The checked fields should now appear outside of the Print Area under the label.
- 7 In the label-preview area, click and drag the field names to position them as desired. You can move all the fields in the Print Area at once by dragging the Print Area to the desired location.
- 8 If you are creating a custom service-label format, click the **File** menu, and then click **Test Print** to print out a sample label so you can verify your label format. (This menu command is not available if you are using the default service-label format)

If any of the fields do not appear properly or appear cut off, reposition them or the Print Area in the designer, and then choose **Test Print** again.

9 Click **OK** to save your settings and close the Service Label Designer.

Note: If you plan to use a different Label Printer, you can follow the instructions above substituting the Printer Driver and Paper Size for your Label Printer.

Setting up Battery ID labels

Before you set up your battery ID labels, you must install the correct label printer driver.

- 1 Click **System Setup**, and then click Battery ID Label. The **Battery ID Label** Designer dialog box appears.
- 2 On the **File** menu, click **Printer Setup**.
- 3 Enter these settings in the dialog box that appears:
 - Name.** Click the down-arrow button and, from the list that appears, select the DYMO LabelWriter label printer. If the DYMO LabelWriter label printer does not appear on the list, you must close Cadex BatteryShop and install the appropriate printer driver before you continue setting up Service or Battery-ID labels.
 - Size.** Ensure that **30334 2-1/4 in x 1-1/4 in** appears in this box. If it does not, click the down-arrow button and select it from the list that appears.
 - Orientation.** Ensure that the Portrait option is selected.
- 4 Click **OK**.
- 5 Under Label Field, select (check) the fields you want to appear on your Battery ID labels. Clear any fields you do not want to include on the labels.
- 6 In the label-preview area, click and drag the field names to position them as desired. You can move all the fields in the Print Area at once by dragging the Print Area to the desired location.
- 7 On the **File** menu, click **Test Print** to print out a sample label so you can verify your label format.

If any of the fields do not appear properly or appear cut off, reposition them or the Print Area in the designer, and then choose **Test Print** again.

- 8 If you have included the bar code on your label, test the bar code by scanning it with a bar-code scanner.

If the scanner cannot read the bar code, it was probably cut off. Reposition it on the label, print a test label, and try the scan again.

- 9 Click **OK** to save your settings and close the Battery ID Label Designer.

Note: If you plan to use a different Label Printer, you can follow the instructions above substituting the Printer Driver and Paper Size for your Label Printer.

Setting up service reports

Before you set up your service reports, you must install an appropriate printer driver.

- 1** Click **System Setup**, and then click **Service Report**. The Service Report Designer dialog box appears displaying the default service-report format.
- 2** On the **File** menu, click **Printer Setup**.
- 3** Enter these settings in the dialog box that appears:
 - Name.** Click the down-arrow button and, from the list that appears, select the printer on which to print service reports. If your standard printer does not appear on the list, you must close Cadex BatteryShop and install the appropriate printer driver before you continue setting up service reports.
 - Size.** Click the down-arrow button and, from the list that appears, select the size of the paper on which you want to print service reports.
 - Source.** Click the down-arrow button and, from the list that appears, select the printer tray that holds the paper on which you want to print service reports. Choices available depend on the selected printer.
 - Orientation.** Select an option:
 - Portrait.** The report page is taller than it is wide.
 - Landscape.** The report page is wider than it is tall.
- 4** Click **OK**.
- 5** If you want to use the default service-label format, go to step 9.

If you want to customize the service-label format, click the **Options** menu, and then click **Use Custom Report**. The Custom Report form appears in the Service Label Designer.
- 6** Under **Label Field**, select (check) the fields you want to appear on your customized service report. Clear any fields you do not want to include in the report.
- 7** In the report-preview area, click and drag the field names to position them as desired.
- 8** On the **File** menu, click **Test** to print out a sample report so you can verify your report format.

If any of the fields do not appear properly or appear cut off, reposition them in the designer, and then choose **Test** again.
- 9** Click **OK** to save your settings and close the Service Report Designer.

Entering information about your site

- 1 Click **System Setup**, and then click **Site Information**. The Site Information dialog box appears.
- 2 Enter the appropriate information into these *required* text boxes:
 - Site Name.** Type the site name within your organization.
 - Company Name.** Type the name of your organization.
 - Serial Number.** Type the Cadex BatteryShop serial number found on the back of your Cadex BatteryShop CD jewel case.
 - Phone No.:** Type the phone number for your site.

This information must be entered in order to be able to use Cadex BatteryShop.
- 3 You can also type information into any combination of these text boxes, as needed:
 - Manager.** Type the name of the site manager.
 - Street.** Type the street address for the site.
 - City.** Type the name of the city in which the site is located.
 - Province/State.** Type the name of the province or state in which the site is located.
 - Zip/Postal Code.** Type the zip code or the postal code for the address of the site.
 - Email address.** Type the e-mail address of the site manager or other person responsible for working with Cadex BatteryShop.
 - Notes.** Enter any additional information that you might find useful. An example might be the types and serial numbers of connected battery analyzers.
- 4 Click **OK**.

Set System Options

Some BatteryShop features can be customized to suit the operator's preferences.

Click System Setup, and then click Options. The System Setup Options dialog box appears.

System Options include the following preferences:

- 1 Battery ID Service Due Period.** The default setting is blank. However, if you want BatteryShop to stamp the Service Due date on the Battery ID service label, you must specify a Service Due period. Click the down-arrow button to display a list of Service Due periods, and select the period you want to use for the Service Due period.
- 2 Auto Print Service Report.** Select (check) this box if you want Cadex BatteryShop to print a service report.

If you want reports to print when the battery is removed, check the "Print Label/Report when battery is removed" checkbox. Leaving the "Print Label/Report when battery is removed" checkbox unchecked will cause reports to print automatically when the analyzer has finished servicing a battery.
- 3 Auto Print Service Label.** Select (check) this box if you want Cadex BatteryShop to print a battery service label.

If you want labels to print when the battery is removed, check the "Print Label/Report when battery is removed" checkbox. Leaving the "Print Label/Report when battery is removed" checkbox unchecked will cause labels to print automatically when the analyzer has finished servicing a battery. If you want duplicate Service Labels printed, check the "Print duplicate service labels" checkbox. Leaving the "Print duplicate service labels" checkbox unchecked will cause a single service label to print.
- 4 Print on Pass.** Select (check) this box if you want Cadex BatteryShop to print a battery service label only if a Battery Service passes.
- 5 Print on Fail.** Select (check) this box if you want Cadex BatteryShop to print a battery service label only if a Battery Service fails.
- 6 Print Label/Report when battery removed.** Select (check) this box if you want Cadex BatteryShop to print a battery service label after service completion only when a Battery is removed from an adapter.
- 7 Print duplicate Service Labels.** Select (check) this box if you want Cadex BatteryShop to print duplicate service labels.
- 8 Detailed Analysis Data Reminder.** Select (check) this option if on completion of a battery service you want to be reminded to open the Real-Time Status dialog box and export the service data to a file. See Appendix for details on [exporting real-time battery-service data](#).
- 9 Secure Database Access.** Select (check) this option if you want to secure the BatteryShop database. Once the database is secure, it is not possible to add, modify, or delete existing battery model or Program records. You can add new Battery Ids via Quick Entry.

See topic [Set or change the password](#) for details on changing the security password..
- 10 Prompt to un-retire Battery ID before service start.** Select (check) this box to be prompted each time a service is requested for a Battery ID that has been retired. Clearing

the box will suppress the prompt and the Battery ID will become un-retired the moment that the service starts.

- 11 **Retire Battery if Target Cap.** not met. Select (check) this option if you want to retire a Battery ID if Target Capacity is not met. If you select this option, BatteryShop will prompt you to un-retire a retired Battery ID the next time you try to service the Battery ID.
- 12 **Capture Data After Service Completion.** Select (check) this option if you want BatteryShop to continue data capture for a service after service completes. The default setting is **OFF**. If you select this option, service data will continue to be collected after the service completes. Setting this option OFF could help to keep the database from growing rapidly.

This feature is particularly useful when a program applies a Trickle Charge to the battery to keep the battery fully charged after the service completes. In some of these cases, a battery could become over-charged or have its protection circuitry tripped resulting in a warning message from the analyzer. In such cases, turning this feature OFF will prevent the Battery Service Status from changing from PASS to FAIL after a service has completed.

- 13 **Save Daily Log.** Select (check) this option if you want Cadex BatteryShop to create a daily log.

This feature logs all analyzer messages for 24 hours. The daily log file is overwritten every 24 hours at midnight..

- 14 **Save Real-Time Data.** Select (check) this option if you want to save the real-time data (voltage, amperage, temperature, and impedance) to the database.

If you do not select this option, real-time data is saved in a temporary database, which is emptied and compacted each you start Cadex BatteryShop. You will not be able to display battery characteristics or cycle graphs for service records.

Note. If your computer does not have a UPS (uninterruptible power supply) device, it is strongly recommended that you not select this option. Selecting this option means that during battery service, your database is updated once every minute. If you do not have a UPS device and your power fails during a database update, your Cadex BatteryShop database will be corrupted and you will not be able to access your data..

- 15 **Display Capacity As.** Choose % or **mAh** as the display unit whenever capacity is reported in reports or labels.
- 16 Select the required **Analyzer Icon display size** (Small, Medium, or Large).
- 17 Select the options for **QuickTest** and **QuickSort** Result formats.

Service Options include preferences that control the behavior of the Analyze Battery form:

- 1 **Visible Analyze Battery Pages.** This is a checkbox list of visible Analyze Battery pages.

The Analyze Battery form offers several methods, via distinct pages on the form, to start a battery service. It is possible to hide pages on the Analyze Battery form that are never used. This feature allows an end-user to have some control on the complexity of the Analyze Battery form.

Select (check) the checkbox(s) for the pages you want to be visible and clear the checkbox(s) for the pages you do not want to be visible on the Analyze Battery form.

- 2 **Serial Number Entry.** Select (check) this option (default) if you want BatteryShop to display the Serial No. combo box control on the **Quick Entry** page of the Analyze Battery form. Uncheck this option to hide the Serial No. control.
- 3 **Auto-Print Battery ID label.** Select (check) this option (default) if you want BatteryShop to print a long Battery ID barcode label each time a new long Battery ID is created via the **Quick Entry** page on the Analyze Battery form. Uncheck this option to disable Auto long Battery ID printing.
- 4 **Quick Entry Target Capacity.** Specify the Target Capacity (default 80%, range 50% - 150%) for a **Quick Entry** Service.

Click Close to close the System Setup Options form.

Other Software includes controls to enable/disable BatteryShop interfaces that have links to other software. Select (check) Phone Checker checkbox to enable it or clear (un-check) to disable it.

If the Phone Checker interface is enabled and Will'tek Phone Checker is installed on the same machine, it is possible to launch Phone Checker from the following locations within Cadex BatteryShop:

- 1 From the Cadex BatteryShop main window, click **Analyzers**, and then click **Analyze Phone**.
- 2 From the Quick Entry page of the Analyze Battery – Battery Information window, click Launch Phone Checker.

DB Backup includes controls to configure frequency and location of database backup. The database will be backed-up to the specified location after the specified number of days have passed and BatteryShop is re-launched.

- 1 **DB Backup frequency (days).** Specify an integer in the range 1..365 for the backup frequency in days. Backup will occur when at least the specified number of days have passed and BatteryShop is re-launched.
- 2 **DB Backup Path.** Specify a directory by selecting the ellipses button and choosing a directory inside of which to store the backup database.

Web Update includes controls to specify rules for updating BatteryShop and Proxy Server settings if you access the Internet via a Proxy Server.

- 1 The **Url** control contains the web address for BatteryShop configuration files.
- 2 The **Password** control is also required for BatteryShop to access files located at the specified address in the **Url** control.
- 3 Check the required checkboxes to specify [Rules for Updating BatteryShop](#) (See Appendix [Rules for Updating BatteryShop](#)).
- 4 Check the **Use Proxy Server** checkbox only if you connect to the Internet via a Proxy Server. Otherwise leave it un-checked.
- 5 Specify the **IP address** for the Proxy Server only if the “Use Proxy Server” checkbox is checked.
- 6 Specify a **Proxy Port** only if the “Use Proxy Server” checkbox is checked.
- 7 Specify a **Connection time-out** in the range 1..5 only if the “Use Proxy Server” checkbox is checked.

Set or change the password

- 1 Click **System Setup**, and then click **Security**.

If no password currently exists, the Create Password dialog box appears. If a password has already been set, the Modify Password dialog box appears.

- 2 Type the old password under **Enter old password**. If no password was set, leave this text box blank.
- 3 Type the new password under **Enter new password**.
- 4 Type the new password again under **Verify new password**.
- 5 Click **OK**.

A message appears stating that the password has been modified.

- 6 Click **OK** to clear the message from the screen.

Synchronize analyzer and computer clocks

- 1 Click **System Setup**, and then click **Set Clock**.

A message appears stating that the operation was successful.

- 2 Click **OK** to clear the message from the screen.

Update Settings

BatteryShop can update Programs, and System Settings via the Internet. This feature requires a working Internet connection.

Choose the **Update Settings** option under **System Setup** menu to update BatteryShop components over the Internet.

Choose the Update Rules options that you want Web Update to follow to update BatteryShop:

- Replace **System Settings** based on Web configuration file will reset all BatteryShop System Settings to their install defaults. This option is unchecked by default.
- Replace existing **Program** records will replace existing Program information with install defaults.
- Add **new Program records** automatically will add new Program records that don't exist in the BatteryShop database.

Choose **OK** to proceed with Web Update or **Cancel** to ignore operation.

Note: To update Battery Models, you must launch the **Battery Model** form and choose **Model Update**

Working with the database

Using and editing the database

The Cadex BatteryShop database is made up of several smaller interrelated databases that you can use to keep track of your customers, your battery service programs, and your battery inventory, including battery services, programs, and related C-Codes. These databases allow you to gather and store information about manufacturers, battery models, customers, individual batteries (through battery ID), battery service programs, and battery services performed.

Databases are made up of individual records, each one of which has specific fields. All records contain the same fields, or types of data. Only specific data entered in the fields differs from record to record. Cadex databases are displayed in a grid format, in which the records are displayed in rows and the fields in columns. The intersection of a column and a row displays the data for a specific field in a specific record.

After you add or modify a large number of records in any of the databases, you may find Cadex BatteryShop runs more slowly. If this is the case, you can compact the database so that the program is able to find database records more efficiently.

Refer to the appropriate topic in the manual for any of the following tasks:

- [Working with battery manufacturer data](#)
- [Working with battery model data](#)
- [Working with customer data](#)
- [Working with battery ID data](#)
- [Database Security](#)
- [Compact the database](#)

See also

- [Custom Programs](#)
- [Working with battery-service data](#)

Working with battery manufacturer data

When you click Manufacturers on the Database menu, the Battery Manufacturers database window appears.

In this window, you can add a new battery manufacturer record, modify battery manufacturer records already in the database, delete battery manufacturer records, and search for specific battery manufacturers.

Add a battery manufacturer record

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Manufacturers**. The Battery Manufacturers database window appears.
- 2 Click **Add**. The Add Manufacturer dialog box appears.
- 3 Type the name of the manufacturer in the Manufacturer Name text box.
- 4 Click **Add**.

Modify a battery manufacturer record

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Manufacturers**. The Battery Manufacturers database window appears.
- 2 Click **Modify**. The Modify Manufacturer dialog box appears.
- 3 Make the required changes to the name of the manufacturer in the Manufacturer Name text box.
- 4 Click **Modify**.

Delete a battery manufacturer

You cannot delete battery manufacturer records that have battery model records associated with them. You must delete the battery model records first.

- 1 Delete any battery models associated with the manufacturer you want to remove from the database. See topic [Delete a battery model from the database](#) for details
- 2 From the Cadex BatteryShop main window, click **Database**, and then click **Manufacturers**. The Battery Manufacturers database window appears.
- 3 Select the battery manufacturer that you want to delete from the database.
- 4 Click **Delete**.
- 5 Click **Yes** to confirm that you want to delete the record.

Refer to the Appendix to [find a record](#)

Working with battery model data

When you click Battery Models on the Database menu, the Battery Models database window appears.

In this window, you can add a new battery model record, modify battery model records already in the database, delete battery model records, search for specific battery models, sort and group the battery model records according to a variety of criteria.

Add a battery model

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery Models**. The Battery Models database window appears.
- 2 Click **Add**.
OR
- 3 Right-click a battery model entry in the grid that is made by the same manufacturer as the battery model you want to add to the database.
- 4 Choose **Add** on the menu that appears.
The Add Battery Model Wizard appears.
- 5 Follow the on-screen prompts to enter data into the appropriate fields in the new battery model record.

For more information about the battery C-Code data required, see the battery analyzer User's Manual.

Modify a battery model

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery Models**. The Battery Models database window appears.
- 2 Select the battery model for which you want to change data.
- 3 Click **Modify**.
The Modify Battery Model Wizard appears.
- 4 Follow the on-screen prompts.

For more information about the battery C-Code data required, see the battery analyzer User's Manual.

Delete a battery model

Deleting a battery model deletes all battery IDs that use the model from the Battery ID database. All service records for the model are also deleted.

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery Models**. The Battery Models database window appears.
- 2 Select the battery model you want to delete.
- 3 Click **Delete**.
- 4 In the warning or confirmation dialog box that appears, click **Yes** to confirm deletion of the battery model and all associated battery ID and service records.

Copy a battery model

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery Models**. The Battery Models database window appears.
- 2 Select the battery model you want to copy.
- 3 Click **Copy**.
- 4 A new record with the name "Copy of <original model name>" will appear having the same properties as the original record.

Modify the C-Code for a battery model

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery Models**. The Battery Models database window appears.
- 2 Select the battery model for which you want to change the extended C-Code.
- 3 Click **C-Code**.
- 4 Change these basic C-Code settings as appropriate:
 - Chemistry
 - [Voltage \(V\)](#)
 - [Battery Rating \(mAh\)](#)
- 5 For **NiCd** or **NiMH** batteries, change these extended C-Code settings as appropriate:
 - [Charge Rate \(mA\)](#)
 - [Discharge Rate \(mA\)](#)
 - [Trickle Charge \(mA\)](#)
 - [Recond. Discharge \(mA\)](#)
 - [Capacity Offset \(%\)](#)
 - [Temp. Sensing. \(°C\)](#)
 - [Negative Slope \(mV/Cell\)](#)
 - [End of Discharge \(V/Cell\)](#)
 - [End of Recond \(V/Cell\)](#)
 - [Charge Method](#)

For **SLA** or **Li** batteries, change these extended C-Code settings as appropriate:

 - [Charge Rate \(mA\)](#)
 - [Discharge Rate \(mA\)](#)
 - [Capacity Offset \(%\)](#)
 - [Temp. Sensing. \(°C\)](#)
 - [Max. Standby Voltage \(V/Cell\).](#)
 - [Max. Charge Voltage \(V/Cell\).](#)
 - [End of Charge/Topping Charge](#)
 - [End of Discharge \(V/Cell\)](#)

To restore Cadex BatteryShop's default extended C-Code settings, click **Default**.

- 6 Click **OK**.
- 7 In the confirmation dialog that appears, click **Yes** to save the new extended C-Code settings.

Model Update

You can update your Battery Models database if your PC is connected to the Internet. The Model Update will follow [Web Update Rules](#), as specified in System Setup Options, to update battery model records in the database.

Note: If you delete a battery model record, all associated service records and Battery ID records will also be deleted.

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery Models**. The Battery Models window appears.
- 2 Click **Model Update**. Click **OK** on the confirmation dialog. The Web Update will start. When the update is complete, you will see a dialog displaying the number of records updated. Click **OK** to clear the dialog.

[Finding, Sorting, and Grouping model records](#)

You can group database records by any category of data, or field, stored in the database.

- 1 Click the column heading for the field by which you want to group the records in the database.
- 2 Drag and drop the column heading cell into the dark grey area just above the column headings.

Records are sorted into groups according to the heading you chose.

You can now further sort the records within each group by clicking any of the remaining column headings.

- 3 If you want to group the records further, you can drag and drop another column heading cell into the dark grey area beside the first one. You can continue to "daisy-chain" column headings to group records into smaller and smaller groups.

In this example, battery model records are grouped by manufacturer and then by chemistry. Within each chemistry group, records are sorted by model. Move the mouse over the example and click the hotspots (indicated by the hand icon) to see details about different parts of the grid.

Import battery model data

Cadex BatteryShop can import battery model data from a *bsmodels.txt* text file created by another Cadex BatteryShop system.

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery Models**. The Battery Models database window appears.
- 2 Click **Import** to select the *bsmodels.txt* file. If required specify an alternate directory where the *bsmodels.txt* file is located. The default location is usually *C:\Program Files\Batshop\Temp*.
- 3 Choose the *bsmodels.txt* file and click **Open** to import the *bsmodels.txt* file.

Export battery model records

You can save your battery model database to a text file that can be imported to other Cadex BatteryShop databases or opened in other applications.

Method 1:

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery Models**. The Battery Models database window appears.
- 2 To export all battery model records, click **Export** without choosing any battery model records. To export a subset of battery model records, use the **Ctrl** and **Ctrl+Shift** keyboard combinations to select the required battery models for export and click **Export Model**.
- 3 If required specify a directory for the *bsmodels.txt* file. The default export location is usually *C:\Program Files\Batshop\Temp*.
- 4 Click **Save** to save the *bsmodels.txt* file.

Method 2:

- 1 From the main Cadex BatteryShop window, click **Database**, and then click **Export Models**.
Cadex BatteryShop creates a comma-separated-values text file called *bsmodels.txt*
- 2 Note the location of the text file.
- 3 Click **OK** to close the confirmation dialog box.

Delete matrix for the selected battery model

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery Models**. The Battery Models database window appears.
- 2 Use the **Ctrl** and **Ctrl+Shift** keyboard combinations to select the required battery model record(s).
- 3 Click **Delete Matrix**
- 4 Choose to delete either the C72/C74/C74ER Series matrix or the C72/C74/C74ER C-Series matrix or both matrix types for the record.
- 5 Choose OK to delete the selected matrix type(s).

Working with customer data

When you click Customers on the Database menu, the Customers database window appears.

In this window, you can add a new customer record, modify customer records already in the database, delete customer records, search for specific customers, and sort and group the customer records according to a variety of criteria.

Sort, Group, or Search for a customers

Add a customer to the database

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Customers**. The Customers database window appears.
- 2 Click **Add**. The Add Customer dialog box appears.
- 3 Type the name of the customer in the **Customer Name** text box.
- 4 Type any notes or comments about the customer in the **Notes** text box.
Some examples might be customer address, phone number, or, if the customer name is a company, the name of the person you deal with at the company.
- 5 If you want to include the customer in a list of favorite customers, click **Include in Favorites list**.
- 6 Click **Add**.

Modify a customer record in the database

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Customers**. The Customers database window appears.
- 2 Select the customer for which you want to change data.
- 3 Click **Modify**. The Modify Customer dialog box appears.
- 4 Make any required changes to the **Customer Name** and **Notes** text boxes.
- 5 Click the **Include in Favorites list** checkbox to select or clear it as needed.
- 6 Click **Modify**.

Delete a customer from the database

Deleting a customer deletes all battery ID and service records for batteries associated with the customer.

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Customers**. The Customers database window appears.
- 2 Select the customer that you want to remove from the database.
- 3 Click **Delete**.
- 4 In the warning or confirmation dialog box that appears, click **Yes** to confirm deletion of the customer and all associated battery ID and service records.

Working with battery ID data

When you click Battery IDs on the Database menu, the Battery IDs database window appears.

In this window, you can add a new battery ID, modify battery ID records already in the database, delete battery ID records, search for specific battery IDs, print battery ID labels, and sort and group the battery ID records according to a variety of criteria.

About battery IDs

In general, if you routinely service a fleet that includes a few batteries of a wide variety of battery models, you will probably find it easiest to create battery IDs and labels as batteries are brought in for servicing.

If you have a large single-model fleet, however, it might be more convenient to create a large batch of sequential battery IDs and corresponding ID labels ahead of time, then label the batteries one by one as they are brought in for service.

When you are dealing with a large fleet of mixed battery models, you will find it easiest to create distinct groups among your battery ID's by adding to the numeric ID numbers prefixes that identify the battery model or group to which the battery belongs. Using group IDs, you can create and print ahead of time, for example, 200 IDs for each of 4 battery models active in your fleet. The prefix allows you to identify the right label for each model without confusion when labeling batches of mixed batteries brought in for service.

Types of Battery IDs

i	Pure Individual	Always 10 digits in length.
iG	Individual in Group	Battery IDs that belong to a Group. These BIDs have a prefix of up to 5 characters and a 6 digit number.
T	Long Battery IDs	Long Battery IDs allow up to 30 characters and support a combination of alpha-numeric characters, the PERIOD, and the DASH (-) characters.

Examples of battery IDs with identifying prefixes:

MOT.000001 to MOT.000200	200 battery ID numbers for Motorola Communications model NTN714AR
NTT.000001 to NTT.000200	200 battery ID numbers for NTT model TZ-803
RA.000001 to RA.000200	200 battery ID numbers for Racal model 520018
MIT.000001 to MIT.000200	200 battery ID numbers for Mitsubishi model SW1450

Add a battery ID record to the database

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery IDs**.
The Battery IDs database window appears.
- 2 Click **Add**.
The Add Battery ID Wizard appears.
- 3 Follow the on-screen prompts.

Modify a battery ID record

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery IDs**.
The Battery IDs database window appears.
- 2 Select the battery ID for which you want to change data.
- 3 Click **Modify**.
The Modify Battery ID Wizard appears.
- 4 Follow the on-screen prompts.

Search, Group, or Sort Battery ID records

Delete battery ID records from the database

Deleting a battery ID record deletes all service records for the battery.

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery IDs**.
The Battery IDs database window appears.
- 2 Select the battery ID record you want to delete.
OR
Select the group of battery ID records you want to delete.
- 3 Click **Delete**.
- 4 In the warning or confirmation dialog box that appears, click **Yes** to confirm deletion of the battery ID or group of battery IDs and all associated service records.

Tip Battery ID groups are identified with G in the Type column of the battery ID database grid. Individual battery ID records have iG in the Type column.

Print battery ID labels

Important! When you are placing a roll of labels on the printer label spool, be sure that the right side of the spool is adjusted so that it fits snugly against the roll.

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Battery IDs**. The Battery IDs database window appears.
- 2 Select the Battery ID record for which you want to print a battery ID label.
- 3 Click **Print Label**.
- 4 Click **Yes** in the confirmation dialog box that appears.
- 5 The label prints to the default printer specified for Battery ID labels.

Tip Before you can print a battery ID label, you must set up the Battery ID label format and printer.

Import Battery IDs

To import Battery IDs from a text file, a Battery ID file must previously have been exported from BatteryShop.

If a Battery ID file is available, follow these steps to import the data into BatteryShop:

- 1 Choose **Import** on the Battery IDs form to display the **Open** file dialog.
- 2 Navigate to the directory containing the file **bsbid.txt** and choose **Open**. The Battery IDs in the file will be imported into the database and the data should appear in the Battery IDs form.

Export Battery IDs

To export Battery IDs to a text file, follow these steps:

- 1 From the Battery IDs form, select the record(s) in the grid to export
- 2 Choose **Export** to display a **Save** file dialog.
- 3 Specify a name for the text file, default is **bsbid.txt**, and choose **OK**.

Working with battery-service data

Cadex BatteryShop battery-service records provide a valuable store of information about the batteries you service and manage.

You can create a wide variety of service-data reports using Cadex BatteryShop Reports to display battery-service records in a grid-style dialog box. You can then work with the records to create customized reports or graphs of battery characteristics or cycles. You can also delete individual battery-service records, or save battery-service records to a variety of file formats for export to other Cadex BatteryShop databases or use with other types of programs.

There are three main report types available:

- **Service History** provides a complete history of service records for selected batteries.
- **Service Counts** provides the total number of services and failures for selected batteries.
- **Battery ID Service Due** displays services that are due for selected battery IDs.

This report is available only for battery IDs that have a Service Due Period specified.

You can run these reports for a number of different combinations of serviced batteries:

- All batteries.
- All batteries for a specific customer.
- All batteries of a specific model.
- All batteries of a specific model for a specific customer.
- An individual battery.

You can specify for each of these combinations (except for an individual battery) whether you want to include only active batteries, only retired batteries, or both active and retired batteries. You can also specify service dates.

Cadex BatteryShop Reports runs independently of Cadex BatteryShop. You can open it from within Cadex BatteryShop by selecting Database and then selecting Reports, or you can choose it from the BatteryShop group in the Windows Start menu. Cadex BatteryShop does not need to be running to start Cadex BatteryShop Reports.

Refer to either of the following topics for more details:

[*Display battery-service records*](#)

[*Creating battery-service reports*](#)

Graph Battery Characteristics

- 1 Display battery-service information, selecting **View Services** as the Query Type.
The Services database window appears.

- 2 Select the battery-service record for which you want to graph battery characteristics.
 - 3 On the **View** menu, click **Battery Characteristics Graph** to display the data in graph format.
 - 4 You can use the controls in the window to specify starting and ending points for displaying data, and to format, print, and export the battery characteristics graphs.
- Note** In order to be able to display battery characteristics graphs, the Save Real-Time Data system option must be selected. See topic on [setting System Options](#) for instructions on how to do this.

Graph Cycles

Cycle Graphs display capacities taken at the end of each Discharge cycle for selected service(s).

A full-discharge is required for the analyzer to return a capacity for the cycle. A discharge with a User-defined timeout that does not result in a full discharge will not store the capacity to the database. In such a case, the Cycle Graph will not have the data to plot the capacity prior to the user defined discharge time-out.

- 1 Display battery-service information, selecting **View Services** as the Query Type.
The Services database window appears.
 - 2 Select the battery-service record(s) for which you want to graph cycles.
 - 3 On the **View** menu, click **Cycle Graph** to display the cycle data in graph format.
 - 4 You can use the controls in the window to specify starting and ending points for displaying data, and to format, print, and export the battery characteristics graphs.
- Note** In order to be able to display cycle graphs, the Save Real-Time Data system option must be selected. See topic on setting [System Options](#) for instructions on how to do this.
- Setting this option one-time, prior to running services, is important so that BatteryShop saves service data.

Exporting battery characteristic graph data to a Microsoft Excel file

- 1 From the Battery Characteristic Graph, choose the **Export Graph** button.
The **Export Data** dialog appears.
- 2 Specify the Directory and Filename for the **.csv** file and choose **Save**.

Exporting battery-service data

You can save your service-history, service-count, and service-due reports as Microsoft Excel or HTML files.

Service data records can also be saved as Cadex BatteryShop files for importing into another Cadex BatteryShop system

Refer to the appropriate topic for the following tasks:

[Save service data to a Cadex BatteryShop file](#)

[Save service data to a Microsoft Excel file](#)

[Save service data to an HTML file](#)

Delete battery-service records

- 1 Display battery-service information. See topic [Display battery-service records](#) for details.
You must choose View Services as the Query Type. The Services database window appears.
- 2 Select the battery-service record(s) you want to delete. See topic [Select battery-service records](#) for details.
- 3 From the Actions menu, click **Delete Selected Records**.
- 4 Click **OK** to confirm record deletion.

Note Service records currently in use by Cadex BatteryShop cannot be deleted.

Compact the database

- 1 If Cadex BatteryShop is currently connected to any Cadex battery analyzers (you see analyzer icons in the dark-red analyzer area), you must end the connection before you can compact the database. The only way to do this is to exit Cadex BatteryShop and then restart the program.

This does not affect any battery service programs running on the analyzers; however, service data will not be saved to Cadex BatteryShop.

- 2 From the Cadex BatteryShop main window, click **Database**, and then click **Compact DB**.

Servicing batteries

You can service batteries by entering the battery model or the unique battery ID and selecting the program you want to run. You can also service batteries by entering battery specifications manually.

When you service batteries, the Cadex BatteryShop main window displays an icon for each connected analyzer that is turned on. Icons are arranged by the number of the COM Port to which the analyzer is connected, starting in the top left corner. You can, however, drag and drop these icons anywhere you want within the dark-red analyzer icon area.

You can also display a window on-screen that updates the status of the battery service once a minute or whenever there is a change in service status.

Before you can service batteries, you must ensure that the battery analyzers are properly connected to the computer, and that Cadex BatteryShop is communicating with the connected analyzers.

Refer to the following topics for more details on servicing batteries:

[Connect to battery analyzers.](#)

[Service batteries by model number.](#)

[Service batteries by Battery ID.](#)

[Service favorite battery models.](#)

[Service batteries by favorite battery ID](#)

[Service batteries by entering battery specifications.](#)

Connect to battery analyzers

- 1 From the Cadex BatteryShop main window, click Analyzers, and then click Connect.
- 2 Click Yes in the confirmation dialog box that appears.

Cadex BatteryShop searches for battery analyzers connected to the serial ports listed in the Ports Configuration map. Refer to the Appendix topic [Set the serial ports connected to battery analyzers](#) for more information.

When it has connected with the available battery analyzer(s), it shows each analyzer as an icon in the dark-red analyzer window. Refer to the Appendix for details on [Analyzer Icon colors](#).

Tip Before Cadex BatteryShop can communicate with your Cadex battery analyzers, the analyzers must be connected to the computer (See topic [Connecting battery analyzers to the computer](#) for details), and the Cadex BatteryShop Ports map must be configured to look for the analyzers on the serial ports to which they are connected (See topic [Setting up battery analyzers](#) for details).

Note BatteryShop will limit analyzer connections to the license version of BatteryShop purchased. If you need to connect to more analyzers, please contact a Cadex sales representative to upgrade your BatteryShop license version.

It is important that all connected analyzers have the required Firmware version for correct BatteryShop operation. See Appendix topic [Ports with incorrect firmware version](#) for more details.

Service batteries by model number

- 1 Turn on the battery analyzer(s). Do not insert any batteries yet; however, you can insert battery adapters.
- 2 Ensure Cadex BatteryShop has connected to the battery analyzers. See topic [Connect to battery analyzers](#) for more details?
- 3 From the Cadex BatteryShop main window, click **Analyzers**, and then click **Analyze Battery**. The Analyze Battery – Battery Information dialog box appears.
- 4 Click **By Model**.
- 5 Enter the model number in the **Battery Model** text box:
Type the model number.

OR

If the model is one that has been serviced recently, click the down-arrow button beside the text box to display a list of recently serviced battery models, and select the model number from the list.

OR

Click the record for the model number in the battery model database grid (see **Tip** below).

The status bar at the bottom of the dialog box should display the **Ready to accept batteries!** message, along with the model number and customer name.

- 6 If you want to include the customer name in the service record:
Type the name in the **Customer Name** text box.

OR

If the customer is in the customer database, click the down-arrow button beside the text box to display the list of customers in the database, and select the customer name from the list.

- 7 Enter these settings:
 - Auto Print Service Report.** Select (check) this option if you want Cadex BatteryShop to print a service report automatically when service is complete.
 - Auto Print Service Label.** Select (check) this option if you want Cadex BatteryShop to print a service label automatically when service is complete.
 - Target Capacity (%).** Enter the target capacity for the battery, as a percentage of the manufacturer's stated capacity for the model. If the battery does not reach this pass/fail benchmark, the Auto program runs automatically to recharge the battery. See Appendix topic [Target capacity](#) for more details.
 - Station Program.** Select a program to use to service the battery from the list of available programs.
 - Analyze Mode.** Choose **Single** to service one battery or **Batch** to service several batteries of the same model.

- 8 To verify or change the extended C-Code settings for the battery model, click **Advanced**. Enter the appropriate settings as required.
- 9 Specify service notes to associate with this service record.
- 10 Insert the first battery in an analyzer battery station.
- 11 If you selected the Batch Analyze Mode in step 7, insert the next battery when the **Service Started** message appears in the status bar.

Repeat until all batteries to be serviced have been inserted in analyzer battery stations and service has started.

- 12 Click **Done** when you have no more batteries to service. The Analyze Battery – Battery Information dialog box closes, but battery service continues until complete, or until you interrupt it by removing the battery from the station.

Note Battery service continues even if you exit from Cadex BatteryShop; however, service records are not created.

Tip You can sort and group the records in the battery model database grid to make it easier to find the model you want to service.

See Appendix on how to [Sort records](#).

See Appendix on how to [Group records](#).

Service batteries by Battery ID

- 1 Turn on the battery analyzer(s). Do not insert any batteries yet; however, you can insert battery adapters.
- 2 Ensure Cadex BatteryShop is communicating with the battery analyzers. See topic [Connect to battery analyzers](#) for more details.
- 3 From the Cadex BatteryShop main window, click **Analyzers**, and then click **Analyze Battery**. The Analyze Battery – Battery Information dialog box appears.
- 4 Click **By Battery ID**.
- 5 Enter the ID number in the **Battery ID** text box:

Type the battery ID number.

OR

If the battery is one that has been serviced recently, click the down-arrow button beside the text box to display a list of recently serviced battery IDs, and select the battery ID from the list.

OR

Click the record for the battery ID in the battery ID database grid (see **Tip** below).

The status bar at the bottom of the dialog box should display the **Ready to accept batteries!** message, along with the battery ID number.

- 6 Enter these settings:
 - Auto Print Service Report.** Select (check) this option if you want Cadex BatteryShop to print a service report automatically when service is complete.
 - Auto Print Service Label.** Select (check) this option if you want Cadex BatteryShop to print a service label automatically when service is complete.
 - Target Capacity (%).** Enter the target capacity for the battery, as a percentage of the manufacturer's stated capacity for the model. If the battery does not reach this pass/fail benchmark, the Auto program runs automatically to recharge the battery. See Appendix topic [Target capacity](#) for more details.
 - Station Program.** Select a program to use to service the battery from the list of available programs.
- 7 To verify or change the extended C-Code settings for the battery model, click **Advanced**. Enter the appropriate settings as required.
- 8 Specify service notes to associate with this service record.
- 9 Insert the battery in an analyzer battery station.
- 10 Click **Done** when the **Service Started** message appears in the status bar.

The Analyze Battery – Battery Information dialog box closes, but battery service continues until complete, or until you interrupt it by removing the battery from the station.

Note Battery service continues even if you exit from Cadex BatteryShop; however, service records are not created.

Tip You can sort and group the records in the battery ID database grid to make it easier to find the battery you want to service.

See Appendix on how to [Sort records](#).

See Appendix on how to [Group records](#).

Service favorite battery models

- 1 Turn on the battery analyzer(s). Do not insert any batteries yet; however, you can insert battery adapters.
- 2 Ensure Cadex BatteryShop is communicating with the battery analyzers. See topic [Connect to battery analyzers](#) for more details?
- 3 From the Cadex BatteryShop main window, click **Analyzers**, and then click **Analyze Battery**. The Analyze Battery – Battery Information dialog box appears.
- 4 Click **By Favorite Model**. Only battery model records that have been selected as favorites appear in the battery model database grid.
- 5 Click the record for the battery model you want to service (see **Tip** below).

The status bar at the bottom of the dialog box should display the **Ready to accept batteries!** message, along with the model number and customer name.

- 6 Enter these settings:

Auto Print Service Report. Select (check) this option if you want Cadex BatteryShop to print a service report automatically when service is complete.

Auto Print Service Label. Select (check) this option if you want Cadex BatteryShop to print a service label automatically when service is complete.

Target Capacity (%). Enter the target capacity for the battery, as a percentage of the manufacturer's stated capacity for the model. If the battery does not reach this pass/fail benchmark, the Auto program runs automatically to recharge the battery. See Appendix topic [Target capacity](#) for more details.

Station Program. Select a program to use to service the battery from the list of available programs.

Analyze Mode. Choose **Single** to service one battery or **Batch** to service several batteries of the same model.

- 7 To verify or change the extended C-Code settings for the battery model, click **Advanced**. Enter the appropriate settings as required.
- 8 Specify service notes to associate with this service record.
- 9 Insert the first battery in an analyzer battery station.
- 10 If you selected the Batch Analyze Mode in step 7, insert the next battery when the **Service Started** message appears in the status bar.

Repeat until all batteries to be serviced have been inserted in analyzer battery stations and service has started.

- 11 Click **Done** when you have no more batteries to service.

The Analyze Battery – Battery Information dialog box closes, but battery service continues until complete, or until you interrupt it by removing the battery from the station.

Note Battery service continues even if you exit from Cadex BatteryShop; however, service records are not created.

Tip You can sort and group the records in the battery model database grid to make it easier to find the model you want to service.

See Appendix on how to [Sort records](#).

See Appendix on how to [Group records](#).

Service batteries by favorite battery ID

- 1 Turn on the battery analyzer(s). Do not insert any batteries yet; however, you can insert battery adapters.
- 2 Ensure Cadex BatteryShop is communicating with the battery analyzers. See topic [Connect to battery analyzers](#) for more details.
- 3 From the Cadex BatteryShop main window, click **Analyzers**, and then click **Analyze Battery**. The Analyze Battery – Battery Information dialog box appears.
- 4 Click **By Favorite Battery ID**. Only battery ID records that have been selected as favorites appear in the battery ID database grid.
- 5 Click the record for the battery model you want to service (see **Tip** below).

The status bar at the bottom of the dialog box should display the **Ready to accept batteries!** message, along with the battery ID number.

- 6 Enter these settings:
 - Auto Print Service Report.** Select (check) this option if you want Cadex BatteryShop to print a service report automatically when service is complete.
 - Auto Print Service Label.** Select (check) this option if you want Cadex BatteryShop to print a service label automatically when service is complete.
 - Target Capacity (%).** Enter the target capacity for the battery, as a percentage of the manufacturer's stated capacity for the model. If the battery does not reach this pass/fail benchmark, the Auto program runs automatically to recharge the battery. See Appendix topic [Target capacity](#) for more details.
 - Station Program.** Select a program to use to service the battery from the list of available programs.
- 7 To verify or change the extended C-Code settings for the battery model, click **Advanced**. Enter the appropriate settings as required.
- 8 Specify service notes to associate with this service record.
- 9 Insert the battery in an analyzer battery station.
- 10 Click **Done** when the **Service Started** message appears in the status bar.

The Analyze Battery – Battery Information dialog box closes, but battery service continues until complete, or until you interrupt it by removing the battery from the station.

Note Battery service continues even if you exit from Cadex BatteryShop; however, service records are not created.

Tip You can sort and group the records in the battery ID database grid to make it easier to find the battery you want to service.

See Appendix on how to [Sort records](#).

See Appendix on how to [Group records](#).

Service batteries by entering battery specifications

- 1 Turn on the battery analyzer(s). Do not insert any batteries yet; however, you can insert battery adapters.
- 2 Ensure Cadex BatteryShop is communicating with the battery analyzers. See topic [Connect to battery analyzers](#) for more details.
- 3 From the Cadex BatteryShop main window, click **Analyzers**, and then click **Analyze Battery**. The Analyze Battery – Battery Information dialog box appears.
- 4 Click **Manual Entry**.
- 5 Enter these settings according to the battery manufacturer's specifications.

Chemistry. Select the battery chemistry from the list. Chemistry is often labeled on the battery.

Voltage. See Appendix topic [Battery Voltage \(volts\)](#) for more details.

Rating. See Appendix topic [Battery Rating \(mAh\)](#) for more details.

The status bar at the bottom of the dialog box should display the **Ready to accept batteries!** message, along with the chemistry, voltage, and rating settings.

- 6 Enter these settings:
 - Auto Print Service Report.** Select (check) this option if you want Cadex BatteryShop to print a service report automatically when service is complete.
 - Auto Print Service Label.** Select (check) this option if you want Cadex BatteryShop to print a service label automatically when service is complete.
 - Target Capacity (%).** Enter the target capacity for the battery, as a percentage of the manufacturer's stated capacity for the model. If the battery does not reach this pass/fail benchmark, the Auto program runs automatically to recharge the battery. See Appendix topic [Target capacity](#) for details.
 - Station Program.** Select a program to use to service the battery from the list of available programs.
 - Analyze Mode.** Choose **Single** to service one battery or **Batch** to service several batteries of the same model.
- 7 To verify or change the extended C-Code settings for the battery model, click **Advanced**. Enter the appropriate settings as required.
- 8 Specify service notes to associate with this service record.
- 9 Insert the battery in an analyzer battery station.
- 10 Click **Done** when the **Service Started** message appears in the status bar.

The Analyze Battery – Battery Information dialog box closes, but battery service continues until complete, or until you interrupt it by removing the battery from the station.

Note Battery service continues even if you exit Cadex BatteryShop; however, service records are not created.

Service batteries by Battery ID or Battery Model

- 1 Turn on the battery analyzer(s). Do not insert any batteries yet; however, you can insert [battery adapters](#).
- 2 Ensure Cadex BatteryShop is communicating with the battery analyzers. See [Connect to battery analyzers](#) for more details.
- 3 From the Cadex BatteryShop main window, click **Analyzers**, and then click **Analyze Battery**. The Analyze Battery – Battery Information dialog box appears.
- 4 Click **Quick Entry**.
- 5 Enter the following information to start a Quick Entry service.

Serial No.

Model#.

Program.

The Serial No. combo box is visible only if the option is set (default) in [System Setup Options](#) (**Service Options** page). The combo box lists [favorite battery IDs](#) only.

The Model# dropdown box only lists [favorite battery models](#) from which to select a model to associate with the Serial#. You cannot type into the Model# dropdown control. If a battery model is already associated with a Serial#, the Model# control will be disabled and it will not be possible to associate another model with the Serial# via the Quick Entry screen. However, it is possible to associate a different battery model to the Serial# via the [Modify Battery ID Wizard](#).

The status bar at the bottom of the dialog box should display the **Ready to accept batteries!** message, along with the chemistry, voltage, and rating settings.

- 6 Specify service notes to associate with this service record.
- 7 Insert the battery in an analyzer battery station.
- 8 Click **Done** when the **Service Started** message appears in the status bar.

The Analyze Battery – Battery Information dialog box closes, but battery service continues until complete, or until you interrupt it by removing the battery from the station.

Notes: Battery service, on the analyzer, continues even if you exit Cadex BatteryShop; however, BatteryShop service records are not updated.

The **Other Software** interface is strictly for launching other software that can be launched from BatteryShop. If **Phone Checker** is installed on the same PC as BatteryShop, it is possible to launch Phone Checker by clicking on the **Launch Phone Checker** button or by clicking **Analyzers** and then clicking **Analyze Phone** in the main BatteryShop window. The Other Software interface can be disabled by clicking on the **Disable Other Software** button. The Other Software interface can be enabled via [System Setup Options](#).

Restarting a service

You can re-start a running service on a C7200/C7400/C7400 ER analyzer.

To re-start the service, right-click on the required analyzer icon station, on the main BatteryShop window, and choose Restart Service.

Notes: The Analyze Battery window must be closed to restart a service.

You cannot change the Program or C-Code for the service you want to restart.

Monitoring battery service

You can use the Cadex BatteryShop Real-Time Status function to keep track of battery-service progress. The Detail Info form displays information about the battery being serviced along with real-time values of current, voltage, temperature, capacity, and impedance, or you can display a chart showing amperage, voltage, battery temperature, and impedance from the start of service to the current moment.

You can also use the Data Monitor to check the connection between your computer and analyzer and ensure that data is being communicated between both devices.

Both the real-time status dialog box and the Data Monitor update and display the status of the battery service once a minute. The Data Monitor also registers any change in service status (for example, when the battery analyzer switches from Charging to Discharging a battery) as it happens.

Refer to the following topics for details on monitoring a battery service:

[Displaying the current status of batteries being serviced.](#)

[Displaying the Data Monitor](#) to verify communication between your computer and analyzers.

Displaying the current status of batteries being serviced

To display real-time battery status

An analyzer icon can have two or four stations depending on the analyzer to which BatteryShop has connected to on a given COM Port. See Appendix topic [Analyzer icon colors](#) for more details on the meaning of station colors.

The Real-Time Status dialog box appears after double-clicking on the analyzer icon battery station. You can use this dialog box to view detailed battery information or a chart showing amperage, voltage, battery temperature, and impedance readings since the start of service, to print service reports and labels, and to export data to other formats.

You can have Real-Time Status dialog boxes open for up to four battery stations at a time.

Refer to the following topics for more details on the current status of batteries being serviced:

[Display detailed battery information.](#)

[Display real-time status as a chart.](#)

[Print a service report immediately.](#)

[Print a service label immediately.](#)

[Print a service report at service completion.](#)

[Print a service label at service completion](#)

[Export real-time battery-service data.](#)

Display detailed battery information

- 1 Open the Real-Time Status window for the battery station for which you want to see battery-service data by double-clicking on the corresponding bar in the analyzer icon.
- 2 Click the **Detail Info** tab, if necessary, to display detailed battery information.

The **Detail Info** tab displays information about the battery being serviced, including C-Code settings, as well as these real-time values that are updated to reflect current battery service as long as the Real-Time Status dialog box is open:

- **Current.** The electrical current (in milliamps) being applied to the battery at the moment.
- **Battery Status.** The service currently being performed on the battery. This is not the same as the program being run, which is shown as part of the C-Code information. For example, if you are running the Auto program, Battery Status could read Charge or Discharge, depending on the current program cycle being performed.
- **Capacity (1st, 2nd, final).** This displays up to three battery capacities measured by the battery analyzer to the current moment.

If battery capacity is determined more than once during a program, the first number is the first battery capacity reached, the second number is the second battery capacity reached, and the third number is the most recent battery capacity reached. If the analyzer has determined battery capacity only once, the first and third numbers are identical, and the second is blank.

- **Voltage.** The number of milliVolts per cell currently being applied to the battery.
- **Temperature.** The current battery temperature in degrees Celsius.
- **Impedance.** The most recent impedance (OhmTest) reading (in milliOhms), if available.

Display real-time status as a chart

- 1 Open the Real-Time Status window for the battery station for which you want to see battery-service data by double-clicking on the corresponding bar in the analyzer icon.
- 2 Click the Chart tab to display the data charts.
- 3 If you want to change the size of the chart:
 - a. Position the mouse cursor on any chart border or corner until you see the cursor change to a double-headed arrow.
 - b. Click and drag the border to the size you want.

The Chart tab displays four graphs. For each graph, the x-axis (the horizontal axis) displays elapsed time in minutes. Each graph displays a different battery service value along its y-axis (vertical axis):

- Amperage (mA). This line graph displays a green line indicating the electrical current applied to the battery by the analyzer from the start of battery service to the present.
- Voltage (mV). This line graph displays a blue line indicating the voltage applied to the battery from the start of battery service to the present.
- Temperature (C). This line graph displays a red line indicating battery temperature from the start of service to the present.
- Impedance (mOhm). This bar graph displays impedance (OhmTest) readings as purple bars from the start of service to the present.

Graphs are updated to reflect current values as long as the Real-Time Status dialog box is open.

Print a service report immediately

- 1 On the battery analyzer icon, double-click the bar that corresponds to the battery station for which you want to print a battery service report. The Real-Time Status dialog box appears.
- 2 Click **File**, and then click **Print Service Report**.

The service report prints on the default printer. It reflects service data completed to the time the report was printed.

Print a service label immediately

Important! When you are placing a roll of labels on the printer label spool, be sure that the right side of the spool is adjusted so that it fits snugly against the roll.

- 1 On the battery analyzer icon, double-click the bar that corresponds to the battery station for which you want to print a battery service label. The Real-Time Status dialog box appears.
- 2 Click **File**, and then click **Print Service Label**.

The service label prints on the default label printer.

Print a service report at service completion

- 1 On the battery analyzer icon, double-click the bar that corresponds to the battery station for which you want to print a battery service report. The Real-Time Status dialog box appears.
- 2 Click **Options**, and then click **Auto Print Service Report**.
The service report prints on the default printer when the battery service is complete.

Print a service label at service completion

Important! When you are placing a roll of labels on the printer label spool, be sure that the right side of the spool is adjusted so that it fits snugly against the roll.

- 1 On the battery analyzer icon, double-click the bar that corresponds to the battery station for which you want to print a battery service label. The Real-Time Status dialog box appears.
- 2 Click **Options**, and then click **Auto Print Service Label**.
The service label prints on the default label printer.

Displaying the Data Monitor

- From the Cadex BatteryShop main window, click **Analyzers**, and then click **Data Monitor**. The Data Monitor window appears.
The Data Monitor screen should display lines of text to show that Cadex BatteryShop is communicating with the connected analyzers. If the Data Monitor screen stays blank, your computer is not communicating with any analyzer. Check the following items:
- Is the analyzer properly connected to your computer? See topic [Connecting battery analyzers to the computer](#) for details.
- Is your analyzer plugged in to an appropriate power source and turned on?
- Is your analyzer set to BatteryShop mode? See topic [Setting up battery analyzers](#) for details.
- Is Cadex BatteryShop looking for the analyzer on the appropriate serial port? See topic [Setting the serial ports connected to battery analyzers](#) for details.
- Did you connect Cadex BatteryShop to the analyzer? See topic [Connect to battery analyzers](#) for details.

Battery Service Programs

Cadex BatteryShop comes with twelve pre-programmed battery services. These programs are also available on Cadex battery analyzers in stand-alone mode.

Basic Programs

The four basic programs are well suited for most battery service applications:

- Auto. See topic [Auto Program](#) for details.
- Charge. See topic [Charge Program](#) for details.
- Prime. See topic [Prime Program](#) for details.
- QuickSort (Cadex 7000 C-Series battery analyzers only) See topic [QuickSort Program](#) for details.
- QuickTest (Cadex 7000 Series battery analyzers only). See topic [QuickTest Program](#) for details.

Auto Program

The Auto Program exercises batteries to maintain optimum performance. If the target capacity of NiCd and NiMH batteries cannot be reached, a reconditioning cycle is automatically applied.

Use this program to

- Restore batteries affected by memory.
- Perform routine weekly or monthly battery maintenance.
- Identify marginally performing batteries.
- Service batteries in unknown condition.
- Verify battery condition for warranty claim

Approximate service time at default C-rate:

NiCd and NiMH	2.5 – 10 hours
SLA	20 – 40 hours
Li-ion	6 – 20 hours

Charge Program

The Charge Program applies a fast charge to a battery. No capacity readings are taken and no discharge is applied.

Use this program to

- Charge batteries quickly.
- Top up partially discharged or partially used batteries.

Approximate service time at default C-rate:

NiCd and NiMH	1.5 hours
---------------	-----------

SLA	10 hours
Li-ion	4 hours

Prime Program

The Prime Program repeatedly cycles battery until maximum capacity is reached. If capacity improvement is more than 5% over previous reading, an additional cycle is applied.

Use this program to

- Prepare new batteries for field use.
- Condition batteries that have been in storage. Do not store Smart Batteries in discharged state.

Approximate service time at default C-rate:

NiCd and NiMH	5 – 10 hours
SLA	40 – 80 hours
Li-ion	12 – 25 hours

QuickTest Program

The QuickTest program tests battery SoH using data from other batteries of the same model, as stored in the QuickTest matrix.

If you do not have a QuickTest matrix for the model of battery you want to test, you can create one using the [Learn program](#).

You can tell whether there is a QuickTest matrix available for your battery by looking up the battery in your Battery Models database. The Battery Models database has a Confidence Grade (CG) field. If you see a letter “C” or “B” in the CG column for a battery model, there is a QuickTest matrix stored in the database for that battery model.

Note: You must be using a Cadex 7200 or a Cadex 7400 battery analyzer with a 16 k battery adapter to be able to use the QuickTest program.

A QuickTest matrix must be re-learned whenever the C-Code for the battery model is altered. Otherwise, a QuickTest service for the battery model will yield incorrect SOH readings. The matrix for the battery model will be erased whenever the C-Code is modified. It is possible to manually erase a matrix. See Appendix topic [Erasing a Matrix for a battery model from the BatteryShop database](#) for details.

BatteryShop cannot use pre-firmware 6.00 matrices for QuickTest. If you upgraded from a pre-version 6.00 BatteryShop, the matrices will not be imported into the new database. Therefore, you will have to run the Learn program again to create a new matrix before you can run a QuickTest service.

Use this program to

- Analyze battery SoH quickly and accurately.

Approximate service time:

All chemistries: Approximately 2 minutes

It is safe to stop a QuickTest service that lasts longer than 15 minutes and assume a poor battery. Running a QuickTest for a longer duration will not yield better results.

QuickSort Program

QuickSort can only be used with single cell Li-ion batteries with a rating in the range of 500mA – 1500mA to quickly sort a large pool of batteries prior to thorough testing or conditioning. The battery must have at least 40% State of Charge.

It will determine if a battery's SoH is good enough to be sent back out in to the field, or if the battery should be more thoroughly tested so that it can be returned for warranty replacement or recycled.

A QuickSort percentage result DOES NOT imply battery capacity:

80% or greater implies a good battery.

70% - 79% implies a battery with low SoH that requires priming.

69% or less implies a poor battery that either qualifies for warranty replacement or should be recycled.

Use this program to

Sort a large number of single cell Li batteries quickly prior to through testing.

Approximate service time:

Single cell Li batteries only: Approximately 30 seconds

Notes:

QuickSort is available only on 16k battery adapters. These adapters are marked with a '16K' label on the rear of the adapter. QuickSort can be selected only when the Li-ion C-Code is selected.

The battery must have at least 40% State of Charge.

This program works for single cell Li-ion, 3.6V, and 500mA to 1500mAh batteries and with the FlexArm adapter (07-110-0180).

Advanced Programs

There are also eight specialty programs to meet a wider variety of battery service needs:

- OhmTest. See topic [OhmTest Program](#) for details.
- Runtime. See topic [Runtime Program](#) for details.
- Self Discharge. See topic [Self Discharge Program](#) for details.
- Life Cycling. See topic [Life Cycling Program](#) for details.
- Discharge Only. See topic [Discharge Only Program](#) for details.
- Extended Prime. See topic [Extended Prime Program](#) for details.
- Learn (Cadex 7000 C-Series and Cadex 7000 Series battery analyzers only). See topic [Learn Program](#) for details.

- Boost (Cadex 7000 C-Series and Cadex 7000 Series battery analyzers only). See topic [Power Boost Program](#) for details.
- QuickTest (Cadex 7000 C-Series battery analyzers only). See topic [QuickTest Program](#) for details.

For more detailed information about Cadex basic and advanced programs, consult your Cadex battery analyzer user's manual.

OhmTest Program

The OhmTest Program tests internal resistance against a user-definable resistance threshold and passes or fails the battery.

If using a Cadex 7000 C-Series or Cadex 7000 Series battery analyzer, set the analyzer resistance threshold points (OhmTest setpoints) from Cadex BatteryShop. [How?](#)

Use this program to

- Check if the battery is in good condition.
- Determine if the battery requires to be analyzed further.

Approximate service time:

All chemistries: Approximately 10 seconds

Runtime Program

The Runtime Program measures the length of time a battery can provide a given current and remain above its End of Voltage point. The service time of the Runtime Program depends on the settings.

If using a Cadex 7000 C-Series or Cadex 7000 Series battery analyzer, you can specify the Runtime program settings from Cadex BatteryShop. See Appendix topic [Set analyzer program options](#) for details

Use this program to

- Test runtime of batteries for wireless communications equipment.

Self Discharge Program

Reads fully charged battery capacity, recharges and reads the capacity again after a user definable rest period. If the second reading is lower by 30% or more, the battery is failed.

If using a Cadex 7000 C-Series or Cadex 7000 Series battery analyzer, you can specify the rest period from Cadex BatteryShop. See Appendix topic [Set analyzer program options](#) for details.

Use this program to

- Identify high self discharge on batteries that otherwise may have good capacity readings.

Approximate service time:

NiCd and NiMH	30 hours
SLA	60 hours
Li-ion	50 hours

Life Cycling Program

The Life Cycling Program continuously cycles the battery until capacity drops below the target capacity. It displays the initial capacity, final capacity, OhmTest result, and self discharge readings (if included).

Note This is a destructive test that cycles a battery until it fails. Do not run this program on a battery you need to use.

Use this program to

- Verify battery life cycle.
- Estimate performance time.

Approximate service time:

NiCd	1500 cycles
NiMH	500 cycles
SLA	200 – 500 cycles
Li-ion	1000 cycles

Discharge Only Program

The Discharge Only Program discharges a battery to the End Of Discharge setting in the battery's C-Code.

Use this program to

- Determine residual capacity of battery.
- Prepare batteries for storage. Do not store Smart Batteries in discharged state.
- Determine battery performance under load.

Approximate service time at default C-rate:

NiCd and NiMH	1.5 hours
SLA	20 hours
Li-ion	4 hours

Extended Prime Program

The Extended Prime Program applies a 16-hour trickle charge, followed by cycling to obtain peak capacity.

Use this program to

- Prepare new batteries or batteries that have been in extended storage for use.

Approximate service time at default C-rate:

NiCd and NiMH	21 – 26 hours
SLA	56 – 96 hours
Li-ion	28 – 41 hours

Learn Program

The Learn program profiles a battery to create a QuickTest matrix. The QuickTest program uses the matrix to quickly estimate the State of Health (SoH) of a battery.

Ensure that both the analyzer and adapter used to create a matrix are calibrated.

How to calibrate:

[C7x00](#)

[Adapter](#)

To create an effective QuickTest matrix follow these steps:

- 1 Calibrate the adapter and ensure that the C-Code for the battery is correct.
- 2 If you are using a battery that has not been used for two months or more, run the **Prime** program on the battery before running it through the **Learn** program. [Follow precaution for Nickel-based batteries before running Learn program.](#)
- 3 Run the **Learn** program using a good battery (**metered capacity > 80%**). After Learn has completed, take the same battery and run it again in the same adapter using **QuickTest**. The final SoH (state of Health) result should be within the range of the actual battery capacity. If not, erase the matrix ([Delete matrix for the selected battery model](#)) and start over. Once successful, test other batteries of the same capacity if possible to ensure that the SoH readings are within an acceptable range.
- 4 To create the most effective matrix, repeat the previous step with more batteries. It is recommended to run a Learn program on at least three batteries: above 90% capacity, 70-80% capacity and less than 70% capacity. The batteries can be Learned in any order.
- 5 Changing anything in the C-Code, apart from the target capacity and program will erase the matrix.
- 6 You can **freeze a matrix** from further unwanted augmentation by follow instructions to [protect the matrix](#).

Note: You must use a Cadex 7000 C-Series or Cadex 7000 Series battery analyzer with a 16kb battery adapter to be able to use the Learn program.

Batteries with resistance above 800mOhm (as measured by OhmTest) should not be used with the Learn program.

Use this program to

- Create QuickTest matrices for a battery model.
- Increase QuickTest [accuracy](#) for a battery model.

Approximate service time:

All chemistries: 4 – 8 hours per battery for Learn
5 minutes for [Q-Learn](#)

Power Boost Program

The Power Boost program applies a trickle charge for 60 seconds or until battery voltage increases past the end-of-discharge voltage setting (whichever comes first), and then discharges for ten seconds.

Note A Cadex 7000 C-Series or Cadex 7000 Series battery analyzer is required to use the Boost program.

Use this program to

- Reactivate batteries with open or shorted protection circuits, or with voltage so low that Cadex BatteryShop does not recognize them when they are inserted in battery adapters in the analyzer.

Approximate service time:

All chemistries: Approximately 70 seconds

Custom Programs

You can also create your own battery service programs to meet your specific needs.

Custom battery service programs

You can create customized battery service programs with any combination of service operations for specialized battery service needs or for special batteries. Each program can have up to six phases. See Appendix topic [Program Phases](#) for details.

There is no limit to the number of custom programs you can create and store in Cadex BatteryShop.

It is possible to overheat and damage a battery by using an incorrect or inappropriate program. For this reason, the use of custom programs is recommended *only* for those who have a detailed understanding of batteries and battery maintenance, as well as of how battery analyzers in the Cadex 7000 series function.

Basic and advanced programs cannot be deleted or modified, although it is possible to copy and rename an existing program to create a new custom program.

Cadex creates Custom Programs regularly. You can download these programs from the [Cadex Web site \(www.cadex.com\)](http://www.cadex.com) and import them into Cadex BatteryShop.

Note If security is active, you cannot add or delete custom programs, or modify any settings in custom programs.

Refer to the following topics for more details on Custom programs

[Add a custom program.](#)

[Create a custom program from an existing program.](#)

[Modifying programs.](#)

[Delete a custom program.](#)

[Import a custom program.](#)

[Export a custom program.](#)

Add a custom program

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Programs**. The Custom Programs dialog box appears.
- 2 Click **Add**. The Add Custom Program dialog box appears.
- 3 Enter these settings:
 - Program Name.** Type a name for your new program.
 - Analyzer Short Name.** Type a shortened version of the program name (to a maximum of 9 characters). This is the name that appears on the battery analyzer display screen.
 - Set Program as Active.** Select (check) this option if you want to be able to select the program when you are servicing batteries. Clear the option if you do not want to make it available for battery service.
- 4 Click **Add**. The new program appears in the list of programs with the name highlighted.
- 5 Click **Phase 1** in the Program Phases section of the dialog box.
- 6 Select the actions to be performed in Cycles 1 and 2 and the Test of Phase 1, and enter any required settings for the chosen actions. See Appendix topic [Program Phases](#) for details.
- 7 Repeat steps 5 and 6 for Phases 2 through 6.
- 8 Click **Save**.
- 9 In the confirmation dialog box that appears, click Yes.
- 10 Click **OK**.
- 11 Click **Close** to return to the Cadex BatteryShop main window.

Create a custom program from an existing program

You can modify a copy of an existing basic, advanced, or custom program to create a new custom program quickly.

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Programs**. The Custom Programs dialog box appears.
- 2 Click the name of the basic, advanced, or custom program you want to copy.
- 3 Click **Copy**. The Copy Custom Program dialog box appears.
- 4 Enter these settings in the dialog box that appears:
 - Program Name.** Type a name for your new program.
 - Analyzer Short Name.** Type a shortened version of the program name (to a maximum of 9 characters). This is the name that appears on the battery analyzer display screen.
 - Set Program as Active.** Select (check) this option if you want to be able to select the program when you are servicing batteries. Clear the option if you do not want to make it available for battery service.
- 5 Click **Copy**. The new program appears in the list of programs with the name highlighted.
- 6 Click **Phase 1** in the Program Phases section of the dialog box.
- 7 Select the actions to be performed in Cycles 1 and 2 and the Test of Phase 1, and enter any required settings for the chosen actions. See Appendix topic [Program Phases](#) for details.
- 8 Repeat steps 5 and 6 for Phases 2 through 6.
- 9 Click **Save**.
- 10 In the confirmation dialog box that appears, click **Yes**.
- 11 Click **OK**.
- 12 Click **Close** to return to the Cadex BatteryShop main window.

Modifying programs

You can set any basic, advanced, or custom program as active or inactive. Active programs are included in the list of Station Programs in the Analyze Battery – Battery Information dialog box, and are therefore available to use for servicing batteries. See topic [Servicing batteries](#) for details.

You can also edit the name, analyzer name, and program phase settings for any custom program in your programs database.

Refer to the following topics for details:

[Set a program as active or inactive.](#)

[Change the name of a custom program.](#)

[Modify a custom program.](#)

[Import a custom program.](#)

[Export a custom program](#)

Delete a custom program

Deleting a custom program deletes all related service records.

From the Cadex BatteryShop main window, click Database, and then click Programs. The Custom Programs dialog box appears.

- 1 Select the custom program that you want to delete.
- 2 Click **Delete**.
- 3 In the warning or confirmation dialog box that appears, click **Yes** to confirm deletion of the program and all associated service records.

Import a custom program

You can import a Custom Program file as a completely new custom program or as an update to an existing custom program of the same name.

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Programs**. The Custom Programs dialog box appears.
- 2 Click **Import**. The Import Custom Program File dialog box appears.
- 3 Select the file to import.
Custom program files have a *.cpg* extension.
- 4 Click **Open**. The imported program appears in the list.

Export a custom program

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Programs**. The Custom Programs dialog box appears.
- 2 Click the name of the basic, advanced, or custom program you want to export.
- 3 Click **Export**. The Export Custom Programs dialog box appears.
- 4 Enter a name for the custom program file.
The file name is automatically given an extension of *.cpg*.
- 5 If you want to export the program as a read-only file, select (check) the **Open as read-only** check box.
- 6 Click **Save**.

Analyzing and Reporting Service Data

[Displaying the current status of batteries being serviced](#)

Working with battery-service data

Cadex BatteryShop battery-service records provide a valuable store of information about the batteries you service and manage.

You can create a wide variety of service-data reports using Cadex BatteryShop Reports to display battery-service records in a grid-style dialog box. You can then work with the records to create customized reports or graphs of battery characteristics or cycles. You can also delete individual battery-service records, or save battery-service records to a variety of file formats for export to other Cadex BatteryShop databases or use with other types of programs.

There are three main report types available:

Service History provides a complete history of service records for selected batteries.

Service Counts provides the total number of services and failures for selected batteries.

Battery ID Service Due displays services that are due for selected battery IDs.

This report is available only for battery IDs that have a Service Due Period specified.

You can run these reports for a number of different combinations of serviced batteries:

All batteries.

All batteries for a specific customer.

All batteries of a specific model.

All batteries of a specific model for a specific customer.

An individual battery.

You can specify for each of these combinations (except for an individual battery) whether you want to include only active batteries, only retired batteries, or both active and retired batteries. You can also specify service dates.

Cadex BatteryShop Reports runs independently of Cadex BatteryShop. You can open it from within Cadex BatteryShop by selecting Database and then selecting Reports, or you can choose it from the BatteryShop group in the Windows Start menu. Cadex BatteryShop does not need to be running to start Cadex BatteryShop Reports.

Refer to the following topics for details:

[Display battery-service information.](#)

[Creating battery-service reports.](#)

[Graph Battery Characteristics.](#)

[Graph Cycles.](#)

[Exporting battery-service data.](#)

[Delete battery-service records.](#)

Programming Adapters

You can manually program C-Code/Matrix settings on a Cadex battery adapter.

- 1 Insert an adapter into a Cadex C7000 Series analyzer.
- 2 From BatteryShop, right-click on the analyzer station icon where the adapter was inserted.
- 3 Select **C-Code/Matrix Transfer** menu option from the context menu to display the C-Code/Matrix Transfer dialog.

Troubleshooting

C7000 and C7000ER message and warning codes

For more information about individual messages and warnings, see the battery analyzer User's Manual.

Code	Global Message	Detail Message
0	OFFLINE	STATION OFF LINE
1	NO ADAPT	NO ADAPTER
2	CHARGE	CHARGING
3	TRKL CHRГ	TRICKLE CHARGE
4	RECOND	RECONDITIONING
5	READY	READY
6	DCHG WAIT	DISCHARGE WAIT
7	DISCHARGE	DISCHARGING
8	INSERT	INSERT THE BATTERY
9	CHG WAIT	CHARGE WAIT
10	EMPTY	NO BATTERY
11	START	START BATTERY PROCESSING
12	COLD WAIT	BATTERY TOO COLD
13	HOT WAIT	BATTERY TOO HOT
14	OVERHEAT	BATTERY OVER TEMP
15	FINISHED	PROCESS COMPLETED
16	WARNING	PROGRAM FAULT DETECTED
17	REMOVED	BATTERY REMOVED
18	INTERRUPT	PROCESS SUSPENDED
19	RESTING	RESTING XX:XX
20	INSERTED	BATTERY INSERTED
21	RESTING	RESTING XX:XX
22	CAL WAIT	SETTING UP CALIBRATION
23	CALIBRATE	STATION CALIBRATING
26	REMOVED	BATTERY REMOVED
27	OHMTEST	RESISTANCE TEST
28	OHMTEST	RESISTANCE TEST

Code	Global Message	Detail Message
29	CALIBRATE	CALIBRATE
30	END CYCLE	CHARGE CYCLE COMPLETE
31	END CYCLE	DISCHARGE CYCLE COMPLETE
32	RESUMED	CYCLE RESUMED
33	END CYCLE	USER PROGRAMMED TIMEOUT
34	BATSHOP	BATSHOP MODE WAIT
35	SM ADP IN	SM-BUS ADAPTER INSERTED
36	SM BAT IN	SMART BATTERY INSERTED
112	WARNING	CELL MISMATCH
113	WARNING	PLATEAU TIMEOUT
115	WARNING	TARGET CAPACITY NOT MET
118	WARNING	SOFT BATTERY STEP DOWN
120	FAIL 120	OVER VOLTAGE
121	SHORT/REV	SHORTED OR REVERSED
122	FAIL 122	BATTERY SHORTED
123	FAIL 123	LOW VOLTAGE TIMEOUT 1
124	FAIL 124	LOW VOLTAGE TIMEOUT 2
125	FAIL 125	NO SLOPE TIMEOUT ZONE 1
126	FAIL 126	LOW VOLTAGE NEGATIVE SLOPE
127	FAIL 127	LOW VOLTAGE TIMEOUT 3
128	FAIL 128	SOFT BATTERY
129	FAIL 129	INTERMITTENT BATTERY
130	WARNING	CURRENT RISE
135	FAIL 135	RESISTANCE THRS. EXCEEDED
142	FAIL 142	DISCHARGE TIMEOUT
144	FAIL 144	CHARGE TIMEOUT
146	FAIL 146	RECONDITION TIMEOUT
150	FAIL 150	THERMISTOR FAILURE
152	WARNING	LOW VOLTAGE TEMP. RISE
154	WARNING	CHRG COMPLETE TEMP. RISE
156	FAIL 156	HOT AT LOW VOLTAGE
158	WARNING	CHARGE COMPLETE HOT
159	FAIL 159	TRICKLE CHARGE OVERHEAT
160	FAIL 160	BAD FUSE OR DRIVER
162	FAIL 162	DISCHARGE CURRENT LOW
164	FAIL 164	CHARGE CURRENT LOW
170	FAIL 170	CALIBRATION FAULT
188	INTERRUPT	SUSPENDED PROCESS ABORTED
192	READY	CELL MISMATCH CORRECTED
195	READY	CAP. IMPROVED TO TARGET
200	POWER ON	POWER ON
201	ADAPT IN	ADAPTER INSERTED
202	ADAPT OUT	ADAPTER REMOVED
207	SYS-TEMP	SYSTEM TEMPERATURE HIGH: COOLING
208	FAIL 208	ADAPTER NOT SETUP

Code	Global Message	Detail Message
209	FAIL 209	ADAPTER DATA INVALID
210	FAIL 210	BAD ADAPTER
211	FAIL 211	NULL C-CODE IN ADAPTER
212	PIC ERROR	PIC COMMUNICATIONS ERROR

Cadex 7000 C-Series and Cadex 7000 Series message and warning codes

For more information about individual messages and warnings, click the detailed message.

Code	Global Message	Detailed Message	
0	OFFLINE	STATION OFFLINE	Station is not reading the adapter. Remove the adapter and restart the analyzer. Make sure all your analyzers have the same firmware version number. Reset the system (see the User's Manual for the battery analyzer).
1	NO ADAPT	NO ADAPTER	No battery adapter is inserted, or the inserted adapter is not detected. Check contacts. Clean with a lint-free cotton swab dipped in 100% isopropyl alcohol.
2	CHARGE	CHARGING	Battery is being charged normally.
3	TRKL CHRG	TRICKLE CHARGE	The reconditioning process is complete, and the battery is being recharged. The program has specified a trickle charge.
4	RECOND	RECONDITIONING	Battery is being reconditioned.
5	READY	READY	Battery is ready. Faults or warnings (if any) were corrected. Remove battery and use as normal.
5	CAP: XX%	CAP. OK	Battery is ready. Faults or warnings (if any) were corrected. Battery capacity is as stated. Remove battery and use as normal.
5	CAP: XX%	READY	Battery is ready. Faults or warnings (if any) were corrected. Battery capacity is as stated. Remove battery and use as normal.
6	DCHG WAIT	DISCHARGE WAIT	Station is on hold until sufficient power is available. Wait until other stations have completed battery service.
7	DISCHARGE	DISCHARGING	Battery is being discharged

Code	Global Message	Detailed Message	
8	INSERT	INSERT THE BATTERY	normally. Insert battery in the battery adapter.
9	CHG WAIT	CHARGE WAIT	Station is on hold until sufficient power is available. This is normal if large batteries are being serviced. Service resumes automatically when sufficient power is available to the station.
10	EMPTY	NO BATTERY	No battery is inserted, or the inserted battery is not detected. Check contacts. Turn on battery switch if applicable. Check for correct battery for the adapter and adapter contacts. Clean all contacts. Run Power Boost.
11	START	START BATTERY PROCESS	Battery service has started.
12	COLD WAIT	BATTERY TOO COLD	Battery temperature is below set value when inserted. The battery automatically starts processing when temperature reaches the minimum value set in the C-Code. Warm the battery to room temperature.
13	HOT WAIT	BATTERY TOO HOT	Battery temperature is too hot when inserted. Allow the battery to cool or use the analyzer in a cooler room.
14	OVERHEAT	BATTERY OVER TEMP	Battery has overheated during charge. Station goes to Resting (code 19) until the battery cools. If using a non-OEM battery, the battery thermistor may be incorrect for the adapter. Contact Cadex to upgrade the adapter for your particular battery.
15	FINISHED	PROCESS COMPLETE	(Code 15, Code 35, Code 36) Current battery-service program is complete.
16	WARN 016	PROGRAM HAS FAILED	The custom program has produced an error, and the Next statement is not processed. The program stops. Check the custom

Code	Global Message	Detailed Message	
			program statements. Learn program was unable to update the QuickTest™ matrix due to poor battery condition, usually high internal resistance. Discard the battery and run the program with a different battery.
17	REMOVED	BATTERY REMOVED	Battery is removed when the program is complete. This message appears briefly when the battery is removed.
18	INTERRUPT	PROCESS SUSPENDED	Battery is removed during service. Re-insert battery within 5 seconds to resume service.
19	RESTING	RESTING	Station is in an automatic rest period specified in the charge program for NiMH batteries when temperature sensing for the adapter is not enabled.
20	INSERTED	BATTERY INSERTED	The battery analyzer detects a battery in an adapter.
21	RESTING	RESTING	Station is in an automatic rest period specified in the charge program for NiMH batteries when temperature sensing for the adapter is not enabled.
22	CAL WAIT	SETTING UP CALIBRATION	Station is preparing for a calibration process.
23	CALIBRATE	STATION CALIBRATING	(Code 23, Code 29) Station is being calibrated. Process takes 10 - 20 seconds
25	RESUME	PROCESS RESUMING	Battery service is continuing after a power interruption of one hour or less. This message appears after the initial startup screen and remains until the analyzer determines the point at which battery service was interrupted and resumes the current program from that point.
26	REMOVED	BATTERY REMOVED	A five-second delay after the

Code	Global Message	Detailed Message	
27	OHMTEST	RESISTANCE TEST	battery is removed when the program completed. A manually selected or programmed resistance test for the battery is in progress. Program completes in 5 seconds.
28	OHMTEST	RESISTANCE TEST	An automatic resistance test under the Life Cycling or QuickTest™ program is in progress. Program completes in 5 seconds.
29	CALIBRATE	STATION CALIBRATING	(Code 23, Code 29) Station is being calibrated. Process takes 10 - 20 seconds
30	END CYCLE	CHARGE CYCLE COMPLETE	Charge cycle completed. Program is going to the next step.
31	END CYCLE	DCHG CYCLE COMPLETE	Discharge cycle completed. Program is going to the next step.
32	RESUMED	CYCLE RESUMED	Power resumed or the battery is re-inserted into the adapter.
33	END CYCLE	USER PROGRAMMED TIMEOUT	The time programmed in the custom program is completed. The program goes to the next step.
34	BATSHOP	BATSHOP MODE WAIT	Battery is detected on an analyzer connected to Cadex BatteryShop™. Waiting for user to start battery service in Cadex BatteryShop. If service has been started and this message remains, check the C-Code in Cadex BatteryShop to ensure that settings are correct for the battery.
35	FINISHED	PROGRAM COMPLETE	(Code 15, Code 35, Code 36) Current battery-service program is complete.
36	FINISHED	PROGRAM COMPLETE	(Code 15, Code 35, Code 36) Current battery-service program is complete.
112	ALERT 112	CELL MISMATCH	For NiCd batteries only. The cells reach full charge at different times

Code	Global Message	Detailed Message
113	ALERT 113	<p>so the negative slope is not well defined. The program proceeds to the next cycle as normal. Wait until processing is complete because the Auto and Prime programs attempt to correct this warning. If corrected, code 192 (Cell mismatch corrected) appears.</p> <p>The negative slope in extended C-Code may have to be increased to 32 mV/cell or more.</p> <p>Battery is old or has been in storage. Operating time may be reduced. Either monitor battery use or discard the battery. If the battery is new, use the Prime program.</p> <p>Battery was fully charged before full-charge conditions were met. For SLA and Li batteries only. The end-of-charge setting in the C-Code may have to be increased. Battery may be old and operating time less than manufacturer's specifications.</p>
115	FAIL 115	<p>TARGET CAPACITY NOT MET Battery capacity is below the target capacity. The analyzer attempts to improve the capacity by reconditioning the battery. Wait until processing is complete. The Auto and Prime programs try to correct this warning. If corrected, Code 195 (Cap. improved to target) appears. If not corrected, Code 116 appears.</p>
116	FAIL 116	<p>TARGET CAPACITY NOT MET Final capacity of the battery is below the target capacity. Attempts to improve battery capacity did not succeed in bringing capacity above target. Check that the battery rating matches the C-Code mAh setting. Battery may be old and operating time less than manufacturer's specification.</p>
118	ALERT 118	<p>CHARGE CURRENT REDUCED Battery voltage rising too quickly</p>

Code	Global Message	Detailed Message
120	FAIL 120	<p>OVER VOLTAGE</p> <p>while charging. Analyzer is cutting the charge rate in half and will attempt to complete service at lower current rate. Wait until processing is complete. If voltage rises again, code 128 (Soft battery) appears and the program ends. Charge rate in the extended C-Code may have to be reduced. If the battery is new or has been in storage, use the Prime program.</p> <p>Battery voltage is too high on insertion. Check the battery voltage setting in the C-Code. Safety circuits in Li-ion batteries may be activated. Discharge the battery in its original equipment. Check the electrolyte. If all fails, discard the battery.</p>
121	REVERSED	<p>BATTERY REVERSED</p> <p>Negative voltage detected. Battery may be connected backwards in the adapter. Ensure that battery leads are firmly connected to the battery.</p>
122	SHORTED	<p>BATTERY SHORTED</p> <p>Battery is not accepting charge in the initial charge cycle (the voltage remains low). Check that the battery voltage is above 0.30 V/cell. The charge rate may have to be lowered. If all else fails, discard the battery.</p> <p>Battery voltage is too low on insertion. Battery may have shorted cells. If so, discard battery.</p> <p>Ensure battery leads are firmly connected to the battery.</p> <p>Battery may be fully discharged. Recharge battery in its original charger before placing it in the analyzer, or run Power Boost.</p>
123	LOW VOLT	<p>LOW VOLTAGE TIMEOUT 1</p> <p>The battery stopped accepting charge 1 C-minute into the charge cycle (see code 122, Battery shorted).</p>
124	LOW VOLT	<p>LOW VOLTAGE TIMEOUT 2</p> <p>The battery stopped accepting charge 10 C-minutes into the</p>

Code	Global Message	Detailed Message
125	LOW VOLT	<p>charge cycle (see code 122, Battery shorted).</p> <p>NO NEG. SLOPE TIMEOUT 1 The battery is losing charge faster that it is being supplied in the initial charge cycle. The charge rate in the C-Code may have to be increased. If all fails, discard the battery.</p>
126	LOW VOLT	<p>LOW VOLTAGE AT NEG. SLOPE</p> <p>The battery is losing charge faster than it is being supplied to the battery in the initial charge cycle. For NiCd and NiMH batteries only. The charge rate in the C-Code may have to be reduced. If battery is a high capacity NiCd, reduce the charge rate to 0.5 C. Otherwise reduce to 0.6 C. If all fails, discard the battery.</p>
127	LOW VOLT	<p>LOW VOLTAGE TIMEOUT 3</p> <p>Charge terminated. Correct voltage could not be obtained in allotted time due to high battery capacity for set charge current, incorrect voltage setting, or shorted cells. Check C-Code settings and battery rating. Replace battery if low voltage remains.</p>
128	SOFT	<p>UNABLE TO CLAMP CHARGE V</p> <p>Battery voltage is rising quickly during charging, even after code 118 (Soft battery step down). Processing has ended. Battery may be overcharged. Discharge the battery for 10 minutes, then charge again. Battery may be a high capacity type battery. Reduce the charge rate. Battery is new. Use the Prime program to prepare the battery for use. Check that correct contacts are used.</p>
129	FAIL 129	<p>INTERMITTENT BATTERY</p> <p>Battery connection opened five times in one minute. Check and clean the battery contacts. Check that correct contacts are used. Check that the battery is properly</p>

Code	Global Message	Detailed Message
130	ALERT 130	<p>CURRENT RISE AT FULL CHARGE</p> <p>inserted. The charge rate in extended C-Code may have to be reduced. Check that the C-Code is correct for the battery. Protection circuitry opened at end-of-discharge voltage. Increase end-of-discharge voltage.</p> <p>For intrinsically safe batteries, use I/S settings (see the User's Manual for the battery analyzer).</p> <p>Generally for SLA and Li only. Battery current suddenly increased as the end-of-charge condition was achieved, possibly indicating a "cell mismatch" condition. If the SLA battery is a Hawker cell, use the Hawker C-Code settings (see the User's Manual for the battery analyzer). Allow the station to complete service.</p>
135	FAIL 135	<p>HIGH CELL RESISTANCE</p> <p>The battery resistance has exceeded the OhmTest setpoint threshold. Program has been stopped.</p>
136	FAIL 136	<p>HIGH CELL RESISTANCE</p> <p>The battery resistance has exceeded the OhmTest setpoint threshold. Program is complete.</p>
142	TIMEOUT	<p>DISCHARGE TIMEOUT</p> <p>Battery capacity has exceeded 250% of the rated capacity. Check that the mAh rating of the battery matches the C-Code mAh setting. The discharge rate in the extended C-Code may have to be raised.</p>
144	TIMEOUT	<p>CHARGE TIMEOUT</p> <p>Charge time has exceeded the expected value for the battery. Check that the mAh rating of the battery matches the C-Code mAh setting.</p>
146	TIMEOUT	<p>RECONDITIOIN TIMEOUT</p> <p>Recondition time has exceeded the expected value for the battery. Program goes to the next cycle. Check the C-Code settings. The</p>

Code	Global Message	Detailed Message
150	FAIL 150	<p>THERMISTOR FAILURE</p> <p>recondition discharge rate may have to be raised. The battery may be intrinsically safe, preventing deep discharge. Use I/S settings for the battery (see the User's Manual for the battery analyzer). Cells are mismatched. If battery is new, use the Prime program.</p> <p>Battery or adapter thermistor is open or shorted. Clean the contacts on the battery. Warm the battery to room temperature. The battery thermistor may be damaged. Check by testing a known good battery and comparing; discard battery if damaged. If the battery is good and this message persists, contact Cadex. Thermistors on non-OEM batteries may not match those of OEM batteries and thus may be inappropriate for the adapter. Contact Cadex to upgrade the adapter for your particular battery.</p>
152	TEMP RISE	<p>RAPID HEAT RISE</p> <p>Battery temperature is rising rapidly at low voltage (usually at the initial stage of charge). Charging is terminated. The charge rate in the extended C-Code may have to be reduced. The battery may be old or have shorted cells. Discard the battery.</p>
154	HOT BATT	<p>HEAT TERMINATION</p> <p>Battery is being charged normally but temperature is rising rapidly towards its end-of-charge state. Wait until processing is complete. An appropriate WAIT code may appear until the battery has cooled before the next process begins. The charge rate in the extended C-Code may have to be lowered. Observe battery performance. The battery may be old.</p>
156	FAIL 156	<p>HOT AT LOW VOLTAGE</p> <p>Battery temperature went to its</p>

Code	Global Message	Detailed Message
158	HOT BATT	<p>HEAT TERMINATION</p> <p>maximum setting in the initial charge cycle. Cool the battery to the service temperature. Increase the temperature sensing in the C-Code. The internal cells may have shorted or the battery is old. Either monitor battery use or discard.</p> <p>Battery is fully charged but the temperature is at or above the maximum value set in the C-Code, (see code 154, Chg complete temp rise). Reduce charge rate if problem persists.</p>
159	FAIL 159	<p>HOT BATT ON TRICKLE CHARGE</p> <p>The temperature on the battery has exceeded its maximum setting. The trickle charge stops. The trickle-charge rate or the maximum standby voltage in the extended C-Code may have to be reduced. Check that the mAh rating of the battery matches the C-Code mAh setting. Lower the room temperature.</p>
160	FAIL 160	<p>BAD FUSE OR DRIVER</p> <p>The analyzer is not able to supply current to the battery through its current drivers. Very low values of current (about 0 mA) may be displayed on the analyzer before this code appears and processing stops. Unlike primary fuses, station fuses cannot be replaced by users. Check the following items before contacting Cadex for service:</p> <ul style="list-style-type: none"> • Ensure that battery and adapter contacts are clean. • Verify that mAh rating of the battery matches the C-Code mAh setting. • The battery may not be able to accept the current load. Lower or raise the charge rate in the extended C-Code. • The battery may be

Code	Global Message	Detailed Message
		<p>intrinsically safe. Use I/S settings (see the User's Manual for the battery analyzer).</p> <ul style="list-style-type: none"> The battery may be faulty. Try a different battery in the same station.
162	FAIL 162	<p>DISCHARGE CURRENT LOW</p> <p>The analyzer cannot discharge the battery. Very low values of current (< 50 mA) are displayed on the analyzer before this code appears (see code 160, Bad fuse or driver).</p>
164	FAIL 164	<p>CHARGE CURRENT LOW</p> <p>Current driver cannot provide the requested charge current (see code 160, Bad fuse or driver).</p>
170	FAIL 170	<p>CALIBRATION FAULT</p> <p>Current cannot pass through shorted terminal during calibration. Repeat calibration procedure (see User's Manual for battery analyzer). An AWG 10 (2.5 mm) wire (minimum size) is recommended to short contacts/leads.</p>
175	WARN 175	<p>BATTERY UNDERCHARGED</p> <p>Current cannot pass through shorted terminal during calibration. Repeat calibration procedure (see User's Manual for battery analyzer). An AWG 10 (2.5 mm) wire (minimum size) is recommended to short contacts/leads.</p>
176	WARN 176	<p>BATTERY OVERCHARGED</p> <p>Current program completed; battery SoC (State of Charge) is too high. Discharge the battery for 10 minutes, then charge again. Battery is new. Use the Prime program to prepare the battery for use. Check that correct contacts are used. Battery may have a high internal resistance. Verify with OhmTest and discard the battery.</p>

Code	Global Message	Detailed Message
177	ALERT 177	BATTERY UNDERCHARGED Current program completed; battery SoC (State of Charge) low. Run the Charge program on the battery.
178	ALERT 178	BATTERY OVERCHARGED Current program completed; battery SoC (State of Charge) is too high. Discharge the battery for 10 minutes, then charge again. Battery is new. Use the Prime program to prepare the battery for use. Check that correct contacts are used. Battery may have a high internal resistance. Verify with OhmTest and discard the battery.
179	FAIL 179	UNABLE TO LEARN MATRIX Failure to create or update a Learn Matrix during a Learn/Quicklearn service is due to one or all of the following conditions: <ol style="list-style-type: none"> 1 Target Capacity is not met 2 Impedance is too high 3 State of Charge is not in range.
188	INTERRUPT	SERVICE INTERRUPTED Battery is removed during service for more than five seconds. Program terminated.
192	READY	CELL MISMATCH CORRECTED Cell mismatch (code 112) is corrected through several charge/discharge cycles. Use the battery as normal.
195	READY	CAP. IMPROVED TO TARGET Target capacity is achieved or exceeded after an initial warning (see code 115, Target capacity not met).
200	POWER ON	POWER ON Power is detected inside the analyzer.
201	ADAPT IN	ADAPTER INSERTED Adapter is detected on a station. If message persists, remove and re-insert adapter. If it still persists, re-enter the C-Code.

Code	Global Message	Detailed Message	
202	ADAPT OUT	ADAPTER REMOVED	Adapter is removed from a station. If message persists, press ESC on the battery analyzer.
203	(blank)	PASSWORD ENTERED	System password has been entered and activated. Password is required for some actions, depending on analyzer security level selected (see the User's Manual for the battery analyzer).
204	(blank)	INVALID PASSWORD ENTERED	An incorrect password has been entered. Enter the correct password. If message persists or if no password should be required, replace backup battery (see the User's Manual for the battery analyzer). If correct password is unknown, contact Cadex with battery analyzer serial number.
205	(blank)	SECURITY ENABLED	System security has been activated. Password required for some actions, depending on analyzer security level selected (see the User's Manual for the battery analyzer).
206	(blank)	ADAPTER SETUP UPDATED	At least one C-Code in the battery adapter has been updated by Cadex BatteryShop.
207	SYST-TEMP	SYSTEM TEMP. HIGH: COOLING	All cycles are briefly suspended due to high temperature inside the analyzer. Service will resume in a few minutes, after the board has cooled down. If it reoccurs continually, move the analyzer to a cooler room.
208	FAIL 208	ADAPTER NOT SET UP	Adapter is not programmed with a C-Code, or the C-Code is invalid. Re-enter a C-Code.
209	INV ADAPT	ADAPTER DATA INVALID	Invalid value in selected C-Code. Modify the C-Code or delete and re-enter the C-Code. The C-Code is not compatible with the firmware; the C-Code may have been configured for a newer

Code	Global Message	Detailed Message
210	BAD ADAPT	<p data-bbox="594 300 784 541">BAD ADAPTER</p> <p data-bbox="976 300 1360 478">firmware, Delete and reenter the C-Code, reset the extended C-Code to default values or upgrade the analyzer with the latest firmware using Cadex Firmware Utility software.</p> <p data-bbox="976 516 1360 663">Adapter is not recognized by the analyzer. Remove and re-insert the adapter. Clean the gold contacts on the underside of the adapter.</p> <p data-bbox="976 667 1360 751">Reset the extended C-Code to default values or delete and re-enter the C-Code.</p> <p data-bbox="976 756 1370 814">If message persists, adapter may be damaged.</p>
211	NULL CODE	<p data-bbox="594 850 943 877">NULL C-CODE IN ADAPTER</p> <p data-bbox="976 850 1365 968">An empty C-Code is selected. Select a programmed C-Code or program the selected empty C-Code.</p>
214	CCODE N/U	<p data-bbox="594 1003 878 1031">C-CODE NOT USABLE</p> <p data-bbox="976 1003 1373 1367">C-Code is not suitable or is out of range for the analyzer. C-Code may have been created on an "Extended Range" (ER) analyzer or an analyzer with more recent firmware version. Check required battery parameters and edit or re-enter the C-Code. Update the firmware on your analyzer to the most recent version, if necessary, using Cadex Firmware Utility software.</p> <p data-bbox="976 1371 1365 1425">Run the program on a Cadex ER analyzer.</p>

DAO Error on Windows XP/2000 in User-level mode

A DAO Error may have one of two causes:

- 4 The database is corrupt, or
- 5 The **Discretionary Access Control List** (DACL) access permissions for the \Batshop\Db folder have been reset to their defaults – preventing User-level access to the database.

If the BatteryShop database is corrupt, the only options available are to work with a recent good database backup or to request Cadex Customer Support to attempt database repair. The later may incur a cost.

If a Windows Service Pack has reset the DACL for the \BatShop\Db folder, follow these steps to reset DACL on the folder:

- 6 Log-ON as **Administrator**
- 7 Navigate to the \Batshop folder using File **Explorer**.
- 8 **Right-click** on the **Db** folder and choose **Properties**.
- 9 Click on the **Security** tab.
- 10 Choose the **Users** group and click on the **Full Control** checkbox.
- 11 **Uncheck** the **Allow inheritable permissions from parent to propagate to this object**.
- 12 Click on the **Copy** button.
- 13 Click on **OK** to save changes.

Analyzer LED does not match Service Status record in BatteryShop database

In most cases, the Analyzer LED, BatteryShop Station Icon, and Service Status record in the BatteryShop database should match exactly.

However, in some cases, it is possible to see the Service Status record in the BatteryShop database display a pass when the Analyzer LED displays fail. This indicates that the battery has completed and passed the service but failed while in trickle charge mode.

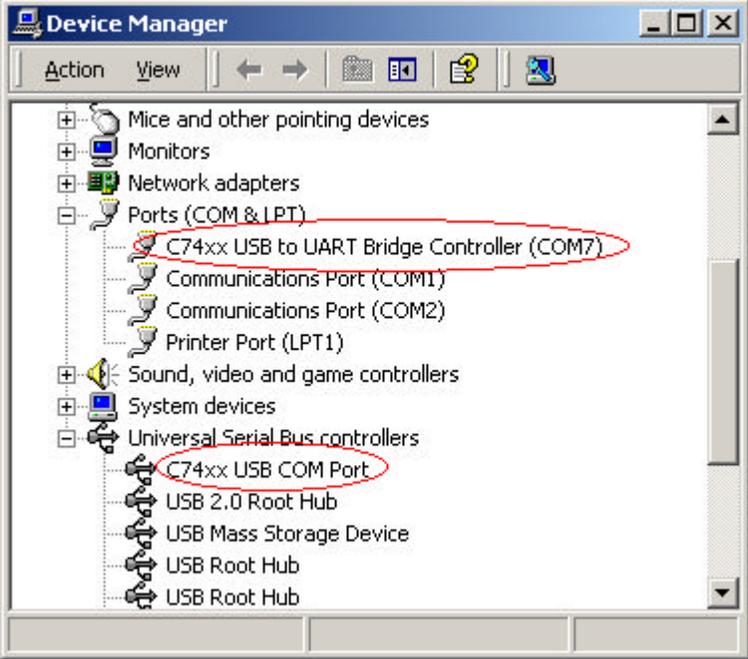
Check the fault-code, reported by the Analyzer or Real-Time Status Panel in Batteryshop, and cross-reference with [Cadex 7200 and Cadex 7400 message and warning codes](#) in BatteryShop Help. Move the mouse pointer over the Detailed Message column for the required message and warning code and click on the mouse button when the cursor changes from an I-beam to a Link Select (Pointing Hand) cursor. This will display a description of the Message/Warning code and possible actions that can be taken to prevent the message/warning from appearing while servicing the problem battery.

Note: If the C-Code for a problem battery model is altered to prevent the occurrence of a message/warning code, the associated QuickTest matrix must be deleted and re-learned using the modified C-Code before starting a QuickTest service. See topic [QuickTest Program](#) for details..

USB connectivity issues...

Consult the following list to troubleshoot USB connectivity issues with C-Series analyzers. Exit from Cadex BatteryShop or Cadex Firmware Utility before starting to troubleshoot USB connectivity:

Issue	Check
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Issue	Check
<p>Cannot see C-Series analyzer connected directly to the PC via USB cable.</p>	<p>Right-click on My Computer and choose Properties to display the System Properties dialog.</p> <p>Click on the Hardware tab and choose the Device Manager button.</p> <p>Close the System Properties dialog.</p> <p>Choose the + sign beside Ports (COM & LPT).</p> <p>Choose the + sign beside Universal Serial Bus controllers.</p> <p>The USB device drivers for the C7xx should be visible as they appear circled in red in the following diagram:</p>  <p>With the analyzer powered-ON, unplug the USB cable from the back of the analyzer and monitor the Device Manager.</p> <p>The Device Manager should reset and re-display connected devices.</p> <p>Plug the USB cable back into the back of the analyzer.</p> <p>The Device Manager should reset and re-display the list of connected devices.</p> <p>On detection of the USB device, the PC will prompt for USB Device Drivers if the Device Drivers were not pre-installed. This indicates that BatteryShop is not yet installed because BatteryShop Setup pre-installs the required USB drivers. If the Device Drivers are present, the PC will automatically load the newly detected USB device.</p>

Issue	Check
<p>Cannot see C-Series analyzer connected via a USB 2.0 Hub</p>	<p>The USB 2.0 Hub must have "Transaction Translator" support for communications with a C-Series battery analyzer.</p> <p>If a USB 2.0 Hub with "Transaction Translator" support is not available, then, it may still be used after disabling "USB Host Controller" in "Device Manager" under "Universal Serial Bus controllers"</p> <p>The port to which the analyzer is connected on the USB Hub can be defective.</p> <p>With the analyzer powered-ON, connect the USB cable directly into the PC and see if the device is detected in the Device Manager. If the device is detected, then the port on the Hub is defective.</p> <p>Disconnect the USB cable from the PC and connect into a different port on the USB Hub. Repeat until a functioning port on the USB Hub is located. When the USB device is detected, Windows XP may complain about installing an un-signed driver; Choose "Continue Anyway" to complete the driver installation.</p>
<p>The PC crashes after un-plugging a USB cable.</p>	<p>Ensure that the PC is running Windows 2000 Professional SP4 or Windows XP SP2 and that it has at least 512MB RAM and a 1 GHz CPU. Windows will become unstable if the required resources are not available for it to unload or load device drivers each time that a USB device is disconnected from or connected to the PC.</p>
<p>In Windows XP, a Hardware Installation dialog appears during BatteryShop Setup and during first-time detection of each analyzer connected via USB cable.</p>	<p>Windows XP will prompt to continue with driver installation whenever an un-signed driver is about to be installed. Choose "Continue Anyway" to clear the prompt and proceed with driver installation.</p>
<p>Why is it that the Port number assigned to C74xx USB to UART Bridge Controller changes each time the PC is powered-ON?</p>	<p>This is the nature of USB device enumeration. There is no guarantee that the PC will enumerate USB devices in the same way each time that the PC is powered-ON. This is the primary reason for recommending that analyzers be connected to the PC via Serial Cable instead of USB. A Serial COM Port always has the same Port number each time that the PC is powered-ON</p> <p>Note: The Port# is displayed on the Service Report and on the Battery Characteristic Graph. If the service was run on an analyzer connected directly via USB cable, the Port# on the Report/Graph is valid only for the duration of that service during that PC session.</p>

Issue	Check
<p>Why is it that Analyzer Icons in BatteryShop disappear when an analyzer connected via USB cable is disconnected from the PC or when the analyzer is powered-OFF?</p>	<p>Whenever a C74xx USB to UART Bridge Controller device driver is unloaded from the system, BatteryShop detects the removal and removes the associated icon for the analyzer.</p> <p>Note: Disconnecting or powering-OFF analyzers connected to BatteryShop via USB is not recommended while BatteryShop is running. Doing this may cause BatteryShop to disconnect other analyzers connected via USB also.</p>

Glossary

Term	Definition
<p>Battery adapter</p>	<p>Interface between the battery analyzer and the battery, configured for specific battery types. The battery adapter is equipped with a serial EEPROM (electrically erasable programmable read-only memory) programmed with C-codes for specific batteries.</p> <p>To insert an adapter</p> <ol style="list-style-type: none"> 1 Place the empty battery adapter into the battery adapter station of the Cadex analyzer. 2 Press down on the back panel (with the label) until the adapter snaps in place. <p>To remove an adapter</p> <ol style="list-style-type: none"> 1 Remove the battery from the adapter. 2 Press the latch bar behind the adapter label and lift the adapter upwards.
<p>Battery cycle</p>	<p>One charge followed by one discharge (or one discharge followed by one charge). Even when batteries are only partially charged or discharged, a cycle is considered to have occurred.</p>

Term	Definition
Battery Voltage (volts)	<p>The terminal voltage of the battery. The voltage is based on a nominal cell voltage of 1.2 V/cell for NiCd and NiMH batteries, 2 V/cell for SLA batteries, and 3.6 V/cell for Li-ion batteries.</p> <p>On some NiCd and NiMH batteries, manufacturers may rate their batteries based on 1.25 V/cell rather than 1.2 V/cell. For example, the battery may have a stated voltage of 7.5 V or 12.5 V. To obtain the correct voltage, multiply this number by 0.96. These voltages are definitions only and do not affect test results.</p> <p>Some manufacturers may state the number of cells in their batteries rather than battery voltage. To get the correct voltage, multiply the number of cells by the voltage for the chemistry type. For example, the voltage of a six-cell NiCd battery would be $6 \times 1.2 \text{ V} = 7.2 \text{ V}$.</p>
Battery Rating (mAh)	<p>The nominal capacity of the battery, or capacity specified by the manufacturer and expressed in milli-ampere hours (mAh).</p> <p>Capacity is the amount of electrical energy (charge) a rechargeable battery can hold.</p> <p>Target capacity is set as a percentage of battery rating.</p>
C-Code	<p>Configuration Code</p> <p>Battery parameters stored as part of the battery models database (or in battery adapters) that configure the Cadex battery analyzer for servicing a specific battery model. Describes a particular battery type and the settings required to process that battery type.</p>
C-Minute	<p>A proportional measure of time equal to one minute at a C-rate of 1 C.</p>
C-Rate	<p>Unit by which charge and discharge times are scaled; charge or discharge rate expressed as a fraction or multiple of the battery capacity rating.</p> <p>A battery rated at 1000 mAh provides 1000 mA for one hour if discharged at 1 C, which draws a current equal to the rated capacity. The same battery discharged at 0.5 C would provide 500 mA for two hours.</p>
Capacity	<p>The amount of energy that a fully-charged battery is capable of holding.</p>
Capacity Offset	<p>Adjusts the capacity readings during discharge of a battery at a C-rate different than that specified by the manufacturer. Primarily used for SLA batteries.</p>

Term	Definition
Charge Method (NiCd and NiMH only)	<p>Specifies the method used to charge NiCd and NiMH batteries.</p> <p>The reverse load method intersperses discharge pulses during the charge cycle to keep batteries cool and promote the recombination of gases.</p>
Charge Rate (C-Rate)	<p>The rate at which the analyzer charges the battery. A 1000 mAh capacity battery with a charge current of 500 mA has a charge rate of 0.50 C. A lower C-Rate reduces the charge current and increases time required to charge the battery.</p>
Confidence Grade	<p>The level of accuracy expected from a specific QuickTest matrix. The confidence grade level for a specific matrix increases as the Learn program adds to the matrix by gathering data from same-model batteries with differing levels of SoH. See topic Creating effective QuickTest matrices for details.</p> <p>Confidence grade is indicated as A (high), B (satisfactory), or C (low).</p>
Discharge Rate	<p>The rate at which the analyzer discharges the battery. A 1000 mAh capacity battery with a discharge current of 500 mA has a discharge C-Rate of 0.50 C. A lower discharge C-Rate reduces the discharge current and increases service time. The maximum discharge power is 35 W per analyzer station.</p> <p>Maximum discharge is reduced for batteries with higher nominal voltage (2400 mA for a 14.4 V battery). For a single-cell NiCd or NiMH battery, the maximum discharge is 2500 mA.</p>
End of Charge	<p>The rate of charge supplied by the battery analyzer at which SLA and Li batteries are considered fully charged. When the detected charge rate drops below the specified end-of-charge value, the battery is fully charged and the analyzer completes the charge cycle on the battery.</p> <p>The Charge Optimization setting affects the way the end-of-charge setting is used during a charge.</p>
End of Discharge	<p>The level to which battery charge must drop for the discharge cycle to be complete.</p>
End of Recondition	<p>The level to which battery charge must drop for the reconditioning cycle to be complete.</p>
Intrinsically safe battery	<p>A battery with built-in safety protection circuitry. These batteries are used primarily in explosive environments.</p>
Li	<p>Refers to any lithium-based battery chemistry.</p>
LiPh	<p>Refers to lithium-phosphate battery chemistry.</p>
Li-ion	<p>Lithium-ion battery chemistry.</p>

Term	Definition
Li-polymer	Lithium-polymer battery chemistry.
Matrix	The set of battery parameters for a specific battery model stored during the Learn program and used for testing batteries of the same model during the QuickTest program.
Maximum Charge Voltage	The voltage level per cell for SLA and Li batteries at which the analyzer stops charging the batteries. The charge current drops while the maximum charge voltage is maintained.
Maximum Standby Voltage	The level of voltage per cell at which SLA and Li batteries are maintained at full charge after service is complete. The maximum standby voltage must be lower than the maximum charge voltage.
Memory	Reversible capacity loss in NiCd and NiMH batteries caused by an increase in the size of crystals formed within the battery. See Recondition.
Milli-ampere hour (mAh)	Unit of battery capacity or rating. A battery that provides a current of 1000 milli-amperes for 1 hour is rated at 1000 mAh (or 1 Ah)
Negative Slope	A measure of the voltage drop that occurs when the battery reaches full charge. The charge cycle is terminated when the voltage drop reaches the specified negative slope value.
NiCd	Nickel Cadmium battery chemistry.
NiMH	Nickel-Metal Hydride battery chemistry.
Recondition	A deep discharge below 1.0 V/cell with a controlled current. Reconditioning helps break down large crystals, which develop as a result of memory, to more desirable small sizes, often restoring the battery to its full capacity. Applies to NiCd and NiMH only.
Recondition Discharge Rate	Recondition discharge is a slow and gradual discharge applied during reconditioning after the battery reaches the end-of-discharge voltage specified in the C-Code. During this process, the crystalline build-up (memory) on the cell plates dissolves, and the battery often restores itself. Expressed in mA and as a percentage of the Discharge Rate setting.
Residual capacity	Charge capacity remaining in the battery when it is inserted in an analyzer.
Resistance	Also called internal resistance. Opposition to current flow, and dissipation of energy in the form of heat. Batteries with high resistance are not able to deliver heavy current pulses or elevated loads.

Term	Definition
Self-discharge	Battery capacity lost during storage because of internal leakage between the positive and negative cell plates.
Smart battery	A battery equipped with specialized circuitry that can communicate with an analyzer and provide battery information.
State of Charge (SoC)	The current energy content of a battery.
State of Health (SoH)	The overall condition of a battery, taking into account its capacity, resistance, self-discharge, and state of charge.
SLA	Sealed lead-acid battery chemistry.
Target capacity	<p>Capacity is the amount of electrical energy (charge) a rechargeable battery can hold. As a battery ages, its capacity declines. Target Capacity is the percentage of the battery capacity compared to the nominal capacity. It allows the user to set a pass/fail criteria based on the final capacity reading after a battery is serviced.</p> <p>Recondition, a special cycle that can rejuvenate a battery's capacity, is automatically applied by the Auto program for NiCd and NiMH batteries that fail.</p> <p>The Target Capacity can be set between 50% and 150%. Typical settings:</p> <p>90% Maintains batteries for critical applications which require maximum energy reserve and high reliability. Fewer batteries will pass.</p> <p>80% Recommended (default) setting. It satisfies both the need for an adequate energy reserve as well as the economic need to get the longest possible service life from each battery.</p> <p>70% Recommended for less stringent applications where battery power demand is not critical or is of brief duration. More batteries will pass.</p> <p>Lowering target capacity increases the number of batteries that pass, at the expense of greater performance variation between batteries. Increasing Target capacity provides more consistent high performance at the expense of a larger rate of failure. For example, if target capacity is set to 80%, a battery with a capacity reading of 78% fails. However, if the target capacity switch is set to 70% with the same battery, the battery passes.</p> <p>Target capacity is a pass/fail mark only. It does not affect the charge level. Batteries are always fully charged regardless of the target capacity set.</p>

Term	Definition
Temperature Sensing	<p>Defines the temperature range within which the analyzer can service the battery. If battery temperature moves outside the specified range, service stops until the temperature is back within the acceptable range. Refers to battery temperature, not surrounding temperature.</p> <p>Effective only for batteries or battery adapters equipped with a temperature sensor.</p>
Trickle charge	Maintenance charge to compensate for battery self-discharge.
UPS	<p>An uninterruptible power supply (UPS) device provides power to your computer for at least a short time during a power failure. It also protects against power surges. A UPS device is able to sense a loss of power and activate its battery before data loss occurs. This gives you the time to save your data and shut down the computer before the battery runs out.</p>

Appendix

Cadex BatteryShop

Connect to battery analyzers

- 1 From the Cadex BatteryShop main window, click **Analyzers**, and then click **Connect**.
- 2 Click Yes in the confirmation dialog box that appears.

Cadex BatteryShop searches for battery analyzers connected to the serial ports listed in the Ports Configuration map. See topic [Setting the serial ports connected to battery analyzers](#) for details.

When it has connected with the available battery analyzer(s), it shows each analyzer as an icon in the dark-red analyzer window. Consult the Appendix for more on [Analyzer icons colors](#).

Tip: Before Cadex BatteryShop can communicate with your Cadex battery analyzers, the analyzers must be connected to the computer, and the Cadex BatteryShop Ports map must be configured to look for the analyzers on the serial ports to which they are connected.

Note: [BatteryShop will limit analyzer connections to the license version of BatteryShop purchased](#). If you need to connect to more analyzers, please contact a Cadex sales representative to upgrade your BatteryShop license version.

It is important that all connected analyzers have the required Firmware version for correct BatteryShop operation.

Export real-time battery-service data

- 1 On the battery analyzer icon, double-click the bar that corresponds to the battery station for which you want to export battery-service data. The Real-Time Status dialog box appears.
- 2 Click **File**, and then click **Export Data**.
- 3 Note the name of the data file for future reference.
- 4 Click **Yes** in the confirmation dialog box that appears.

Cadex BatteryShop creates a Microsoft Excel comma-separated values file containing this information:

Battery ID
Manufacturer
Battery Model Number
Customer
Adapter Number
Time Service Started
Station program selected
C-Code

All amperage, voltage, temperature, and impedance data collected and plotted on the real-time status chart to the time of file creation.

Cadex BatteryShop assigns a file name with a .csv extension, and stores the file in the Cadex BatteryShop Temp directory (usually *C:\Program Files\BatShop\Temp*).

Tip: You can [open the data in Microsoft Excel](#) for further data analysis.

Open a comma-separated values or text file in Microsoft Excel

- 1 Start *Microsoft Excel*.
- 2 Click **File**, and then click **Open**.
- 3 In the dialog box that appears, navigate to the Cadex BatteryShop Temp directory (usually *C:\Program Files\BatShop\Temp*).
- 4 In Files of Type, select **Text Files (*.prn; *.txt; *.csv)**.
- 5 Click the name of the comma-separated values or text file you want to open in Microsoft Excel.
- 6 Click **Open**.

You can now use Microsoft Excel functions to analyze, graph, or create a report of the Cadex BatteryShop data.

Analyzer icon colors

Analyzer icons display the serial port number and the type of Cadex analyzer (70 for C7000, 72 for Cadex 7200, and 74 for Cadex 7400) in the top half, and have two or four vertical bars in the bottom half representing the analyzer's battery stations. The color of these bars indicate the current status of the station.

Color	Status
Black	No adapter
White	Adapter inserted
Yellow	Program running
Green	Ready (program finished successfully)
Red	Program failed

Ports with incorrect firmware version

All connected analyzers are required to have the minimum required firmware version for correct operation with BatteryShop.

Ports connected to analyzers that do not meet this requirement appear in the Firmware Version dialog immediately after connecting to analyzers.

In such a case, BatteryShop services may exhibit unexpected results.

Firmware that works with this version of BatteryShop can be found on the BatteryShop CD and as a download from the [Cadex](http://www.cadex.com) website (www.cadex.com).

Please consult Cadex Firmware Utility Help for details on upgrading the firmware on connected analyzers.

Group records

You can group database records by any category of data, or field, stored in the database.

- 1 Click the column heading for the field by which you want to group the records in the database.
- 2 Drag and drop the column heading cell into the dark grey area just above the column headings.

Records are sorted into groups according to the heading you chose.

You can now further sort the records within each group by clicking any of the remaining column headings.

- 3 If you want to group the records further, you can drag and drop another column heading cell into the dark grey area beside the first one. You can continue to "daisy-chain" column headings to group records into smaller and smaller groups.

In this example, battery model records are grouped by manufacturer and then by chemistry. Within each chemistry group, records are sorted by model. Move the mouse over the example and click the hotspots (indicated by the hand icon) to see details about different parts of the grid.

Find a record

You can search for battery ID records by specifying a battery ID, for battery manufacturer records by specifying a manufacturer name, for customer records by specifying a customer name, and for battery model records by specifying a manufacturer name, model name, battery adapter number, or battery application ("Used in").

- 1 Sort the database records in ascending order according to the field you are using to search for a record. How?
- 2 Type the first few letters of your search string in the **Search by** text box.

The first record that matches the search string is highlighted.

For example, if you are searching in the battery model database for a battery model manufactured by Alexander, you might type AL in the Search by Manufacturer text box. The first record highlighted may be Alcatel, which also matches the specified search string.

- 3 To refine your search, type more letters in the search string until the record you are looking for is highlighted.

You can also use the wildcard character "*" to search for a battery ID, manufacturer, customer, or battery model, where "*" stands for any string of one or more characters.

For example, if you are looking for a specific customer record and you can't remember the exact customer name but know that it has the word "Power" as the second or third word, you could type *Power in the Search by text box to narrow the search.

Sort records

You can sort database records by any category of data, or field, stored in the database.

To sort data in ascending order (from 0 to 9 and A to Z)

- Click the column heading for the field by which you want to sort the database

To sort data in descending order (from Z to A and 9 to 0)

Double-click the column heading for the field by which you want to sort the database

Display battery-service records

1 Open Cadex BatteryShop Reports:

From the Cadex BatteryShop main window, click **Database**, and then click **Reports**.

OR

From the Windows Start menu, select **Programs**, then select **BatteryShop**, and then click **Reports**.

The BatteryShop Reports dialog box appears.

2 Under **Query Type**, select the battery-service information you want to display for selected batteries:

View Services.

Select this option to display the most complete information about battery service. These columns appear in the grid:

Service ID.

Code. Battery analyzer message code (see battery analyzer manual for more information).

Status. Final status of battery service (program complete, program not completed, program failed)

Battery ID.

Started. Time and date battery service started.

Ended. Time and date battery service completed.

Manufacturer. Battery manufacturer.

Model. Battery model number.

Program. Battery service program run.

Customer.

Targ. Cap. Target capacity set for the battery.

Final Cap. Final battery capacity achieved during service.

Final Imp. Final impedance achieved for the battery.

CH Cycles. Number of charge cycles run during the battery service.

DCH Cycles. Number of discharge cycles run during battery service.

REC Cycles. Number of reconditioning cycles run during battery service.

You must select this option if you want to create battery-characteristics graphs or cycle graphs, or if you want to export service records to another Cadex BatteryShop database or a SiteMonitor database.

Service History.

Select this option to display or report the complete history of service records for selected batteries. These columns appear in the grid:

Manufacturer. Battery manufacturer.

Created. Time and date the record was created.

Battery Model. Battery model number.

Customer.

Program. Battery service program run.

Display Status.

Final Capacity. Final battery capacity achieved during service.

Final Impedance. Final impedance achieved for the battery.

Retired. A checkmark in this column indicates that the battery has been retired from active service.

Service Counts.

Select this option to display or report the total number of services and failures for selected batteries. These columns appear in the grid:

Manufacturer. Battery manufacturer.

Model. Battery model number.

Battery.

Battery ID.

Failures.

Percent Failure.

Battery ID Service Due.

Select this option to display or report batteries that are due for servicing from selected batteries. These columns appear in the grid:

Battery.

Battery Type.

Manufacturer. Battery manufacturer.

Model. Battery model number.

Customer.

In Service.

Last Service.

Service Freq.

- 3** Under **Select**, choose the batteries for which you want to print service data:

All. Select this option if you want to create a report for all batteries, all active batteries, all retired batteries, or all batteries for a specific customer.

Battery ID. Select this option if you want to create a report for a specific battery. If you choose this option, you must also enter the Battery ID for which you want to create a report. How?

Battery Model #. Select this option if you want to create a report for one battery model. If you choose this option, you must also enter the Battery Model # for which you want to create a report. How?

- 4** If you selected **All** or **Battery Model #** in step 3 and you want to create a report for batteries from a specific customer, enter the customer name.

Enter the required data in one of three ways:

Type the data in the text box.

Click the down-arrow button to the right of the text box to select from a list of recent entries.

Use the Browse function:

- a. Click **Browse** or .
 - b. In the grid dialog box that appears, find the record that has the data you want to enter.
 - c. Double-click the appropriate record.
- 5** If you selected **All** or **Battery Model #** in step 3, choose an option from the Retired Batteries list:
- Include All Batteries.
 - Include Only Retired Batteries.
 - Include Only Active Batteries.

- 6** Under Service Period, enter the time period for which you want to include service data: Select (check) **All Dates** to include all service data for specified batteries regardless of date.

OR

Include service data from a specific time period only:

- a. Clear the **All Dates** option.
- b. Enter a Start Date for the beginning of the period you want to report.
- c. Enter an End Date for the end of the service-report period.

Dates selected are inclusive (the report includes services performed on the selected Start and End dates).

- 7** Click **Run**.

The records for the report appear in a database grid window.

Tip You can rearrange the information in the database grid by [sorting](#) and [grouping](#) it according to column heading.

Select and rearrange fields to include in battery-service reports

- 1** Display battery-service information. How?
- 2** On the Grid Options menu, click Column Selector. The Customize window opens in the bottom right-hand corner of the database grid window.

Any column (field) heading that appears in the Customize window does not appear as part of the service report.

- 3** Choose the fields you want to appear in your report:

To remove a specific field from the battery-services report you are creating:

Click and drag the column (field) heading from the database grid window to the Customize window.

To restore a removed field to the battery-services report:

Click the heading in the Customize window and drag it into place among the column headings in the database grid window.

- 4 Size the columns so that you can see the information you need to see:
 - a. Place the mouse cursor on the line to the right of the column heading for the column whose size you want to change until the left-right sizing cursor appears.
 - b. Click and drag the cursor until the column is the desired size.

OR

On the Grid Options menu, click Best Fit (all columns).

- 5 Put the fields in the order you want them to appear in your report:
 - a. Place the mouse cursor on the heading of a column you want to move.
 - b. Click and drag the heading to its new location among the column headings.

Select battery-service records

- 1 See Appendix for details on how to [display Battery Service Information](#).

- 2 **To select one record only:**

Click the record.

To select more than one record listed continuously:

- a. Click the first record you want to select.
- b. Hold down the **Shift** key and click the last record you want to select.

To select more than one record not listed continuously.

- c. Click the first record you want to select.
- d. Hold down the **Ctrl** key and click the next record you want to select.
- e. Repeat step b until you have selected all desired records.

To select all records:

On the Actions menu, click Select All Records.

Print a customized report

Once you have displayed battery-service data in the Reports database grid and arranged it in a way that meets your needs, you can print the customized report you have created.

- 1 From the **File** menu, choose **Print Preview**. The Print Preview Caption window appears, displaying your report as it will appear on paper.
- 2 Set up the report page:
 - a. On the **Report** menu, click **Page Setup**.

The page representation shown at the top of the dialog box changes to reflect the choices you make in the dialog box.

- b. Under Paper, choose the paper size from the Size list.
 - c. Under Orientation, specify whether you want the report to print out as portrait (taller) or landscape (wider).
 - d. Under Margins, enter the sizes for all four margins in inches. (1 inch is approximately equal to 25 mm.)
 - e. Click **OK**.
 - 3 Set up the printer:
 - a. On the **Report** menu, click **Print**.
 - b. In the Name text box, enter the printer on which you want to print your report.
 - c. Click **Properties**.
 - d. Make any necessary changes in the dialog box that appears. Settings in this dialog box depend on the printer selected. See your printer user's manual for more information.
 - e. Click **OK** to close the printer properties dialog box.
 - 4 Under Page range, select an option to determine which pages are printed:

All. Select this option to print all pages in the report.

Current Page. Select this option to print only the page currently on-screen.

Pages. Select this option to print selected pages. If you select this option, you must also specify the pages you want to print.
 - 5 Under Copies, enter these settings:

Number of Pages. Click the down-arrow button and select an option from the list that appears:

All. Print both even and odd pages.

Even. Print even-numbered pages only. This option is useful if you want to print the report using both sides of the paper.

Odd. Print odd-numbered pages only. This option is useful if you want to print the report using both sides of the paper

Number of Copies. Enter the number of copies of the report or pages to print.
 - 6 Click **OK**.

Creating battery-service reports

There are a number of procedures that you can follow to customize a battery-service report so that it includes the information you want to report in the order you want to report it:

[Display battery-service records](#)

[Select and arrange the fields you want to include in the report.](#)

[Group the records by column heading.](#)

[Sort the records by column heading.](#)

[Select records to include in the report.](#)

[Print the report.](#)

Save service data to a Cadex BatteryShop file

- 1 Display battery-service information, choosing **View Services** as the Query Type.
The Services database window appears.
- 2 On the **File** menu, point to **Export To**, and then click **BatteryShop File**. The Export Analysis Data dialog box appears.
- 3 In the **File name** box, type a name for your Cadex BatteryShop file. It is automatically given a **.bse** extension.
- 4 Click **Save**.

Your file is saved to the Batshop\Temp folder unless you specify a different folder.

Save service data to a Microsoft Excel file

- 1 Display battery-service information, choosing any Query Type.
The report or services database window appears.
- 2 On the **File** menu, point to **Export To**, and then click **Microsoft Excel File**. The Save As dialog box appears.
- 3 In the **File name** box, type a name for your file. It is automatically given an **.xls** extension.
- 4 Click **Save**.

Your file is saved to the Batshop\Temp folder unless you specify a different folder.

Save service data to an HTML file

- 1 Display battery-service information, choosing any Query Type.
The report or services database window appears.
- 2 On the **File** menu, point to **Export To**, and then click **HTML File**. The **Save As** dialog box appears.
- 3 In the **File name** box, type a name for your file. It is automatically given an **.htm** extension.
- 4 Click **Save**.

Your file is saved to the Batshop\Temp folder unless you specify a different folder.

Set the serial ports connected to battery analyzers

Note: [BatteryShop will limit analyzer connections to the license version of BatteryShop purchased.](#) If you find that you cannot move COM Ports to the Ports to search for: list, you will need to upgrade your BatteryShop license version. Please contact a Cadex sales representative to purchase an upgrade license.

[BatteryShop will automatically detect C-Series analyzers connected with a USB cable](#) via a USB 2.0 Hub or directly to the USB 2.0 Port on the PC. It is NOT required to map these ports using the Port Manager.

- 1 Click **System Setup**, and then click **Ports Map**. The Ports Map dialog box appears.
- 2 Move all serial ports to which you have connected battery analyzers from the **Ports not to search for** list to the **Ports to search for** list:

Click the double left arrow (◀◀) to move all ports to the **Ports to search for** list.

OR

- a. Select the serial ports to move from the **Ports not to search for** list:

To select one port, click that port. The port is highlighted.

To select ports listed consecutively ports, click the first port in the list, hold down **Shift** key, and then click the last port in the list. All ports between the first and last are highlighted.

To select additional ports, hold down the **Ctrl** key while clicking the ports.

- b. Click the single left arrow (◀) or double-click the required port to move the ports to the Ports to search for list.

- 3 Move serial ports in the **Ports to search for** list to which you have NOT connected battery analyzers to the **Ports not to search for** list:

Click the double right arrow (▶▶) to move all ports to the **Ports not to search for** list.

OR

- a. Select the serial ports to move from the **Ports to search for** list:

To select one port, click that port. The port is highlighted.

To select ports listed consecutively ports, click the first port in the list, hold down **Shift** key, and then click the last port in the list. All ports between the first and last are highlighted.

To select additional ports, hold down the **Ctrl** key while clicking the ports.

- b. Click the single right arrow (▶) or double-click the required port to move the ports to the **Ports not to search for** list.
- 4 Click **OK**.

Ports with incorrect firmware version

All connected analyzers are required to have the minimum required firmware version for correct operation with BatteryShop.

Ports connected to analyzers that do not meet this requirement appear in the Firmware Version dialog immediately after connecting to analyzers.

In such a case, BatteryShop services may exhibit unexpected results.

Firmware that works with this version of BatteryShop can be found on the BatteryShop CD and as a downloaded from the Cadex website www.cadex.com.

Please consult Cadex Firmware Utility Help for details on upgrading the firmware on connected analyzers.

Q-Learn Program

Calibrate the adapter and ensure that the C-Code for the battery is correct. Take several batteries having metered capacity of 100% or greater. Confirm this capacity by servicing the batteries using the Prime program. Note the final capacity and resistance reading in each case. Take the battery with the highest capacity (ensure that it is 100% or greater) and the highest resistance and run this battery using Q-Learn program. After Q-Learn has completed, take the same battery and run it again in the same adapter using QuickTest. The final SoH (state of Health) result should be 100%. If it is less than 100%, erase the battery matrix ([Delete matrix for the selected battery model](#)) and start over. Once successful, test the other batteries with the same capacity to ensure that the SoH readings are within an acceptable range. Changing anything in the C-Code, apart from the target capacity and program will erase the matrix.

Note: You must use a Cadex 7200/7400/7400ER battery analyzer with a 16kb battery adapter to be able to use the Q-Learn program.

Q-Learn assumes that the battery capacity is 100% or greater. If a battery with less than 100% capacity is used with Q-Learn, it will give erroneous results.

Use Q-Learn program, to create a matrix, when you have only one **brand new battery (100% or better metered capacity) primed within the last day**. Use [Learn Program](#) instead if you have several batteries of the same model each with capacity of 100% or greater to create a matrix.

Batteries with resistance above 800mOhm (as measured by OhmTest) should not be used with the Q-Learn program. It is a good idea to run OhmTest on any battery you plan to put through the Q-Learn program.

Only custom adapters should be used. Universal adapters such as the Alligator Clips (07-110-0115), the Claw (07-110-0170) and the FlexArm (07-110-0180) are NOT recommended. These adapters will give inaccurate results due to resistance errors from long leads.

Q-Learn and **QuickTest** cannot be used with the following batteries:

- SLA batteries greater than 2Ah (2000mAh).
- 1-cell (1.20V) and 2-cell (2.40V) NiCd and NiMH batteries.
- Batteries with resistance above 800mΩ (as measured by OhmTest). It is a good idea to run OhmTest on any battery you plan to put through the Q-Learn program.
- Batteries that disconnect or reset or give failures during Learn or Q-Learn.
- Batteries that cannot accept a charge rate and discharge rate of at least 1.00C. These batteries tend to give errors if they are serviced on the analyzer using the Auto or Prime program.

Erasing a Matrix for a battery model from the BatteryShop database

To erase a matrix for a battery model:

- 1 Insert an 16Kb adapter for the battery model into a station in a Cadex 7200/7400 analyzer
- 2 From BatteryShop, right-click on the analyzer station icon where the adapter was inserted
- 3 Select **C-Code/Matrix Transfer** menu option from the context menu to display the C-Code/Matrix Transfer dialog.
- 4 Select C-Code location **C10** from the list in the **C-Code/Matrix Transfer** dialog
- 5 Select the **Write C-Code/Matrix to adapter** radio button
- 6 Select the **Ellipses button** to launch the Battery Model database
- 7 Select the battery model record with the matrix to be erased and choose the **Close** button. The C-Code for the battery model should appear in the text area to the left of the Ellipses button and the selected battery model name should appear below the C-Code text area
- 8 Choose the **Run** button to write the C-Code/Matrix to adapter location **C10**
- 9 Select the **Erase Adapter Matrix** radio button
- 10 Then select the **Run** button to erase the matrix at the specified adapter C-Code location
- 11 Select the **Read C-Code/Matrix from adapter** radio button
- 12 Then select the **Run** button to read the C-Code record, without the matrix, back into the database from the specified adapter C-Code location. The "Matrix: Not found" caption will appear below the Battery Model name in the C-Code/Matrix Transfer dialog.

Precaution with Nickel-based batteries during Learn

If you run an Auto or Prime program to confirm that the battery does have a metered capacity > 80%, it is important that you run a Discharge program on the battery for half an hour before running the Learn program. This precaution is designed to minimize temperature rise.

Protect a matrix

After you have created a QuickTest matrix that you are satisfied with, you can freeze a matrix from further unwanted augmentation. To freeze a matrix, follow these steps to protect the matrix:

- 1 Enable [database security](#).
- 2 Launch **Battery Models** form and search for the battery model with the matrix you want to **protect**.
- 3 **Right-click** on the record and choose "**Protect Matrix**".

Confidence grade

The level of accuracy expected from a specific QuickTest matrix. The confidence grade level for a specific matrix increases as the Learn program adds to the matrix by gathering data from same-model batteries with differing levels of SoH.

Confidence grade is indicated as B (satisfactory), or C (low).

Database Security

When database security is disabled, default for the generic version of BatteryShop, an operator can make edits to Battery Model records, modify C-Codes, manage Battery ID records, delete records, and run Web Update to update Battery Model records in the database.

In some cases however, an operator may decide to enable database security so as to be able to [protect against matrix augmentation](#) or to prevent other operators from making edits to the database. With database security enabled, an operator can still scan new Battery IDs via Quick Entry form, but cannot create/modify battery model information.

To use the database security feature, you must first create a password. Choose the Security menu option from the System Setup menu. Specify a password twice on the Create Password form. You can now enable/disable database security via System Setup Options.

To enable database security:

- 1 Choose **Options** from the **System Setup** menu.
- 2 Click on the **Secure Database Access** checkbox on the **Standard Options** page.
- 3 Enter the password and choose **OK**.
- 4 You will see a **checkmark**, in the **Secure Database Access** checkbox, if database security is enabled.
- 5 Choose **Close** followed by **Yes** to close the **System Options** form.
- 6 Choose **OK** to clear the information dialog confirming that the new configuration file was saved.

To disable database security:

- 1 Choose **Options** from the **System Setup** menu.
- 2 Enter the password and choose **OK**.
- 3 Click on the **Secure Database Access** checkbox on the **Standard Options** page.
- 4 Enter the password and choose **OK**.
- 5 You will see no checkmark, in the **Secure Database Access** checkbox, if database security is disabled.
- 6 Choose **Close** followed by **Yes** to close the **System Options** form.
- 7 Choose **OK** to clear the information dialog confirming that the new configuration file was saved.

Set analyzer program options

- 1 Ensure Cadex BatteryShop has connected to the battery analyzer for which you want to set analyzer options. See Appendix topic [Connect to battery analyzers](#) for details?
- 2 Right-click the bottom half of the icon representing the analyzer for which you want to set options.
- 3 Click **Analyzer Options** on the menu that appears. The Analyzer Options dialog box appears.
- 4 Enter these settings:
 - Automatic OhmTest.
 - Self-Discharge Rest Period (hrs).
 - Charge Optimization.
 - Maximum number of cycles for LIFECYCLE Program.
 - OhmTest Setpoints:
 - NiCd.
 - NiMH.
 - SLA.
 - Li.
 - Runtime Program Parameters:
 - Percent 1.
 - Percent 2.
 - Percent 3.
 - Minutes 1.
 - Minutes 2.
 - Minutes 3.
- 5 Click **Download** to copy the settings to the battery analyzer.
- 6 Click **Close**.

Program Phases

A custom program consists of six phases. Each of the first five phases consists of two cycles and a test. The sixth phase, Phase DONE, consists of one cycle only and does not proceed to any other cycle.

Cycle 1 and Cycle 2

There are seven different actions that can be performed as Cycle 1 or Cycle 2 of phases 1 through 5:

- **Skip Cycle.**
Skips the current cycle and goes on to the next cycle or to the TEST statement.
- **Discharge.**
Discharges the battery for the specified time period at the specified rate.
- **Charge.**
Charge the battery for the specified time period. The Charge rate is set in the Extended C-Code.
- **Recondition.**
Reconditions (deep discharges) the battery for the specified time period. The Recondition Discharge rate is set in the extended C-Code.

This cycle is skipped for SLA and Li batteries because these chemistries cannot be reconditioned.

Can be applied only after a discharge cycle..
- **Trickle Charge.**
Trickle-charge NiCd and NiMH batteries for a specified interval. The trickle-charge rate is set in the extended C-Code.

This cycle is skipped for SLA and Li batteries.
- **Rest.**
No current is applied for the specified time period.
- **Impedance Test.**
Performs an OhmTest on the battery.

Test

You can choose from ten different test conditions, or IF statements, when you are setting tests for phases 1 through 5:

- **Skip Test.**
Go to the TRUE statement. The FALSE statement is ignored.
- **Target Capacity Met.**
If the capacity reached during the last discharge cycle meets or exceeds the target capacity, go to the TRUE statement; otherwise, go to the FALSE statement.
- **Target Capacity Not Met.**

If the capacity achieved during the last discharge is below the target capacity, go to the TRUE statement; otherwise, go to the FALSE statement.

- **Capacity increase < 5%.**

If the improvement in capacity during the last two discharge cycles is less than 5% (for example, the last capacity reached is 88% and the capacity reached before is 85%), go to the TRUE statement; otherwise (for example, if the last capacity reached is 90% and the one before is 80%), go to the FALSE statement.

- **Capacity increase > 5%.**

If the improvement in capacity during the last two discharge cycles is greater than 5% (for example, the last capacity reached is 90% and the capacity reached before is 80%), go to the TRUE statement; otherwise (for example, if the last capacity reached is 88% and the one before is 85%), go to the FALSE statement.

- **Loop Count < Max.**

If the number of charge/discharge cycles required to bring the battery to target capacity is less than the value set in the Count box, go to the TRUE statement; otherwise, go to the FALSE statement.

- **Loop Count > Max.**

If the number of charge/discharge cycles required to bring the battery to target capacity is greater than the value set in the Count box, go to the TRUE statement; otherwise, go to the FALSE statement.

- **Total Capacity < 5%.**

If the capacity reached during the last discharge cycle is less than 5% of nominal capacity, go to the TRUE statement; otherwise, go to the FALSE statement.

- **Total Capacity > 5%.**

If the capacity reached during the last discharge cycle is greater than 5% of nominal capacity, go to the TRUE statement; otherwise, go to the FALSE statement.

- **User Defined Timeout.**

If the time period set in Cycle 1 or Cycle 2 expires before the battery is fully charged, discharge, or reconditioned, go to the TRUE statement; otherwise, go to the FALSE statement.

For Trickle Charge and Rest, the program goes to the TRUE statement only.

You can choose from ten different possible responses to the results of the IF statements. Each of these responses is available as a THEN statement (for when the battery passes the test) or as an ELSE statement (for when the battery fails the test).

- **Go to next Phase.**
- **Go to Phase 1.**
- **Go to Phase 2.**
- **Go to Phase 3.**
- **Go to Phase 4.**
- **Go to Phase 5.**
- **Go to Phase 6 (Done).**
- **Repeat N Times.**

Repeat the current phase the number of times specified (to a maximum of 100 times).

- **Rest.**
No current is applied for the specified time period.
- **Fail.**
Stop the program and fail the battery.

Phase Done

You can choose one of three different actions to perform as the final phase of your custom program:

- **Ready – No Charge.**
Completes the program. No trickle charge is applied.
- **Ready – Trickle Maintenance.**
Completes the program, but continues to trickle-charge the battery at the trickle-charge rate in the extended C-Code. Includes the Standby maintenance cycle, which performs a discharge/charge cycle every 30 days (180 days for SLA).
- **Ready – Trickle.**
Completes the program, but continues to trickle-charge the battery at the trickle-charge rate in the extended C-Code.

Set a program as active or inactive

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Programs**. The Custom Programs dialog box appears.
- 2 Locate the basic, advanced, or custom program whose status you want to change.
- 3 Select (check) the box in the Active column to make the program available for battery service, or clear the box to remove the program from the list of programs available for battery service.
- 4 Click **Close** to return to the Cadex BatteryShop main window.

Change the name of a custom program

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Programs**. The Custom Programs dialog box appears.
- 2 Click the name or short name you want to change.
You cannot change the name of a preprogrammed basic or advanced program.
- 3 Type the new name or short name for the custom program.
Short names can have a maximum of 9 characters.
- 4 Click **Close** to return to the Cadex BatteryShop main window.

Modify a custom program

- 1 From the Cadex BatteryShop main window, click **Database**, and then click **Programs**.
The Custom Programs dialog box appears.
- 2 Click the name of the custom program you want to modify.
- 3 You cannot modify a preprogrammed basic or advanced program.
- 4 Click **Phase 1** in the Program Phases section of the dialog box.
- 5 Make the desired changes to the Cycle 1, Cycle 2, and Test actions, or to their settings.
See Appendix topic [Program Phases](#) for details.
- 6 Repeat steps 3 and 4 for Phases 2 through 6.
- 7 Click the name of any other program in the programs grid.
- 8 Click **Save**.
- 9 In the confirmation dialog box that appears, click **Yes**.
- 10 Click **OK**.
- 11 Click **Close** to return to the Cadex BatteryShop main window.

Database naming conventions

The Cadex BatteryShop database file has the file name bs.mdb and is located in the \Batshop\Db\ directory.

When the setup program backs up an existing database file, it copies it to bs_100x_y.mdb in the same directory, where x is the database version, and y is the number of times that version of the database has been updated.

Calibrating a Cadex 7000 C-Series, Cadex 7000 Series or Cadex 7000 battery analyzer

Every electronic instrument needs periodic calibration to compensate for component drift due to aging. The Cadex Analyzer Voltage Calibration Kit offers a do-it-yourself method that is economical, quick and easy. For ISO9000 users, this kit includes a renewable calibration certificate that is valid for three years from the date of purchase and is traceable to a national standard.

Voltage Calibration Kit

Contact a Cadex sales representative to obtain a Voltage Calibration Kit

C7000 Voltage Calibration Procedure

1. Turn **ON** the analyzer.
2. When the global screen is displayed, firmly insert the Voltage Calibration Adapters, one in each station (the C7200 battery analyzer requires only two Voltage Calibration Adapters).
3. Press the **MENU** key.
4. Scroll to SYSTEM SETUP using the **▲** key (On C7000/ER or BOS use S1 key) and press **ENTER**.
5. a. C7200, C7400, BOSII: scroll to 'Calibrate Voltage'.
b. C7000, C7000ER, BOS: scroll to 'Calibration', press **ENTER** scroll to 'Voltage Calibration.'
6. Press **ENTER** to begin calibration. The calibration process takes about 5 seconds.
7. Remove the Voltage Calibration Adapters when instructed on the screen.
8. Press the **Menu** key to return to the Global screen.
9. Press and release the **Fn** key, then press the number **7** to display the startup screen. The "#" should appear in the upper right corner to indicate a successful calibration.
10. The C7x00 is now voltage calibrated.
11. Perform Adapter/Station Calibration. Refer to the C7x00 Users Manual for adapter/station calibration instructions.

Maintaining Calibration

- **Voltage Calibration:** Using the Voltage Calibration Kit, calibrate the C7000 C-Series and C7000 Series battery analyzer at least once a year to maintain performance specifications.

- **Adapter/Station Calibration:** Refer to the C7x00 Users Manual for information on maintaining adapter calibration.

Recalibrating the Voltage Calibration Adapters: Return the voltage calibration kit to the factory every three years for recalibration and recertification. Contact Cadex or e-mail service@cadex.com for a cost estimate and a Return Authorization.

Calibrating an Adapter

Battery adapters should be calibrated once a year or whenever they are moved from one analyzer to another. Station calibration corrects variations in tolerances due to aging of the components in the adapter and compensates for voltage loss from cables and electrical contacts.

Failure to calibrate battery adapters can cause inaccurate capacity readings, especially on low voltage batteries or single cells operating at high charge or discharge currents. OhmTest and QuickTest™ results can also be affected, in some cases dramatically.

Use an electrical short with a 10 AWG wire or a copper plate for this procedure.

To calibrate an adapter

- 1 Make sure that there is no battery inserted into the adapter.
- 2 From the global display, press **FN**, then press **8**

or

- a. From the global display, press **MENU**
 - b. Press **▲** or **▼** to scroll to SYSTEM SETUP, and then press **ENTER**
 - c. Press **▲** or **▼** to scroll to CALIBRATE STATION, and then press **ENTER**.
- 3 Press the station key for the station that contains the adapter you want to calibrate.
 - 4 Use a short length of heavy gauge wire (AWG 10) or a copper plate to short all terminals on the battery adapter together.

Warning.

Never short the contacts on a battery.

- 5 Press **ENTER** to start calibrating. Calibration takes about 20 seconds.
Remove the adapter when prompted.

Update Rules

BatteryShop has configurable features that include **System Setup Options**, **Battery Models** database, and **Programs**.

These features can be updated via the Web depending on options set on the **Web Update** page of **System Setup Options**

Rules for updating BatteryShop features:

- Replace **System Setup Options** will reset all BatteryShop System Setup Options to their install defaults. This option is unchecked by default so as not to overwrite current settings.
- Update **Battery Models** will update the battery model database. Records that are marked Favorite will retain Favorite status and will not be updated. Battery Model update will not work when database security is enabled. The two options available for Battery Model updates are:
 - a) Only add new battery models (Default)
 - b) Add new / over-write existing (incl. matrix)
- Update **Programs** will update Programs.

Note: To make Update Rules settings permanent, choose **Options** under **System Setup** menu and then choose the **Web Update** page. Select the checkboxes you want remembered and then choose **Close**. Choose **Yes** to save settings.

Cadex Analyzers

Connect Cadex battery analyzers to a COM port

BatteryShop requires the following Serial Communication Settings for communication with a Cadex 7000 C-Series, Cadex 7000 Series, or Cadex 7000 battery analyzer:

Bits per second:	9600
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	None

To verify the Serial Port settings on your PC:

- 1 Right-click on **My Computer** and select **Properties** to display the **System Properties** dialog box.
(Alternatively, you can launch the **Control Panel** from **Start >Settings >Control Panel** and double-click on the **System icon**.)
- 2 Select the **Device Manager** tab.
- 3 Select the **+** sign to the left of the Ports icon.
- 4 Double-click on a **Serial Port** to which an analyzer is connected to get the Properties dialog box.
- 5 Select the **Port Settings** tab.
- 6 Select **OK** after verifying that the settings match those listed above.
- 7 Re-boot the PC before attempting to connect to an analyzer via BatteryShop.

Connect Cadex battery analyzers to a USB port

The recommended method to connect Cadex analyzers to the PC is directly via serial cable or by using an USB to Serial adapter such as the EdgePort USB Expansion Module(s) from [Digi](#).

Cadex C-Series analyzers can connect directly, via a USB cable, to a USB 2.0 port on the PC or to a USB 2.0 Hub, with "Transaction Translator" support, that is connected to a USB 2.0 port on the PC. To connect directly to a PC via USB 2.0 Port or a USB 2.0 Hub, the PC must be running on Windows 2000 SP4 or Windows XP SP2.

To connect one or more C-Series battery analyzers to the USB 2.0 port of your computer:

- 1 Follow instructions to [install BatteryShop](#) if not already done. BatteryShop Setup will pre-install install the required USB drivers for C-Series analyzers.
- 2 If you want to connect more than one analyzer, connect USB 2.0 Hub(s), in bus-powered mode, to the USB 2.0 Port on the PC. Note: Hubs that support bus-powered mode do not require a Power Adapter to power the Hub. The USB 2.0 nub must have "Transaction Translator support" for communications with a C-Series battery analyzer.
- 3 Power-ON the C-Series analyzer before connecting into the USB 2.0 Hub or the USB 2.0 Port on the computer. See special instructions in Appendix under USB for [installing C7xx USB drivers on Windows XP](#).

Note: For issues with USB, see "[USB connectivity issues](#)" under Troubleshooting.

Cadex 7000 Series battery analyzers cannot connect directly to a USB port. Install and use an USB-to-serial adapter to use the USB port on your computer. [Cadex](#) recommends the Edgeport USB Expansion Modules from [Digi](#). These modules work with Windows 2000 and Windows XP, providing multiple high-speed serial connections through one USB port on your computer.

To connect one or more battery analyzers to the USB port of your computer

- 1 Install the USB-to-serial adapter or expansion module according to the manufacturer's instructions.
- 2 Confirm USB setup and note the new COM port number(s). How?
- 3 Connect the Cadex battery analyzer(s) to the USB-to-serial adapter or expansion module using the cable and cable adapter shipped with Cadex BatteryShop.

Expanding COM ports with a multiport adapter

You can use a COM port multiport adapter to connect up to 32 battery analyzers to a computer. Multiport adapters that add 4, 8, 16, or 32 COM ports to your system are available from Cadex. For configuration details, see the installation and configuration guides that come with the multiport adapters.

Cadex supplies and strongly recommends RocketPort plug-and-play multiport adapters by Control. Moxa multiport adapters also work well, but require manual configuration. Other multiport adapters that emulate serial COM ports should work, but as they have not been tested, no assurance can be made to that effect. Cadex does not provide technical support

for installation of multiport adapters not provided by Cadex.

Do not install a RocketPort adapter and an USB-to-serial adapter on the same system. Installing a RocketPort adapter on a computer with an USB port may cause problems with any devices connected to the USB port.

RocketPort

The most current RocketPort manuals can be downloaded from the [Comtrol](http://www.comtrol.com) website (www.comtrol.com).

Install a RocketPort adapter for Windows 2000/XP Professional

- 1 Turn off the computer and insert the RocketPort PCI adapter card(s) into the PCI slot(s) on your computer's motherboard. How?
- 2 Turn on the computer and log on.
- 3 Windows 2000 automatically detects the new hardware and installs the required RocketPort drivers.
- 4 Set up the adapter(s):
 - a. Click Start on the Windows Task Bar, point to Settings, and then click Control Panel.
 - b. Double-click System. The System Properties dialog box appears.
 - c. Click Device Manager.
 - d. Double-click Multi-function adapters, and then double-click RocketPort – PCI # Port, PCI-BUS, where # is the number of ports supported by the adapter.
 - e. Click the Main Setup tab, and then click Properties.
 - f. Specify a COM port number for the first RocketPort COM port. COM5 is recommended. The remaining COM port numbers are assigned automatically.
 - g. Click OK to save your settings.
 - h. Click OK again.
 - i. Click Yes to add program manager menu commands to the utility.
 - j. Close the Device Manager window and the Control RocketPort RocketModem window.
 - k. Click OK to close the System Properties dialog box.
- 5 Verify your new RocketPort COM port numbers:
 - a. Repeat steps 4a – 4c.
 - b. Under Ports (COM & LPT), ensure that the RocketPort COM port numbers that you are assigned are listed.
 - c. Make a note of the RocketPort COM port numbers. You will need this information during Cadex BatteryShop setup.
 - d. Click OK.
- 6 Close the Control Panel window.
- 7 Restart the computer for all changes to take effect.

Your RocketPort adapter is now complete. See the RocketPort manual for instructions on connecting your battery analyzers to the RocketPort interface.

USB

Confirm USB Setup

- 1 Click **Start** on the Windows Task Bar, point to **Settings**, and then click **Control Panel**.
- 2 Double-click **System**. The System Properties dialog box appears.
- 3 Click the **Device Manager tab**.
- 4 Verify that you have the following devices installed under Universal **Serial Bus Controller**:
 - a. A Host Controller
 - b. USB Root Hub
- 5 If you installed an Edgeport USB Expansion Module, you should also see one or both of these devices listed:
 - a. Inside Out Networks Edgeport/#
 - b. Inside Out Networks Edgeport/# Serial ports [device serial number]

If you installed a USB-to-serial adapter other than the recommended Edgeport USB Expansion Module, you should see your device listed rather than the Edgeport devices listed above.

- 6 Under **Ports (COM & LPT)**, verify that at least one new COM port is present (usually COM 3 and above).
- 7 Make a note of these new COM port numbers. You will need them during Cadex BatteryShop setup.
- 8 Click **OK**.

Installing C7xx USB drivers on Windows XP

Windows XP will prompt twice to confirm driver pre-installation during BatteryShop Setup and again for each analyzer connected via USB serial port.

- 1 Choose the **Continue Anyway** button to proceed with driver installation for **C74xx USB to UART Bridge Controller**.
- 2 Choose the **Continue Anyway** button again to proceed with driver installation for **C74xx USB COM Port**.

Dymo LabelWriter

A Label Printer driver must be installed for Cadex BatteryShop to work correctly. This is the case even if a label printer is not available and there is no plan to print labels.

If using the DYMO LabelWriter, install the printer driver that comes with the printer.

Refer to the DYMO manual for instructions on installing the DYMO printer drivers.

The latest driver for the Dymo LabelWriter, which supports the three printer models, is available on the [DYMO](http://www.dymo.com) website (www.dymo.com)

If using a Windows' label printer from an alternate manufacturer, please insure that the correct Windows' printer drivers are available and that the printer supports a label size that has at least 1.5 inches horizontal and 1-inch vertical dimensions. Please consult the alternate manufacturer printer manual to set up their printer for your version of Windows.

Set up LabelWriter for Windows 2000 Professional

A Label Printer driver must be installed for Cadex BatteryShop to work correctly. This is the case even if a label printer is not available and there is no plan to print labels.

If using the DYMO LabelWriter, install the printer drivers that come with the printer.

Refer to the DYMO manual for instructions on installing the DYMO printer drivers.

Install the label printer driver using the Administrator profile. Also, run the Setup Wizard once for the Administrator profile and for each User profile under which Cadex BatteryShop is used. Failure to do so will cause printing problems.

- 1 For a LabelWriter label printer, follow the manufacturer's instructions for connecting the printer to your computer, and then turn the printer on.
- 2 Run **Install.exe** on the Dymo CD to install the LabelWriter driver.
- 3 On the Windows Task Bar, click **Start**, then point to **Settings**, and then click **Printers**.
- 4 Configure the printer:
 - a. Right-click **DYMO LabelWriter** in the Printers window and click **Printing Preferences** on the menu that appears.
 - b. Under **Paper size**, choose **30334 2-1/4 in x 1-1/4 in**.
 - c. Under **Print Quality** select **Barcodes and Graphics**.
 - d. Under **Print Density**, select **Normal**. This option ensures that bar code scanners can read printed bar codes.

For an older label printer, experiment to find a setting that allows bar codes to be read consistently by a scanner held 1/4 inch from the bar code. If none of the settings work, replace the label printer with a newer model.

- 5 Click **OK**.

Note: If planning to use a different Label Printer, follow the instructions above substituting the Printer Driver and Paper Size for your Label Printer.

Set up LabelWriter for Windows XP

Install a Label Printer driver for Cadex BatteryShop to work correctly. This is the case even if a label printer is not available and there is no plan to print labels.

If using the DYMO LabelWriter, install the printer drivers that come with the printer.

Refer to the DYMO manual for instructions on installing the DYMO printer drivers.

Install the label printer driver using the Administrator profile. Also, run the Setup Wizard once for the Administrator profile and for each User profile under which Cadex BatteryShop is used. Failure to do so will cause printing problems.

- 1 For a LabelWriter label printer, follow the manufacturer's instructions for connecting the printer to the PC, and then turn the printer on.
- 2 Run **Install.exe** on the Dymo CD to install the LabelWriter driver.
- 3 On the Windows Task Bar, click **Start**, then point to **Settings**, and then click **Printers**.
- 4 Configure the printer:
 - a. Right-click **DYMO LabelWriter** in the Printers window and click **Printing Preferences** on the menu that appears.
 - b. Under **Paper size**, choose **30334 2-1/4 in x 1-1/4 in**.
 - c. Under **Print Quality** select **Barcodes and Graphics**.
 - d. Under **Print Density**, select **Normal**. This option ensures that bar code scanners can read printed bar codes.

If you have an older label printer, you may have to experiment to find a setting that allows bar codes to be read consistently by a scanner held 1/4 inch from the bar code. If none of the settings work, replace your label printer with a newer model.

- 5 Click **OK**.

Note: If you plan to use a different Label Printer, you can follow the instructions above substituting the Printer Driver and Paper Size for your Label Printer.

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