

**Cellcorder® CRT-300
Previewer
User's Guide**



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Cellcorder CRT-300 Previewer User's Guide, 4200-040R1.0, Book Revision 1.0

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1 Safety Information

You must read and understand the following safety precautions and those printed elsewhere in this manual before using the Cellcorder®.

- Except as explained in this manual, do not attempt to service Albér equipment yourself. Opening the equipment may expose you to dangerous voltages. Refer servicing beyond that described in this manual to authorized personnel.
- Do not allow liquids or moisture to get into the equipment. If liquid does get into the equipment, unplug it immediately and contact your nearest authorized service center or Albér directly.
- Ensure equipment is provided adequate ventilation. Do not block equipment ventilation openings.
- Do not exceed equipment voltage or power ratings or capabilities.
- Do not let unauthorized persons operate the equipment.
- The maximum voltage the Cellcorder can read is 20V. Do not attempt to read Overall Volts (OV). The Cellcorder calculates OV based on cell voltage readings.
- Never let any Cellcorder metal surfaces come in contact with a battery post or grounded rack while testing with the unit.
- Do not attempt to read internal resistance of an open cell/module while the battery is on-line.
- Do not perform any testing with the Cellcorder when the AC Power indicator is lit or when the charger module is connected to the Cellcorder. Injury to personnel or damage to equipment could result.
- Use of this product in a manner not specified could compromise the designed-in safety of this product.
- High voltage or current may be present in the equipment. Only qualified personnel should perform the operations described in this manual.

2 System Requirements

The following are the minimum system requirements for the CRT-300 Previewer software operation.

Version 1.00A25 or later firmware for the CRT-300 Cellcorder
or Version 2.00 or later firmware for the CLC-200 Cellcorder

Microsoft Windows™ 95, 98, NT4.0, 2000 or XP

Personal computer using a 486 100MHz or higher processor

16M of memory

3M of hard disk space available

CD drive

A typical Cellcorder system requires the following manuals:

Cellcorder CRT-300 User's Guide, 4200-038
or CLC-200 Instruction, 4200-001

Cellcorder CRT-300 Previewer User's Guide, 4200-040 (this manual)

Battery Analysis System User's Guide, 4200-002 (if a computer is used)

USB Media Reader/Writer manufacturer's instruction manual (Belkin
Components, Smart Media or other)

Hydrometer manual (if a hydrometer is used)

Data storage module manual (used with the hydrometer)

3 General Description

The Albér CRT-300 Previewer program lets you view the data file (.CDF) created by the CRT-300 and stored on the Smart Media memory card. Unlike the Battery Analysis System (BAS) program, where you can continually build battery files by appending new sets of readings, the Previewer only allows you to view one set of readings at a time and print them.

The Previewer can do the following:

- Display data in bar graph and tabular formats.
- Modify data and save the file.
- Manually create a battery file by entering data from another source and saving the file.
- Create site setup information for the CRT-300.
- Update Cellcorder CLC-200 and CRT-300 firmware.
- Capture data via IR (infrared interface) for the CRT-300 or via RS-232 for the CLC-200.

The Previewer interfaces with both the CLC-200 and CRT-300 Cellcorders. A major difference between the CLC-200 and CRT-300 is that the CLC uses serial port communication and has no IR (infrared) port, while the CRT has IR communication and no serial port. The CRT also offers Smart Media memory card capability, whereas the CLC does not.

4 Software Installation

The Albér CRT-300 Previewer program is compatible with the Cellcorder CLC-200, Version 2.00 or later and the CRT-300, Version 1.00A25 or later, and is distributed on one CD. Before installation, close all other programs.

To install the program, insert the CD into the computer and select Start|Run from the Windows desktop. From the Run dialog box, type d:\setup (or other drive) to start the installation, then follow the on-screen instructions. After installation, an icon shortcut appears on the desktop.

4.1 Sample Data

The Previewer program contains the sample file **sample.cdf**. Use this file to try features described in this manual. When saving a modified sample file, use a different file name so the original sample data does not get changed.

4.2 Infrared Communication Drivers

If you are operating the Previewer on a computer running the Windows 2000 or XP operating systems, you must install special infrared (IR) drivers to use the computer IR port. To install the drivers, insert the CD into the computer and select Start|Run from the Windows desktop. From the Run dialog box, type d:\irdriver (or other drive letter) and follow the on-screen instructions.

4.3 File Types

Several file extensions are used in the Cellcorder and Previewer program. These extensions are associated as follows:

- ADF Accumulated data file used in the BAS program. An ADF file contains many sets of readings or many imported DAT, ZDF or CDF data files.
- CAL Calibration file (CRT-300, CLC-200); one file for **each** Cellcorder in use.
- CCF Configuration file containing site setup information (CRT-300); one file for **all** Cellcorders in use.
- CDF Cell data file (CRT-300); one file for each battery string.
- DAT A DOS-based battery data file created by the older DOS based BAS program.
- PRG Firmware upgrade file (CLC-200); one file for firmware. Typically overwrites previous version.
- QRP A report file generated by BAS Ver 1.5.0.4 and earlier for use with the Report Viewer program.
- UPG Firmware upgrade file (CRT-300); one file for firmware. Typically overwrites previous version.
- ZDF PDA battery data file that is transmitted via wireless e-mail.
- ZRF A report file generated by BAS, Ver 1.7.0.8 and later for use with the Report Archive Reader program.

5 Toolbar and File Menu

To start the Previewer program, double-click the Previewer icon on the desktop or select Start|Programs|Alber|Alber Battery Analysis| CRT Viewer from the Task bar. The Previewer opens and the General page appears. Each toolbar button along the top of the program window displays a hint when the cursor is over it.

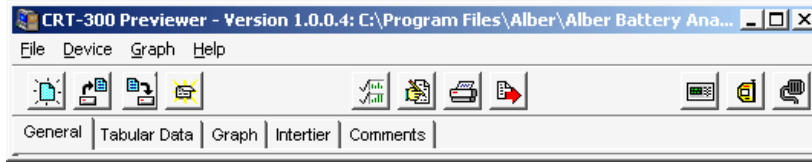
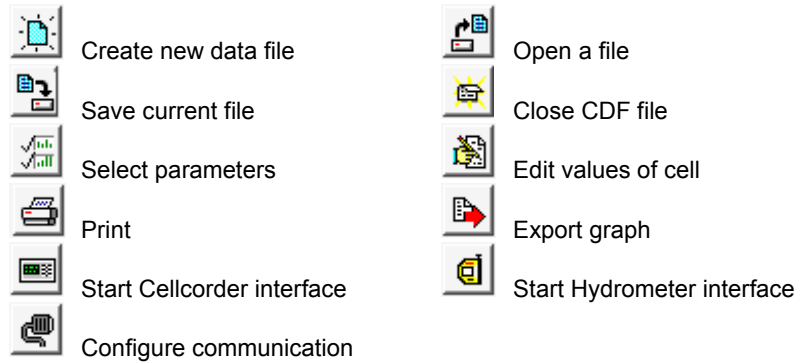


Figure 1. Toolbar

The Main Menu and toolbar provide access to all program features. Some toolbar buttons are not active until certain actions occur, such as opening a battery data file.



5.1 File Menu

A few File Menu options have no toolbar button equivalents. This section describes the File Menu.



File|New - Opens the Select Configuration dialog box. Use to manually create a battery file. Refer to *Creating a Data Set*.

File|Open - Opens a list of Cellcorder **.CDF** data files and PDA **.ZDF** data files in the Cellcorder CDF Files subdirectory. Refer to *Main Menu*.

File|Reopen - Displays a list of recently opened files. Click a file name to open it.

File|Save As - Displays a list of **.CDF** files in the CDF Files subdirectory. Save the file as a **.CDF** file with an existing or new name.

File|Close - Closes the currently open file.

Figure 2. File Menu

File|Print - Opens the Report Option dialog box and then the Print Preview box before printing. Refer to *Setting Report Options*.

File|Printer Setup - Selects the printer and paper orientation.

File|Configuration Editor - Displays the Configuration File Editor pages. Refer to *Configuration File Editor*.

File|Exit - Closes the Previewer program.

File|Clear File List - Clears the list of recently opened files that appears when File|Reopen is selected.

6 *Setting Communication*



Configure communication

Before connecting a device to the computer for data transfer, select a default COM (serial) port. To open the Default Communication Settings box, click the Configure Communication button or select Device|Communications. In the dialog box, select a COM port. If the port is in use or unavailable, a message indicates another selection must be made.

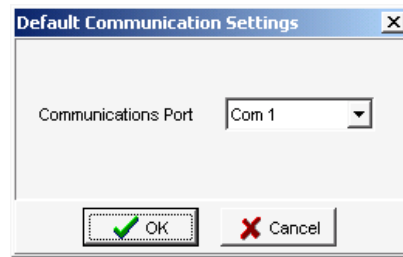


Figure 3. Communication Settings

The selected COM port is used by default unless another port is selected for a specific device. Device specific ports are configured using the individual device interfaces.

7 Capturing CRT-300 Battery Data

When capturing data from the Cellcorder and hydrometer into the Previewer, it is not important which data is copied first. However, if the first unit has data for the same parameters as the second, the data captured last will overwrite previously captured data. For example, if you capture Cellcorder SG and temperature data and then capture hydrometer data, the hydrometer data will overwrite the Cellcorder SG and temperature data.

Capture data from the CRT-300 via IR (infrared signal) or the Smart Media memory card and from the hydrometer module via IR or serial cable as described in the following sections.

7.1 Capturing Battery Data via IR



Cellcorder interface

This section describes CRT-300 to computer battery data capture via IR. This function captures battery cell voltage and resistance data, and site setup data, including location names, dates, and thresholds.

1. Power up the Cellcorder.
2. On the Previewer, click the Create New button or select File|New. The Select Configuration box appears.
3. Click Existing Configuration or New Configuration, then OK. For more details, refer to *Creating a Data Set*.
4. In the Save box, type a file name, select the Cellcorder CDF Files subdirectory, then click Save.
5. On the General page, type Location, Battery and String Names and select the Number of Cells, usually the number of cells in the Cellcorder file that have data.
6. Click the Cellcorder Interface button or select Device|Cellcorder.
7. On the Select Cellcorder box, choose CRT-300 then click OK. The CRT-300 Interface box appears.

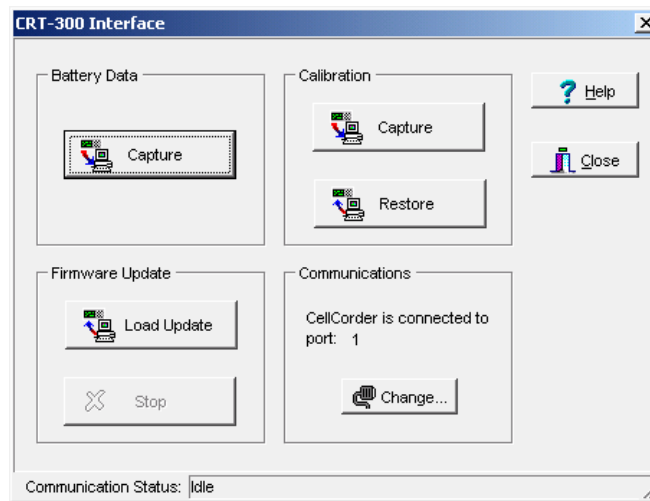


Figure 4. CRT-300 Interface

8. Choose the COM port so the IR interface is enabled. To change the port, from the Interface box, click Change, select the COM port, then click OK. For more details, refer to *Setting Communication*.
 9. On the Cellcorder, press Shift+Send, then select Send data to PC via IR interface.
 10. Align the Cellcorder and computer IR ports.
 11. In the Battery Data area, click Capture to start downloading.
NOTE: While capturing, Communication Status indicates Transferring cell data and the Cellcorder LCD indicates the cell number being transferred. When capture is finished, the status indicates Data transfer completed.
- NOTE: If capture is not successful, check that the correct COM port is selected, the correct Number of Cells is selected, and, if using Windows 2000 or XP, the IR port driver is installed in the computer.
12. After capture, close the Cellcorder Interface box.
 13. On the Cellcorder, to return to the Main Menu, press Cancel then Back.
 14. Review the data on the General, Tabular Data and other pages.
 15. Save the file to the CDF subdirectory if desired.

7.2 Transferring Battery Data via Memory Card

This section describes how to transfer battery data from the CRT-300 to the computer via memory card. This function captures battery cell voltage and resistance data and location names, dates, and thresholds. Before using the memory card, refer to the *Memory Card Note* section.

To transfer data from the CRT-300 to the computer, first save the data from the CRT to the memory card. Refer to *Saving the Readings* in the Cellcorder CRT-300 User's Guide.

Following the instructions packaged with the memory card reader, install the memory card driver software and connect the memory card reader to the computer USB port. Confirm the drive is active by locating it under Windows Explorer.

Insert the Smart Media card into the card reader on the computer. To load the CDF file, start the Previewer program, then click the Open File button or select File|Open. On the Open File box, click the Look In drop-down menu and navigate to the memory card drive. Open the drive, highlight the desired CDF file, and click Open. The data appears in the Previewer program.

If no site information was linked to the readings in the CRT-300 prior to saving the file, the number of cells within the file will not be defined. You must enter the correct number of cells within the string on the General page; otherwise, the bar graphs will default to 256 cells.

Data can be edited on the General, Intertier, and Comments pages. Changes are not saved to the battery file until File|Save is selected. To transfer the file to the computer, save to the CDF Files subdirectory on the computer. To transfer to the Cellcorder, save to the memory card.

7.3 Memory Card Note

WINDOWS 2000 CAUTION: Removal of the memory card from some manufacturer's reader/writers when using Windows 2000 may require your doing the following:

1. Double-click the My Computer icon on the Windows desktop.
2. Right click the reader/writer drive icon and select Eject from the pop-up menu.
3. After the message It is now safe to remove the media from the drive appears, you may remove the memory card.

Failure to follow this procedure could result in lost data. Consult the manual for your reader/writer to see if this or other procedures apply.

8 Capturing Hydrometer Data



Hydrometer interface

This section describes hydrometer module to computer data capture via IR (infrared) or RS-232. This function captures SG (specific gravity) and temperature data.

1. If using RS-232, connect the hydrometer module to the computer via serial cable.
2. On the Previewer, click the Create New button or select File|New. The Select Configuration box appears.
3. Click Existing Configuration or New Configuration, then OK.
4. In the Save box, type a file name, select the CDF Files subdirectory, then click Save.
5. On the General page, type Location, Battery and String Names and select the Number of Cells within the string.
6. Click the Hydrometer Interface button or select Device|Hydrometer. The Hydrometer Interface box appears.

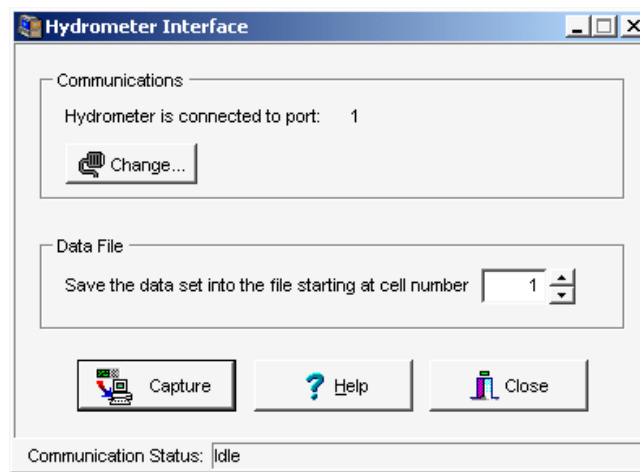


Figure 5. Hydrometer Interface

7. Choose the COM port so the IR interface or RS-232 port is enabled. To change the port, click Change, select the COM port, then click OK. Refer to *Setting Communication*.

8. In the Data File area, set the **Starting at Cell Number *nn*** to the cell number the hydrometer should start downloading data to, typically 1. Thus, hydrometer data for Cell 1 would be recorded in the file under Cell 1, and so on.
The Starting Cell Number - Changing the file starting cell number is useful when more than one hydrometer is used to record data from the same battery. For example, on a 256-cell battery, the first hydrometer tests cells 1 to 128 and stores the data in hydrometer locations 1 to 128. The second hydrometer tests cells 129 to 256 and stores in hydrometer locations 1 to 128 as well. Capture the first hydrometer with the starting cell number set to 1 and capture the second into the existing file with the starting number set to 129.
9. Click Close on the Interface box, because of communication protocol.
10. Press the hydrometer module On button.
11. On the module, press Sel (select) to select the channel (string) A–H from which data will be transferred. The module LEDs indicate status as follows:
Fast - A–H LED is flashing fast: That channel has data and is selected.
Steady - LED is on: That channel has data but is not selected.
Slow - LED is flashing slowly: The channel is selected but has no data.
12. Align the module and computer IR ports.
13. Click the Hydrometer Interface button or select Device|Hydrometer. The Hydrometer Interface box appears.
14. To start downloading, click Capture.
 IMPORTANT NOTE: If using IR, all LEDs on the hydrometer module must be blinking about one time per second when Capture is clicked. If not, push the module On button again, select the string, and click Capture again. Blinking lasts only about 12 seconds after pressing On.
15. As data is captured, Communication Status indicates Downloading. When capture is finished, the status indicates Data transfer completed.
 NOTE: If capture is not successful, verify the correct COM port is selected and the correct Number of Cells is selected. If using IR, verify all hydrometer module LEDs are blinking once per second. If not, push On again and repeat the capture step. Also, if using Windows 2000 or XP, verify the IR port driver is installed in the computer
16. After capture, close the Cellcorder Interface box.
17. If required, disconnect the hydrometer serial cable. The hydrometer module powers down after a few minutes of inactivity.
18. You may review the data on the File|Properties pages and save.

9 Previewer Pages



Open file

When the Previewer starts, the General page appears. To open a file, click the Open File button or select File|Open. The Previewer opens Cellcorder CRT-300 .CDF and .ZDF files but only saves CDF. The Cellcorder CLC-200 data files may be uploaded and saved as a CDF file.

Battery data can be edited on the General, Intertier, and Comments pages. After opening a file, click a tab to display these pages. Changes are not saved to the battery file until a Save is performed. Usually save files to the default Cellcorder CDF Files subdirectory. The following sections describe the General, Tabular Data, Graph, Intertier, and Comments pages.

9.1 General Page

Use the General page to edit site information such as location, battery, and string names, model number, and dates, and set temperature, frequency, and date format. Changing the number of cells, thresholds, temperature units, charger frequency, and date format changes the battery data file contents.

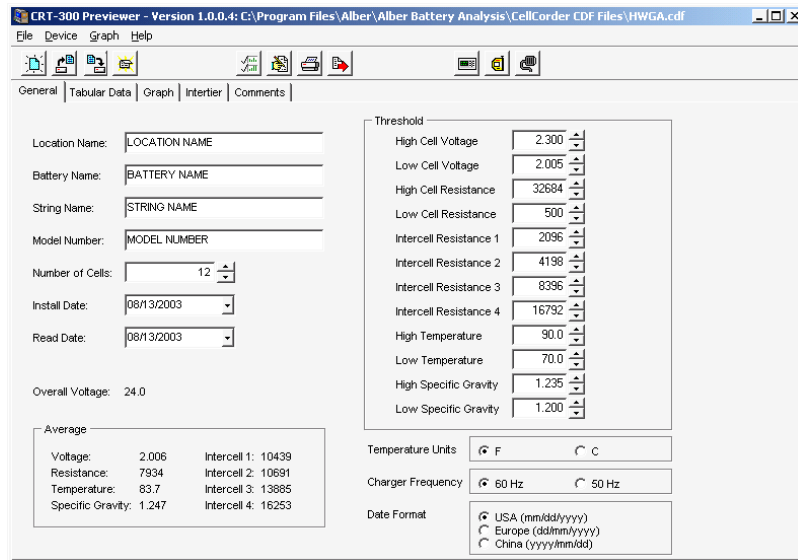


Figure 6. General Page

The bottom left of the page displays OV and average cell voltage, cell resistance, temperature, specific gravity (SG), and intercell resistance. This data cannot be changed. These values are not read from the CDF file, but are calculated from the data.

Location Name, Battery Name, String Name - Edit location name, battery name, and string name in these boxes.

Model Number - Edit the model number of the battery.

Number of Cells - This setting normally is set to the number of cells in the battery, but may be used to limit or expand the number of cells shown on charts or graphs. Change the Number of Cells setting with caution.

CAUTION: The Number of Cells setting affects most displays of battery data, including graphs, reports, and calculations. However, changes to this setting do not affect the actual cell data in the file. No data is lost by reducing the number of cells; the excess cell values simply become unavailable to the program until the Number of Cells is changed to its original value.

Install Date - Edit the date the battery was installed.

Read Date - Indicates the date of the data being displayed. To change, type a new date or click the date field drop-down button and click on the calendar.

Thresholds - Threshold values for voltage, resistance, temperature and SG may be changed in this area. The Graph page bar graph colors change when thresholds are changed. The colors indicate cells are within or exceeding minimum or maximum limits.

Temperature Units - Changing the Temperature Units from Fahrenheit to Celsius converts temperatures to Celsius throughout the program. Changing the temperature scale does not affect the values of data in the file, but only the way the values are indicated.

Charger Frequency - Select 50Hz or 60Hz to filter the ripple frequency.

Date Format - Select U.S. (mm/dd/yyyy), Europe (dd/mm/yyyy) or China (yyyy/mm/dd) date format.

9.2 Tabular Data Page

The Tabular Data Page displays values for all cells with data. When data is available, columns display cell number, cell voltage, internal resistance, intercell R1 to R4 resistance, temperature, and specific gravity.

Cell #	Voltage	Internal Res.	Intercell R1	Intercell R2	Intercell R3	Intercell R4	Temp. (F)	Spec. Gravity
1	12.001	5000	11111	22222	33333	44444	88.5	1.123
2	12.002	12345	22222	33333	44444	55555	85.2	1.124
3	12.003	11223	23232	32323	43434	54545	85.3	1.125
4	12.004	12121	12121	21212	32323	43434	85.4	1.126
5	12.005	10101	10010	20010	30010	40010	85.5	1.127
6	12.006	10000	10000	20000	30000	40000	85.6	1.128
7	12.007	9999	9999	19191	29292	39933	85.7	1.129
8	12.008	9876	9990	19876	29876	39876	85.8	1.130
9	12.009	11111	10101	20202	30303	40404	85.9	1.131

Figure 7. Tabular Data Page

Data is arranged in a list view, which displays record oriented data in rows and columns. Each column represents a field of a record, and each row represents one record.

Click a column header to sort on that column. Click the same header again to reverse the order. A triangle in the header of the selected column points up when sorted in ascending order or down for descending.

To re-arrange column order, click a column header and hold the mouse button down, then drag the header onto another column header. Release the mouse button to place the column at that position. To change column width, drag the dividing line between two column headers left or right.

9.2.1 Editing Cell Data



Edit values

To open the Cell Data Editor to change data on the Tabular Data page, click the Edit Values button, or double-click a cell number or row on the Tabular Data page. The editor indexes to the cell number or row clicked. Use the mouse, Tab or Arrow keys to highlight data to be changed. When editing is complete, click OK to save the changes.

Cell No.	Voltage	Internal Res	Intercell R1	Intercell R2	Intercell R3	Intercell R4	Temperature(F)	Specific Gravity
16	12.016	22332	22322	23232	23232	23232	85.2	1.125
17	12.017	9876	9876	9876	9876	9876	85.3	1.126
18	12.018	8765	9876	9876	9876	9876	85.4	1.127
19	12.019	8765	8765	8765	8765	8765	85.0	1.128
20	12.020	7654	7654	7654	7654	7654	85.5	1.129
21	12.021	11111	11111	11111	11111	11111	85.6	1.130

Figure 8. Cell Data Editor

9.3 Graph Page

The Graph Page displays battery file data in graph and/or table format. The graph can be customized, printed and exported for report generation. Menu items are described below.

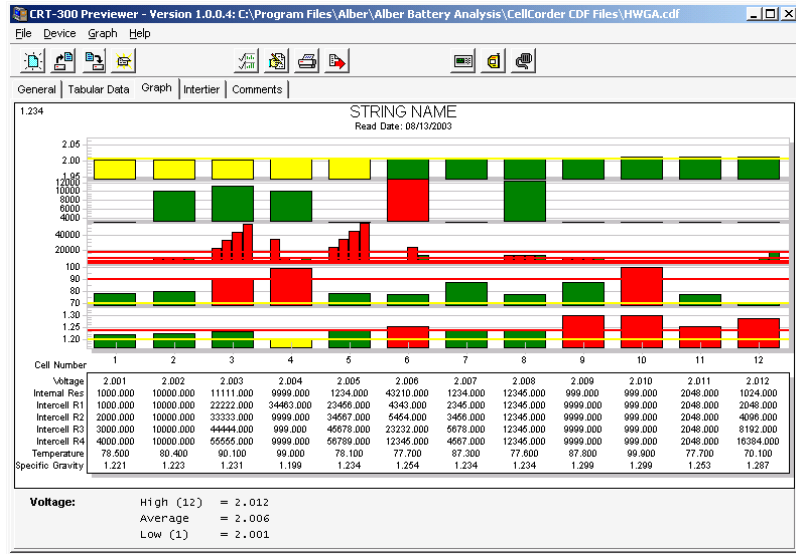


Figure 9. Graph Page

9.3.1 Graph Menu

The Graph menu affects the graph display, not the data. To open the Graph menu, select Graph on the Main Menu.

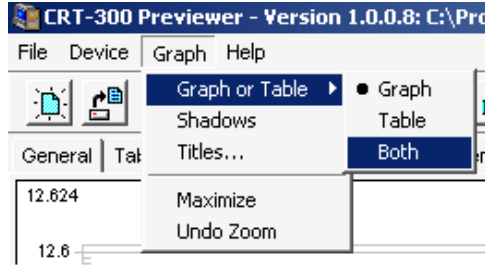


Figure 10. Graph Menu

Graph or Table - Chooses whether the Graph page displays a graph, a data table or both.

Shadows - When checked, adds shadows on each bar in the graph. Click to toggle shadows on or off.

Titles - Customizes the graph title and stores it in the CDF file. When found in a configuration file during report generation, the customized title appears on each graph in the report. Otherwise, the user-defined report title appears.

Maximize - Resizes the graph to full screen. Press Esc or click the top bar to return to normal size. Because the maximized graph is a copy of the original, changes made to this graph may not be reflected in the original.

NOTE: The Maximize function is not the same as maximizing the window.

Zoom and Undo Zoom - To zoom in on a portion of the bar graph, place the cursor on the graph, hold the left mouse button down, and drag across the cells of interest. The cursor changes to a magnifying glass when selecting a valid region. Release the mouse button to complete the zooming. Select Undo Zoom on the Graph menu to return to original size.

9.3.2 Graph Parameters



Select parameters

The Select Parameters dialog box lets you select which parameters appear on the Tabular Data and Graph pages. To display the box, click the Select Parameters button.

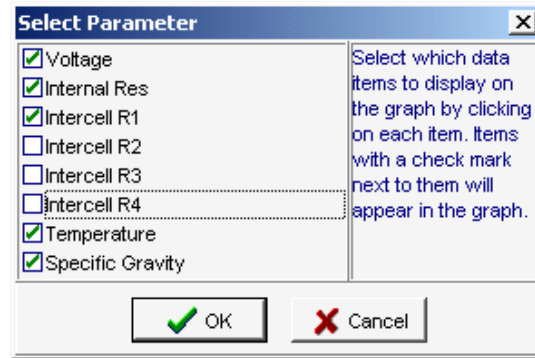


Figure 11. Select Parameter

Check the boxes to cause parameters to display on the Tabular Data or Graph pages, then click OK.

9.3.3 Bar Graph Cell Data

To display text data for a particular cell in the bar graph, enlarge the area of interest on the graph, then click on a bar graph. The Cell Data box appears.

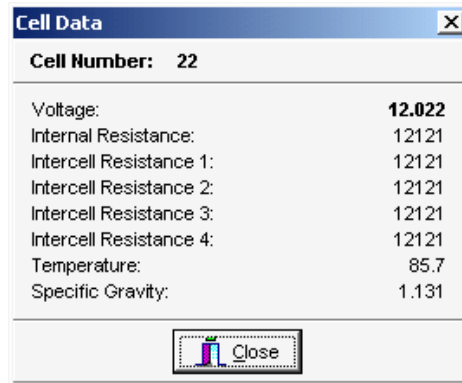


Figure 12. Cell Data Box

The Cell Data box displays the cell number clicked and the cell voltage, internal resistance, intercell resistance, temperature and gravity when data is available. The bold value indicates the portion of the bar graph clicked. For example, if the Intercell Resistance 3 bar was clicked, the value for Intercell Resistance 3 is bold.

9.4 Intertier Page

The Intertier Page lets you set locations of intertiers, either manually or automatically.

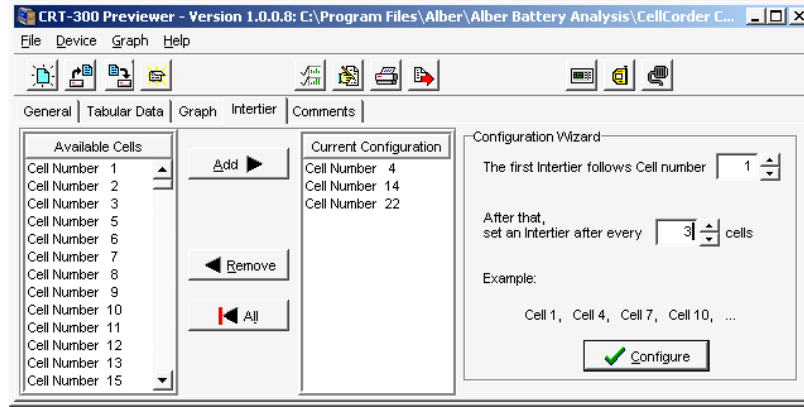


Figure 13. Intertier Page

9.4.1 Intertier Configuration

You may mark battery cells as intertier cells to indicate they are on the boundary of an intertier connection. By convention, only the cell with the lower cell number is marked. For example, if Cell 10, the last cell of one row of cells, is connected to Cell 11, the first cell of the next row of cells, only mark Cell 10 as an intertier cell.

Intertier configuration affects how intercell resistances are calculated. The program ignores intertier cells when calculating high, average, and low intercell resistances for a series of cells because intertier cells have much higher intercell resistances than other cells.

To configure intertier cells, open the battery file. Verify the battery has been configured with the correct number of cells on the General page.

On the Intertier page, **Available Cells** lists cells not designated as intertier cells. When first displayed, the list contains all the cells for the battery, since none are yet marked. **Current Configuration** lists cells marked as intertier cells. The Intertier **Configuration Wizard** is to the right. There are three ways to create an intertier configuration:

Method 1 - Select one or more cells in either list, then click the Add, Remove or All button. **Add** moves selected cells from Available Cells to Current Configuration. **Remove** moves selected cells from Configuration to Available. **All** moves all cells from Configuration to Available. To select multiple cells, hold the Ctrl key down and click each cell. To select a group of cells, click the first cell in the group, hold Shift down, then click the last cell in the group.

Method 2 - Select one or more cells in either list and drag the selection onto the other list.

Method 3 - Use the **Configuration Wizard** to automatically create an intertier configuration. First, click All, if necessary, to clear the current configuration. On the Wizard, fill in the First intertier follows cell number box and the Set an intertier after every *nn* cells box. The **Example** area shows the start of the sequence. Click **Configure** to display the results in the Current Configuration list. The list may be edited, if needed, by using the Add or Remove buttons.

As an example, if a 24 cell battery has intertier cells at 6, 12 and 18, enter 6 in both edit boxes to indicate an intertier every six cells, beginning with cell number 6.

9.5 Comments Page

Use the Comments Page text editor for typing comments. For example, a battery maintenance log might show the date and type of readings taken, or when a cell was replaced or connectors cleaned. You can copy text on this page to the clipboard; right click the comments area to open the edit menu.

10 Configuration File Editor

This section describes how to create and edit the configuration file using the Configuration Editor in the Previewer. To use the Cellcorder to create the file, refer to *Setting Up and Editing a Site* in the Cellcorder manual.

NOTE: The Previewer has a General Page with a Threshold area; the Configuration Editor has a General Page and a Threshold Page.

To edit or create a .CCF configuration file, click File|Configuration Editor. The editor opens the CCF file or, if none exists, indicates Site 0 of 0. To edit a site, select the Location, Battery and String Names from drop down lists or, to add a new site or create a CCF file if none exists, click New and type data.

If a configuration (site) is opened on the Previewer, any changes made and saved to the General Page or Threshold area are reflected in the CCF file on the Configuration Editor General Page and Threshold Page.

10.1 Multiple Sites

If more than one Cellcorder is being used to read data at multiple sites, and all the data is being captured by one computer, the CCF configuration file must originate and be maintained using the Configuration Editor. This avoids having a different CCF file on each Cellcorder.

The Previewer stores the CCF file under Program Files/Alber/Alber Battery Analysis/Battery Analysis. Transfer the CCF file to the CRT-300 by first copying it to the Smart Media memory card. Put the memory card in the CRT, press Load (F3), and select Access Setup Data.

Any site created on the CRT and then linked to a CRT data file (CDF file) is added to the CCF file when opened by the Previewer program

10.2 Editor General Page

The following items are on the Configuration File Editor General Page.

Figure 14. Configuration Editor - General Page

Location Name - Type the location name of the battery installation. Location, battery, and string names are used with each other to identify the strings and hardware.

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

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

String Name - Type a name for each string. Location, battery, and string names are used with each other to identify the strings and hardware.

NOTE: You cannot have two identical string names under the same battery name.

Model Number - Type the model number of the cells.

Number of Cells - The default total number of cells on the Cellcorder is 256. Normally, type the total number of cells in the string. However, you may change the number for custom configurations.

Install Date - Type the battery installation date.

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

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

Charger Frequency - Selecting 50Hz or 60Hz allows Cellcorder circuitry to reject the 50Hz/60Hz ripple and associated harmonics often troublesome to AC-based impedance and conductance meters.

Date Format - Select the date format for your region.

10.3 Editor Threshold Page

Click the Threshold tab. The following items are on the Threshold Page of the Configuration File Editor.

High and Low Cell Voltage, Cell Resistance, Intercell Resistance 1, 2, 3 and 4, Temperature, and Specific Gravity - Use these fields to set limits. During testing, two beeps and reverse video indicate limits are exceeded. The high and low threshold levels cannot be set to zero.

High and low threshold lines appear when a bar graph is displayed on the Graph page. The graph bars change when a cell exceeds a minimum or maximum threshold value. A cell below minimum is shown in yellow; a cell within threshold range is green, and a cell exceeding a maximum threshold is red. To change the High and Low Threshold values after a bar graph appears, click the Tabular Data page, click the reading to edit, and change the value in the Cell Editor.

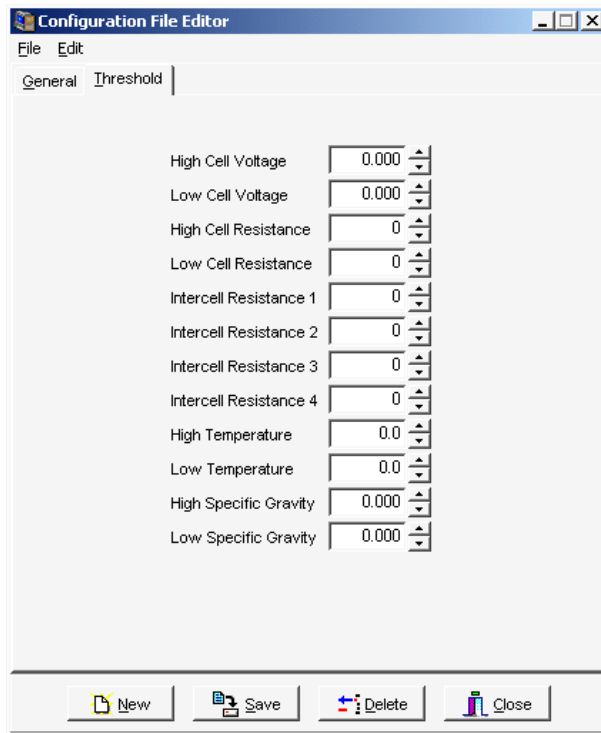


Figure 15. Configuration Editor - Threshold Page

Save - After completing the General and Threshold pages, click Save.

CAUTION: Clicking **Delete** removes all configuration settings for the displayed location, battery and string. All associated set up data will be permanently lost.

11 Generating Reports

The Previewer can print reports with user-specified parameters. A complete report contains cell data tables and graphs. After a report is defined, it can be reviewed in Print Preview before printing.

11.1 Setting Report Options



Print

Open a file, then click the Print button or select File|Print to display the Report Option box.

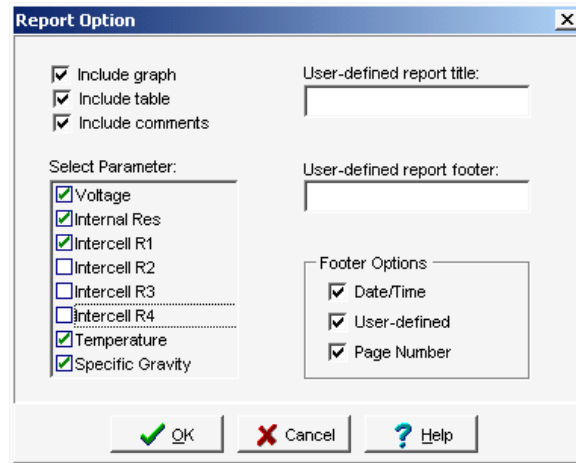


Figure 16. Report Option

The report creates a tabular list of all data or specific data in the battery file. A bar graph report can be created with or without tabular data. The Report Options box has the following items.

Include Graph, Include Table - Click to include a graph and/or table in the report.

Include Comments - If the Comments page has notes, select this option to print them in the report.

Select Parameter - Selects the voltage, resistance, temperature and SG parameters included in the report.

User Defined Report Title and **Report Footer** - Type a title and footer that will appear on every page of the report.

Footer Options area: **Date/Time**, **User Defined**, and **Page Number** - Check these boxes to print on each page the date and time the report was printed, the user defined footer text, and the page number.

After making selections, click OK to display the Print Preview screen. To view other report pages, click the toolbar arrows to step to first, previous, next or last page. Use toolbar buttons to increase or decrease screen page size, print the report, or close the window.

12 Exporting Data



Export graph

The Previewer can export graphed data in multiple formats. To open the Export Option dialog box, click the Export Graph button. To export a file: select the type of export; select the export destination; if available, select the size of the image to export; and click the Export or Print button. Following sections explain this sequence.

To export data as an Excel file, click the **Excel** button on the Export Option box, select the Excel version, then click OK. Type a file name, choose a location to save the file, then click Save. The Tabular Data page is saved in Excel spreadsheet format.

To export in other formats, click **Others** on the Export Option box, then OK. The Export File Options box appears.

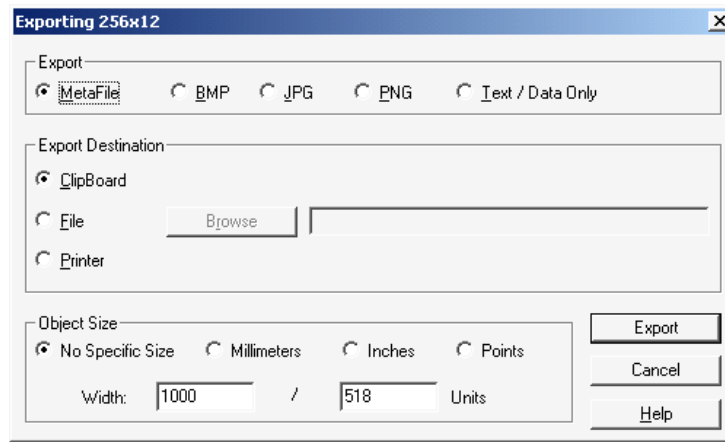


Figure 17. Export File Options

Export area: Click a file type button to enable options in the Export Destination and Object Size areas. The following list defines file formats and destinations.

File Format Options.....	File Destination Options
Metafile	Clipboard, File and Printer
BMP, JPG, PNG, Text/Data.....	Clipboard and File

File Format Output Exported
 Metafile, BMP, JPG, PNG Export the Graph page image
 Text / Data Export data in a column

Export Destination area - Select **Clipboard** to send a file to the clipboard so it may be copied (pasted) into a document.

Select **File** to export as a file. Click Browse to open the File Save As box, type a file name, then click OK. On the Exporting dialog box, click **Export**.

If **Text/Data Only** is selected, after you click Export, the Text/Data Export dialog box appears.

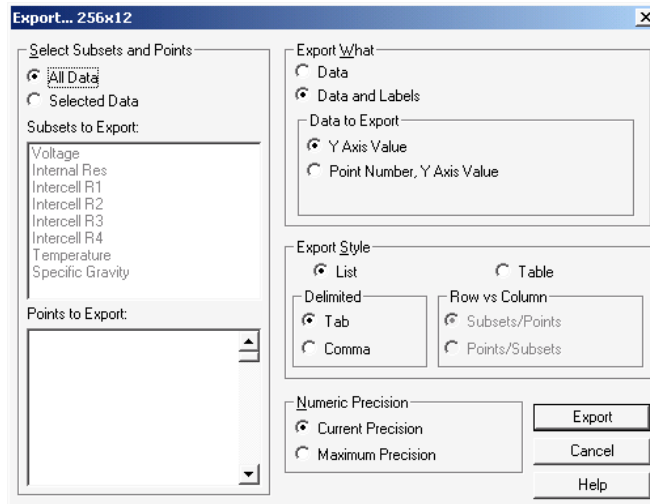


Figure 18. Export Text

Select Subsets and Points area - Click **All Data** or **Selected Data** to export data from all the parameters or only data selected in the **Subsets to Export** and **Points to Export** boxes. To choose export data, click Selected Data, then highlight the item in the list. To select multiple items, hold the Shift or Ctrl key while clicking items. Leaving all list box items unselected exports all data.

In the **Export What** area, select whether data is exported with or without parameter labels. The following examples are illustrated with one parameter (voltage) and five cells.

Data without labels.

2.183 2.123 2.191 2.200 2.136

Data and Labels with **Y Axis Value** selected.

	1	2	3	4	5
Voltage	2.183	2.123	2.191	2.200	2.136

Data and labels with **Point Number, Y Axis Value** selected.

	1	2	3	4	5
Voltage	1, 2.183	2, 2.123	3, 2.191	4, 2.200	5, 2.136

Export Style area - Allows for selection of two styles in which data may be exported: list format and table format.

List - Exports the data one record per line. The data fields can either be separated by tabs or commas.

Tab Format:

Voltage 1	2.183
Voltage 2	2.123
Voltage 3	2.191
Voltage 4	2.200
Voltage 5	2.136

Comma Format:

Voltage,1,2.183
 Voltage,2,2.123
 Voltage,3,2.191
 Voltage,4,2.200
 Voltage,5,2.136

Table - Exports the data in a grid fashion in either a Subset by Point or Point by Subset style.

Subset by Point:

	1	2	3	4	5
Voltage	2.183	2.123	2.191	2.200	2.136

Point by Subset:

	Voltage
1	2.183
2	2.123
3	2.191
4	2.200
5	2.136

Numeric Precision area - With **Current Precision**, data is exported with three decimal places. **Maximum Precision** exports more than three decimal places when data can support this option. Data results are exported as computed, not as displayed.

Object Size area - Select the unit of measure and the dimensions for the object, so it will have usable height and width.

Export Destination area (continued) - If exporting a Metafile to the printer, click **Printer** then click **Print** to open the Print dialog box, select the printer and options, then click OK.

13 Creating a Data Set



Create new

This section describes how to create a battery file by typing the data. You may maintain the file manually or transfer data from a Cellcorder or hydrometer at a later time. To manually create a battery file, click the Create New button or select File|New. The Select Configuration dialog box appears.

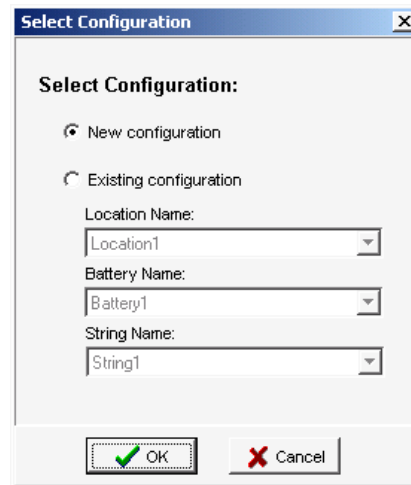


Figure 19. Select Configuration

To copy existing setup data to the new file, click **Existing Configuration**, select the **Location**, **Battery** and **String Names**, then click OK. To create the file with no setup data, click **New Configuration** then OK. If an existing configuration was selected, the General and Intertier pages display battery information. If a new configuration was selected, begin by editing the General page.

The Tabular Data page has all values set to 0 (blank). To edit data on this page, double-click on the grid to open the Cell Data Editor. Refer to *Editing Cell Data* for a description of the editor. After values are edited, continue with the Intertier page if needed.

To save the file, click the Save button or select File|Save. In the Save box, type a file name, then save to the Cellcorder CDF Files subdirectory.

14 CRT-300 Calibration Backup/Restore

This section describes how to back up CRT-300 Cellcorder calibration data and restore calibration to the unit. If the Cellcorder loses calibration data, calibration can be restored instead of sending the unit back to the factory. Factory calibration is backed-up to the memory card in the file **calk.cal**. If you change the calibration, you should back it up to this file. If using a memory card, refer to the *Memory Card Note* section.

14.1 Calibration Backup via Memory Card

This section describes how to back up CRT-300 calibration data as a **.CAL** file to the computer using a memory card.

1. Insert a memory card into the CRT-300 card drive, then power up the Cellcorder.
2. To display the Service Menu, at the Main Menu, press Shift+Serv. The password screen appears.
3. Type the password, then press Enter. (Default is 1234)
4. Select Calibration to display the Calibration Menu.
5. Press Cal-K to display the calibration constants.
6. To back up calibration data to the memory card, press Backup.
7. At Enter File Name, type a name (eight character max.) for the calibration file. (Alber suggests using the Cellcorder serial number.) After typing the file name, press the F2 Save.
8. The CRT-300 displays Saving Cal-K, then Closing File. When Calibration Constants appear, press Cancel three times to return to the Main Menu.
9. After the CAL file is saved, copy it from the memory card to the computer under Programs/Alber/Alber Battery Analysis. After copying the file, you may delete it from the memory card if you wish.

14.2 Calibration Restore via Memory Card

This section describes how to restore CRT-300 calibration from the computer using a memory card.

1. Copy the **.CAL** calibration file from the computer to a memory card.
2. Insert the memory card into the Cellcorder card drive, then power up the Cellcorder.
3. To display the Service Menu, at the Main Menu, press Shift+Serv. The password screen appears.
4. Type the password, then press Enter.
5. Select Calibration to display the Calibration Menu.
6. Press Cal-K to display the calibration constants.
7. To restore calibration K-constants to the Cellcorder, press Restore.
8. Select: Restore from Smart Media (memory card).
9. Highlight the calibration CAL file using the Arrow keys then press Restore.
10. When Calibration Constants appear, press Cancel three times to return to the Main Menu.

14.3 Calibration Backup via IR



Cellcorder interface

This section describes how to back up CRT-300 calibration data as a **.CAL** file to the computer using the IR interface.

1. Power up the Cellcorder.
2. On the Previewer, click the Cellcorder Interface button or select Device|Cellcorder. The Select Cellcorder box appears.
3. Click CRT-300 then OK. The CRT-300 Interface box appears.
4. Choose the COM port so the IR interface is enabled. To change the port, click Change, select the COM port, then click OK. For more details, refer to *Setting Communication*.
5. On the Cellcorder, press Shift+Send, then select Send data to PC via IR interface.
6. Align the Cellcorder and computer IR ports.

7. In the Calibration area on the Interface box, click Capture to start the backup.

NOTE: While capturing, the Communication Status area indicates Transferring calibration data and the Cellcorder LCD indicates Sending data for calibration. When capture is finished, Communication Status indicates Calibration transfer completed.

8. On the Saving Cellcorder Calibration Data box, navigate to Program Files/Alber/Alber Battery Analysis and type the name of the new backup file. (Alber suggests using the Cellcorder serial number for the name.) After typing the file name, click Save. The Cellcorder Calibration Data serial number box appears.

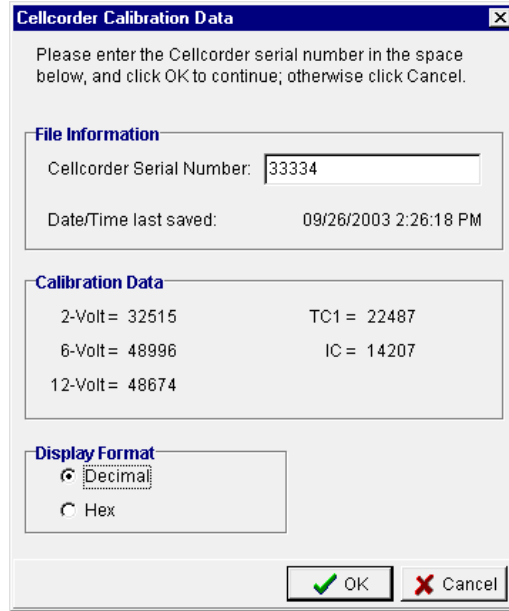


Figure 20. Calibration Data / Serial Number Box

9. Type the Cellcorder serial number in the serial number field.
10. In the Display Format area, click Decimal, then click OK.
11. After the file is saved, close the Cellcorder Interface box.
12. On the Cellcorder, to return to the Main Menu, press Cancel then Back.

14.4 Calibration Restore via IR

This section describes how to restore CRT-300 calibration from the computer using the IR interface.

1. Power up the Cellcorder.
2. On the Previewer, click the Cellcorder Interface button or select Device|Cellcorder. The Select Cellcorder box appears.
3. Click CRT-300 then OK. The CRT-300 Interface box appears.
4. Choose the COM port so the IR interface is enabled. To change the port, click Change, select the COM port, then click OK.
5. On the Cellcorder, press Shift+Send, then select Send data to PC via IR interface.
6. Align the Cellcorder and computer IR ports.
7. In the Calibration area on the Interface box, click Restore.
8. On the Restoring Cellcorder Calibration Data box, navigate to Program Files/Alber/Alber Battery Analysis, highlight the CAL backup file, and click Open.
9. Confirm the Cellcorder Calibration Data box displays the correct serial number. If correct, click OK.
10. After calibration is restored, the Previewer displays Calibration data successfully restored to Cellcorder.
11. Close the Cellcorder Interface box.
12. To save the calibration K-constants to Cellcorder memory, type the password and press Enter.
13. At the message Restoring calibration will overwrite existing calibration constants, press Continue.
14. At the message Calibration constants have been restored, press Continue.
15. To return to the Cellcorder Main Menu, press Cancel then Back.

15 Upgrading CRT-300 Firmware

You can upgrade CRT-300 Cellcorder firmware using the memory card or IR port. Albér publishes upgrades to the web at www.alber.com. Using the memory card to upgrade is much faster than using IR. If using a memory card, refer to the *Memory Card Note* section.

WARNING: Do not continue until you have the **.UPG** upgrade file ready. You will be clearing the current firmware, which makes the Cellcorder unusable until new firmware is loaded.

15.1 Firmware Upgrade via Memory Card

This section describes how to upgrade the CRT-300 firmware using the memory card.

1. Download the UPG upgrade file from the Albér Web site or an Albér CD to Program Files/Alber/Alber Battery Analysis.
2. Using Windows Explorer, copy the file to the memory card.
3. With the CRT-300 power off, insert the memory card into the Cellcorder. To start in upgrade mode, press Esc+Power On.
4. At the message System is ready to clear Flash memory for new program, to upgrade press Continue or to go to the Main Menu without upgrading, press Cancel.
5. After pressing Continue, at the message System ready to receive upgrade file; select file transfer method, press Smart Media. The message File transfer in progress appears and the frame number counts down.
6. When Upgrade successful; system is running Version *nn.nnnnn* appears, press Continue to display the Main Menu.

15.2 Firmware Upgrade via IR

This section describes how to upgrade the CRT-300 firmware using the memory card. Using IR to upgrade is much slower than memory card.

1. Download the UPG upgrade file from the Albér Web site or an Albér CD to Program Files/Alber/Alber Battery Analysis.
2. With the CRT-300 power off, to start in upgrade mode, press Esc+Power On.
3. At the message System is ready to clear Flash memory for new program, to upgrade press Continue or to go to the Main Menu without upgrading, press Cancel.
4. After pressing Continue, at the message System ready to receive upgrade file; select file transfer method, press Infrared. The message File transfer in progress appears. The frame number does not count down yet.
5. On the computer, click the Previewer icon to start the program.
6. On the menu bar, click the Start the Cellcorder Interface button.
7. On the Select Cellcorder box, click CRT-300 then OK.
8. Align the computer and Cellcorder IR ports.
9. On the CRT-300 Interface dialog box, in the Firmware Update area, click Load Update.
10. Select the upgrade file, then click Open. On the Cellcorder screen, the frame number counts down.
11. When Upgrade successful; system is running Version *nn.nnnnn* appears, press Continue on the Cellcorder to display the Main Menu. On the computer, close the CRT-300 Interface box.

16 Capturing CLC-200 Battery Data



Cellcorder interface

This section describes CLC-200 to computer battery data capture via RS-232 serial cable. This function captures battery cell voltage, resistance data, specific gravity, and temperature.

When capturing data from the Cellcorder and hydrometer into the Previewer, it is not important which data is transferred first. However, if the first unit has data for the same parameters as the second, the data captured last will overwrite previously captured data. For example, if you capture Cellcorder SG and temperature data and then capture hydrometer data, the hydrometer data will overwrite the Cellcorder SG and temperature data.

1. Connect the Cellcorder to the computer via serial cable.
2. Power up the Cellcorder.
3. On the Previewer, click the Create New button or select File|New. The Select Configuration box appears.
4. Click Existing Configuration or New Configuration, then OK. For more details, refer to *Creating a Data Set*.
5. On the General page, type Location, Battery and String Names and select the Number of Cells within the string.
6. Select File|Save. In the Save box, type a file name, navigate to the CDF Files subdirectory, then click Save.
7. Click the Cellcorder Interface button or select Device|Cellcorder. The Select Cellcorder box appears.
8. Choose CLC-100 / CLC-200 then click OK. The CLC-200 Interface box appears.

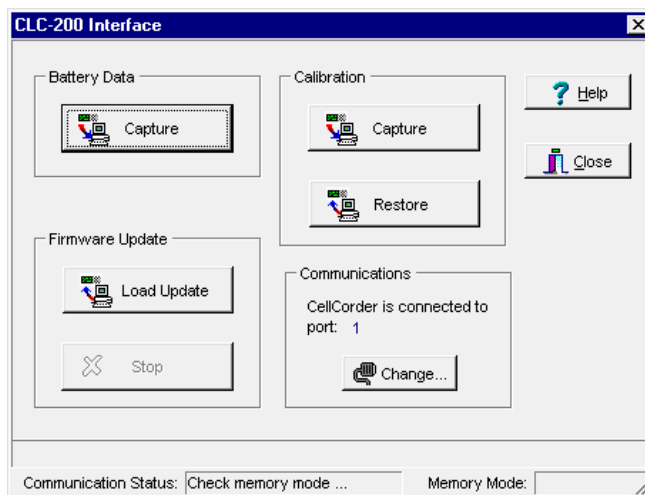


Figure 21. CLC-200 Interface

9. Choose the COM port so the RS-232 serial port is enabled. To change the port, click Change, select the COM port, then click OK.

Communication Status area - The Communication Status area indicates connection status. When the interface is started, this box indicates Connecting; after communication is established, Connected appears. If communication cannot be established, Failed appears and an Error box appears with Retry or Cancel options.

After communication is established, Memory Mode at the bottom indicates Cellcorder memory mode status. If Unknown is indicated, confirm the Cellcorder firmware is Version 2.00 or later. The version number is displayed on the first CLC-200 screen at power up. Memory Mode on the computer displays Unknown until the Previewer communicates with the Cellcorder.

10. In the Battery Data area, click Capture. The Cellcorder Battery Data Capture dialog box appears. (Refer to following figure.)
11. In the Battery Number field, select which battery data to download from the Cellcorder. If the Memory Mode is 7 x 256, the selection is from 1 to 7. If the Memory Mode is 28 x 64, the selection is from 1 to 28.
12. Download the First *mn* Cells defaults to the value in the Number of Cells box on the General page. It is the maximum number of cells from which data will be downloaded. Usually, this value matches the actual number of cells for the selected battery.

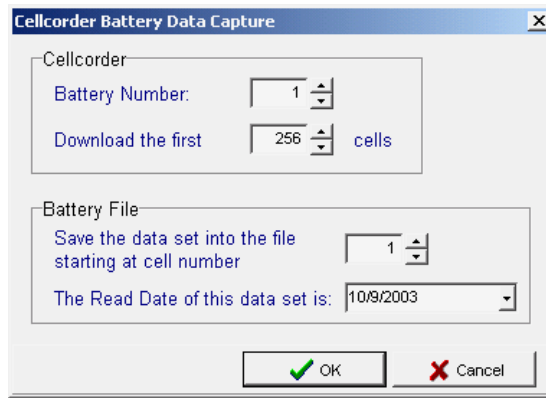


Figure 22. Cellcorder Battery Data Capture

13. In the Battery File area, set the Starting at Cell Number *nn* to indicate what cell number the CLC-200 should start downloading data to, typically 1. Thus, Cellcorder data for Cell 1 would be recorded in the file under Cell 1, and so on.

The Starting Cell Number - Changing the file starting cell number is useful when more than one Cellcorder is used to record data from the same battery. For example, on a 256-cell battery, the first Cellcorder tests cells 1 to 128 and stores the data in Cellcorder locations 1 to 128. The second Cellcorder tests cells 129 to 256 and stores in Cellcorder locations 1 to 128 as well. Capture the first Cellcorder with the starting cell number set to 1 and capture the second into the existing file with the starting number set to 129.

14. In the next box, set the Read Date for this Data Set. Type a date or click the drop-down button on the date field and click a date on the calendar.
15. Click OK to return to the Interface box.
16. On the Interface box, downloading starts. As data is captured, Communication Status indicates Transferring cell data and the Cellcorder LCD indicates the cell number being transferred. When capture is finished, the status indicates Data transfer completed.

NOTE: If capture is not successful, check that the correct COM port is selected and the correct Number of Cells is selected.

17. After capture, to close the Cellcorder Interface box, click Close.
18. Review the data on the General, Tabular Data and other pages
19. Select File|Save to save the file if desired.

17 CLC-200 Calibration Backup/Restore



Start the Cellcorder interface

This section describes how to back up CLC-200 Cellcorder calibration data and restore calibration to the unit. You should back up when the unit is first received and after subsequent calibrations. If the Cellcorder loses calibration data, calibration can be restored instead of sending the unit back to the factory.

Important information for users of Version 1.2 or later software.

Starting with BAS Version 1.2, the calibration files contain special error detection codes that help prevent uploading invalid or unintended calibration data to the Cellcorder. Calibration files created with Version 1.1 or earlier of the program or with the DOS version do not contain these codes and are not compatible with Version 1.2 or later. For this reason, back up calibration data immediately after upgrading from Version 1.1 or earlier so you will have a valid calibration file.

17.1 Calibration Backup via Serial Cable

Do the following to back up the CLC-200 Cellcorder calibration to a file.

1. Connect the Cellcorder to the serial port selected in Setting Communications Ports and verify the Cellcorder is powered on.
2. Click the Cellcorder Interface button or select Device|Cellcorder on the Main Menu.
3. On the Select Cellcorder box, click CLC-200 then OK. The Cellcorder CLC-200 Interface dialog box appears.
4. If required, change the serial port that communicates with the CLC. From the Cellcorder Interface box, click Change in the Communications area and select a different COM port from the Communications Options box.
5. Click Capture in the Calibration block.
6. The Saving Cellcorder Calibration Data box requests a file name. Navigate to a subdirectory and choose an existing calibration data file or enter the name of the new file you will create. Using the CLC serial number for the file name is suggested. This helps identify the file if more than one Cellcorder is used. After typing the file name, click Save.

7. If an existing file is selected, the file is opened and verified, and you will be prompted to confirm your intent to overwrite the file.
8. On the Cellcorder Calibration Data box, fill in the Cellcorder serial number box. This stores the serial number in the file and provides extra security. In the Display Format area, click Decimal. To save the data, click OK, or click Cancel to not save to this file.
9. If the data transfer is successful, a message appears.
10. To close the CLC-200 Interface box, click Close.

17.2 Calibration Restore via RS-232

Do the following to restore the CLC-200 Cellcorder calibration from a file.

1. Connect the Cellcorder to the serial port configured in Setting Communications Ports and verify the Cellcorder is powered on.
2. Click the Cellcorder Interface button or select Device|Cellcorder on the Main Menu.
3. On the Select Cellcorder box, click CLC-200 then OK. The Cellcorder CLC-200 Interface dialog box appears.
4. If required, change the serial port that communicates with the CLC. From the Cellcorder Interface box, click Change in the Communications area and select a different COM port from the Communications Options box.
5. Click Restore in the Calibration block.
6. The Restoring Cellcorder Calibration Data box appears. Navigate to a subdirectory, choose an existing calibration data file, and click Open.
7. The selected file is opened and verified. If the file is valid, the Cellcorder Calibration Data box appears. Verify the Cellcorder serial number in the serial number box. (The number cannot be modified at this time). To restore the data to the Cellcorder, click OK, or click Cancel to not use this file.
8. If the data transfer is successful, a message appears.
9. To close the CLC-200 Interface box, click Close.

18 Upgrading the CLC-200 Firmware

You can upgrade CLC-200 Cellcorder firmware using a serial cable connected to the computer and Cellcorder. Albér publishes upgrades to the web at www.alber.com.

WARNING: Do not continue until you have the **.PRG** upgrade file ready. You will be clearing the current firmware, which makes the Cellcorder unusable until new firmware is loaded.

18.1 CLC-200 Firmware Upgrade via Serial Cable

BAS Version 1.2 and later can upload new firmware to the CLC-200 Cellcorder. The Albér firmware upgrade file sets your Cellcorder to the latest operational specifications. To update your Cellcorder, do the following.

1. Download the upgrade **.PRG** file from the Albér Web site or an Albér CD to Program Files/Alber/Alber Battery Analysis. CLC-200 firmware update files have the extension PRG.
2. Connect the CLC-200 Cellcorder to the serial port configured in *Setting Communications Ports* and verify the Cellcorder is powered on.
3. If updating a previously updated Cellcorder (that is, not running original factory firmware), reset the Cellcorder to original firmware before continuing. The update cannot be applied until this is done.
 - a. **To determine firmware level:** At power up, a Cellcorder running original firmware displays Boot at the bottom of the display, then Initializing and the Main Menu. A Cellcorder running updated firmware displays the revision number then the Main Menu. To reset the Cellcorder firmware, go to Step 4 or, if the Cellcorder is running original firmware, go to Step 5. If you are unsure of firmware status, it will do no harm to reset it.
4. To reset the firmware, if required:
 - a. Power on the Cellcorder.
 - b. Press the Cellcorder <F1> key four times in quick succession.
 - c. At the prompt: Erase RAM program? <Enter> Clear <Esc> Quit press <Enter> and wait for the Cellcorder to re-initialize.
 - d. Refer to step 3 and verify the Cellcorder is reset to original factory firmware.

5. If the Cellcorder is running original firmware, on the computer click the Previewer icon to start the program.
6. On the menu bar, click the Cellcorder Interface button or select Device|Cellcorder.
7. On the Select Cellcorder box, click CLC-200 then OK.
8. Verify Communication at the bottom of the Cellcorder Interface box indicates **Connected**. New firmware cannot be uploaded if there is a communication problem. If required, change the serial port that communicates with the Cellcorder. On the Cellcorder Interface box, click Change and select a different COM port.
9. In the Firmware Update area, click Load Update to open the Upload New Cellcorder Firmware box.
10. Navigate to the subdirectory with the update file, select the file, then click Open.
11. If a valid file is selected, the program reads the firmware version and prompts for confirmation before uploading. For example, the message might be: Click OK to begin uploading Version 2.15. To proceed, click OK. Uploading may take ten minutes. The Cellcorder Interface box estimates time remaining and displays a message when the upgrade is complete.

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