

2932 GENERATE-IT

USER'S GUIDE



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1 Introduction

1.1 What is the Generate-*it* Software?

The Generate-*it* Software (Model 2932) is an add-on for the Calibrate-*it* Software (Model 9932). The Calibrate-*it* Software is designed to collect and store data from reference probes and test probes (Units Under Test [UUT]). This data is used by the Generate-*it* Software to calculate characterization coefficients, print Reports of Calibration, and generate Tables.

The Generate-*it* Software calculates characterization coefficients for platinum, thermistor, and thermocouple probes. The types of coefficients that can be calculated are: ITS-90 for platinum probes; IPTS-68 for platinum probes; Callendar-Van Dusen for platinum probes; Polynomial for platinum and thermistor probes; and coefficients for thermocouple probes types B, E, J, K, N, R, S, T, and AuPt.

The software also generates Temperature vs. Resistance, Temperature vs. Ratio, and Temperature vs. EMF tables.

The Generate-*it* Software also allows data that was collected during a test as well as calculated coefficients to be exported to an ASCII text file. This data can then be easily imported into a spreadsheet or other application.

1.2 Features New to Version 2

A list of new features and enhancements in version 2 of the Generate-*it* software follows:

Version 2.3:

1. Generate-*it* now supports the International or Regional Settings for dates, times, and number formats as configured in the Control Panel. Prior to this version, the International or Regional Settings had to be set to U.S. standard settings for Calibrate-*it* to work properly. Because of this change, all dates must be selected from the drop-down calendar and cannot be typed in manually.
2. The Recall Date is not printed on the Report of Calibration if the Calibration Interval setting on the Test Probe Configuration dialog in Calibrate-*it* was set to 0 days.
3. Prior to this version, the Generate-*it* main window would sometimes be positioned outside of the viewable area of the screen when running the software. This bug has been fixed.

4. Because Generate-*it* now supports the International/Regional settings as configured in the Control Panel, a warning message has been added to the Export feature. The warning message appears if the export delimiter is set to a comma (“,”) **and** the decimal separator is also a comma. The data may not be exported in a format that can easily be imported into other software with these settings. Choose the “tab” option for the export delimiter to resolve this problem.
5. A new tab has been added to the Report Options dialog that allows the font name, size, and style settings to be changed for the default Report of Calibration. The font settings for the report title and the body of the report can be set independent of each other.
6. Reports of Calibration and tables can now be saved to a file and opened later for viewing and printing. This feature enables Reports of Calibration and tables to be sent via floppy disk or e-mail to others who may need to print or view the report. A Report Viewer Utility has also been added to the setup. This viewer can be installed on any computer and allows the report files to be viewed and printed. This utility can be installed on any computer and allows report files to be opened, viewed, and printed without having to install the Calibrate-*it* Software. For more information on installing the Report Viewer Utility on other computers or on creating a Report Viewer Utility Setup Diskette, see Section 7.3, Making Report Viewer Utility Setup Diskette.
7. The Report of Calibration has been reworked to resolve some issues regarding printing. Some printer drivers caused reports that should generally fit on a single page to span multiple pages.
8. The Report of Calibration has been modified to display model and serial numbers up to 20 characters in length.

Version 2.2:

1. When generating Temperature vs. Ratio tables, the Inverse Difference column was incorrectly labeled “dT/dr”. The label has been changed to correctly read “dT/dW”.
2. Prior to this version, the Shared Files Conflict dialog always appeared when running the software in Windows NT with the file COMMDLG.DLL listed. Even though the software works fine de-

spite this file conflict, this problem has been fixed.

3. A new range setting has been added for Type R and Type S Thermocouple probes. This range is named “-50.0°C to 1768.1°C (using extrapolation)”. Selecting this range allows Generate-*it* to automatically determine which reference function to use when calculating coefficients and table values based on the temperature value. Selecting one of the other available ranges forces Generate-*it* to use only the reference function for that range.
4. Temperature vs. EMF (mV) tables can now be generated as well as Temperature vs. EMF (μ V) tables for thermocouple probes.
5. Residuals for thermocouple probes are now displayed/printed in the scale that the UUT readings were entered in instead of always being displayed/printed in μ V.
6. Prior to this version, the Report of Calibration incorrectly labeled the Residuals column in the same scale as the Reference readings for thermocouple probes. Generate-*it* has always calculated and displayed/printed residuals for thermocouple probes in μ V (microvolts). Version 2.2 now prints and displays residuals in the same scale as the UUT readings (either mV or μ V), and are now correctly labeled.
7. Prior to version 2.2, there was an error generating Temperature vs. EMF tables for thermocouple probes: the calculated deviation coefficients were not being applied to the standard coefficients causing the Error column on the table to always display an error of 0.0 at every point. This bug has been fixed.
8. The maximum order for thermistor polynomials has been reduced from 9th order to 6th order. Thermistor probes do not need to be fitted above the 6th order.

Version 2.1:

1. When displaying set-points (raw data) for the user to choose which points are to be used to calculate coefficients, the set-points were not being sorted in ascending order. This sometimes caused message to appear when calculating coefficients stating that the selected set-points did not match the require-

ments for that type of coefficients.

2. The error message “Error 91: Object variable not Set” appeared when exporting tables to an ASCII text file. This bug has been fixed.
3. The delimiter between the first and second columns on a table being exported to an ASCII text file did not match the selected delimiter. The delimiter between the second and third columns, however, was correct. This bug has been fixed.
4. When generating Temperature vs. Resistance tables or Temperature vs. Ratio tables in °F, the values in the First Derivative (dr/dT) column and Inverse Difference column (dT/dW) displayed the values as if the table was in °C.

Version 2.0.0.3:

1. A “File Not Found” error message appeared only in Generate-*it* version 2.0.0.2 when attempting to calculate Callendar-Van Dusen coefficients. This bug has been fixed.
2. When using raw data in °F to calculate ITS-90 coefficients, a message would appear stating that there was no set-point close to 0°C (32°F) selected for use in calculating RTPW even if a set-point near 32°F was selected. This bug has been fixed.

Version 2.0.0.2:

1. Prior to build 2.0.0.2, the Generate-*it* Software had a bug, which caused it to incorrectly display a message stating that no TPW set-point had been selected. This message appeared after the set-points had been selected and the calculate button was clicked **only** if the reference readings were in a scale other than °C. This bug has been fixed.

Version 2.0:

1. The user is now allowed to export selected individual tests over a specified date range. Also, the user is allowed to export data for individual test probes. In prior versions of this software, the data for all test probes in every test over the specified date range

were exported. For more details on exporting data, see Section 3.1.

2. Generate-*it* can now export coefficients for one or more test probes to a text file. For more details on exporting coefficients, see Section 3.2.
3. The Generate-*it* Software report and table printing features have been improved to reduce the amount of time required to print a report or a table. The user now has more control over many aspects of printing the reports and tables (page numbering, font size, resolutions, etc). A new Print Preview window has also been added to the software. For more details on printing reports and tables, see Section 3.5.
4. An additional option has been added to the File menu. The default printer can now be set from the File menu by selecting the Setup Printer option. See Section 3.4.
5. An additional option has been added to the Utilities menu. The Maintain Test Results menu option allows the user to validate the existence of test information and to remove old tests from the database. For more details on using this feature, see Section 5.3.

1.3 Requirements

The Generate-*it* Software requires certain computer hardware and software configurations in order to execute properly.

1.3.1 Calibrate-*it* Software

The Generate-*it* Software was designed to interface with the Calibrate-*it* Software, an automated calibration system designed to collect data from test probes (UUTs). If the Calibrate-*it* Software was not purchased, you will not be able to install or use the Generate-*it* Software. The Generate-*it* Software uses the data collected by Calibrate-*it* to calculate coefficients and to generate tables.

Hart Scientific also sells the Model 9933 TableWare Software that calculates coefficients from raw data entered directly by the user and generates tables. The TableWare Software **does not** interface with the Calibrate-*it* Software. For more information about the TableWare Software, contact Hart Scientific or visit our web site at www.hartscientific.com.

1.3.2 Computer Hardware Requirements

The following minimum computer configuration is required to use the Generate-*it* Software.

- IBM Compatible 386 PC or later with 8MB RAM minimum (IBM Compatible 486 PC or later is recommended)
- VGA monitor or better
- CD-ROM or DVD drive for installation (3.5' floppy disks available upon request)
- Hard disk with a minimum of 12MB of disk space for installation (The program requires additional disk space to store the calculated data.)

1.3.3 Computer Software Requirements

The Generate-*it* Software requires the following operating system:

- MS DOS 5.0 or later with Windows® 3.x

Or

- Windows® 95/98/NT4/2000

1.4 Installation

A backup should always be made of your hard disk drive before installing any software and all running applications should be closed.

If a previous version of Generate-*it* has been installed on this computer, this version should be installed to the same directory/folder. During the setup process, you are asked if the test results computed with the previous version of Generate-*it* should be preserved. Selecting “Yes” copies existing test results from the current database to the new database.

Note: The setup process always creates a directory/folder called \BACKUP and copies the database containing existing test results to this directory/folder and renames it to HART2932.XXX (where XXX is a sequential number).

The Generate-*it* Software v2.3 requires the Calibrate-*it* Software v3.3 or later. The Calibrate-*it* Software is included on the CD-ROM. If you are installing Generate-*it* from floppy diskettes, you must request a set of floppy diskettes for Calibrate-*it* also.

Note: The Generate-*it* Software now supports the International/Regional settings as set in the Windows® Control Panel's Regional Settings or International icon. Before installing Generate-*it*, make sure the date, time,

and number formats are set according to how you want the dates, times, and numbers to appear. If test results are being copied from a previous version database, all data will be formatted according to the current settings when the data is copied.

Installing from CD

1. Insert the Calibrate-*it* Software CD-ROM into your CD-ROM drive.
2. The Setup program should run automatically if using Windows® 95/98/NT4/2000. If using Windows® 3.x, select File | Run from the Program Manager's menu bar. In the dialog box that appears, type D:\CDSETUP.EXE (where D: is the drive corresponding to your CD-ROM drive) and click the OK button.
3. Follow the instructions on the screen. Select the "Install Generate-*it* Software (Model 2932)" option when the Installation Options dialog is displayed.
4. The software files are copied to the specified directory/folder.
5. After all files have been installed, a program group is created with icons for the software, the Help file, and the README file. The installation process is complete.
6. The README file is displayed on the screen before the setup program finishes. Read this file for important information that was not available when the User Guide was printed.

Installing from Floppy Diskettes (available upon request)

1. Insert Disk 1 of the Calibrate-*it* Software into your floppy drive.
2. For Windows® 3.x, select File | Run from the Program Manager's menu bar. For Windows® 95/98/NT4/2000, select the Run option from the Start menu on the Task Bar.
3. In the dialog box that appears, type D:\SETUP.EXE (where D: is the drive corresponding to your floppy drive) and click the OK button.
4. Follow the instructions on the screen. Select the "Install Gener-

ate-*it* Software (Model 2932)” option when the Installation Options dialog is displayed.

5. The software files are copied to the specified directory/folder. Insert other floppy diskettes as prompted.
6. After all files have been installed, a program group is created with icons for the software, the Help file, and the README file. The installation process is complete.
7. The README file is displayed on the screen before the setup program finishes. Read this file for important information that was not available when the User Guide was printed.

Uninstalling the Software

When the software was installed, an icon was created in the program group to uninstall the software. To uninstall the software, simply double-click this icon. The program files will be removed from your system with the following exceptions.

- a. HART2932.MDB database in the \DATABASE directory (contains coefficient)
- b. Any other files created by the software since it was installed

The files mentioned above, along with the directories/folders that these files are in, must be manually deleted using the File Manager or Windows Explorer.

Note: Before deleting the **HART2932.MDB** file, make sure that you do not need to keep any of the coefficients from tests that have been performed. Once this file is deleted, all test data is lost.

1.5 International Settings

As of version 2.3, the Generate-*it* Software recognizes and uses the International/Regional settings such as the date, time, and number formats as set in the Windows® Control Panel's Regional Settings or International icon.

Prior to version 2.3, the Regional/International Settings had to be set to English (U.S.) in order for Generate-*it* to function properly.

1.6 Running the Generate-*it* Software

Every time this software is run, it checks to make sure that all of the required .DLL and .VBX files are found on your computer. If the software detects that an older file has replaced one or more of these files or that the file is not found, a dialog similar to the one below appears detailing the problems found.

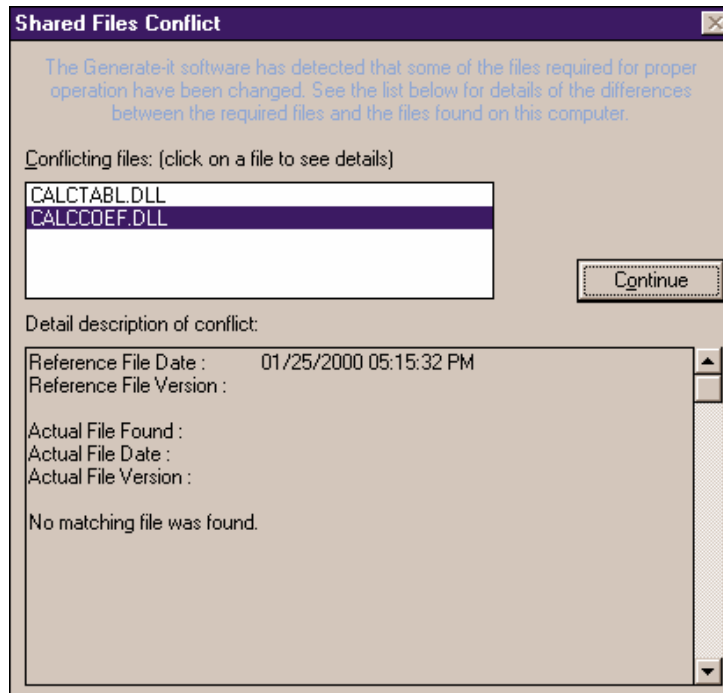


Figure 1 Shared Files Conflict Dialog

Every time you install any software on your computer, you should make a backup of your important files, including all files in the WINDOWS and \WINDOWS\SYSTEM (or WINNT\SYSTEM32) directories. Sometimes during the installation process, a file may be replaced with an older version that is not 100% compatible with the first. This may cause the software to perform unexpectedly or fail to run at all. Replacing a .DLL or .VBX file with a newer version does not usually cause any problems because these files are typically backward-compatible. There are, however, exceptions to this rule.

If the Shared Files Conflict dialog is displayed when you run the Generate-*it* Software, a list of the files in question is shown in the Conflicting

Files list. Select each of the files, one at a time, and read the information that appears in the bottom half of the dialog. Depending on the information given, you must decide what to do. The software may continue to run without problems, however there is no guarantee.

The .DLL and .VBX files are typically located in the WINDOWS\SYSTEM (or WINNT\SYSTEM32) directory. If you find it necessary to avoid conflicts, these files can be copied to the directory where the Generate-*it* Software was installed. Be sure to compare the files on your computer with the list of required .DLL and .VBX files.

1.7 Required .DLL and .VBX Files

The Generate-*it* Software requires certain .DLL and .VBX files. All required files are shipped on the installation CD or diskettes. A list of these files and their required date stamp follows:

.DLL Files	Date
CALCCOEF.DLL	06/20/2000
CALCTABL.DLL	08/25/2000
CO1C40EN.DLL	09/20/1995
COMPOBJ.DLL	06/21/1995
CTL3DV2.DLL	05/17/1996
MFCOLEUI.DLL	04/27/1995
MSABC200.DLL	09/06/1994
MSAFINX.DLL	04/28/1993
MSAJT112.DLL	04/13/1994
MSAJT200.DLL	08/15/1995
OC25.DLL	05/17/1996
OLE2.DLL	06/21/1995
OLE2DISP.DLL	06/21/1995
OLE2NLS.DLL	06/21/1995
STORAGE.DLL	06/21/1995
TYPELIB.DLL	06/21/1995
VBDB300.DLL	02/01/1995
VBRUN300.DLL	05/05/1995
WOWGLUE.DLL	06/14/1994
.VBX Files	Date
CMDIALOG.VBX	04/28/1993
DWVSTAMP.VBX	03/18/1996
SPIN.VBX	05/05/1955
SSCALA.VBX	01/08/1999
SSDATA2.VBX	10/12/1995
TABPRO11.VBX	04/21/1995
THREED.VBX	07/11/1995
VSVIEW2.VBX	04/22/1998

1.8 Generate-*it* Main Display

The main display window (Figure 2) consists of the menu, toolbar, and workspace area.

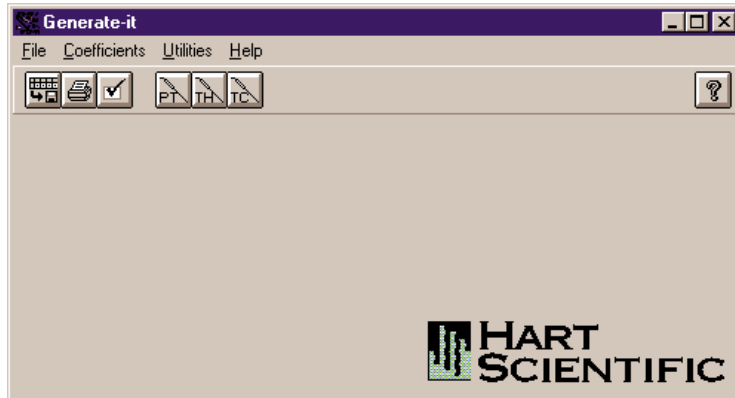


Figure 2 Generate-*it* Main Display Window

The menu bar allows access to the various features of the software. A general description of the options in each menu is given below:

File - Export data and coefficients, change default settings, printing options, exit the software.

Coefficients - Calculate coefficients from test data.

Utilities - Compact and repair databases and maintain databases.

Help - Display help topics and About dialog.

Enabled and Disabled

All menu items and toolbar buttons are enabled.

Window Information

The Generate-*it* Main Display is the main window for the software. The display area remains blank until a menu or toolbar button is selected.

1.9 Generate-*it* Toolbar

The toolbar provides quick access to many of the most common functions such as exporting data to a text file, printing reports and tables, default settings, calculating the different types of probe coefficients, and

help.

The function of each toolbar button can be found by placing the mouse pointer over the button and waiting for approximately 1/2 second. A help balloon appears indicating the function of the button. If a help balloon does not appear, make sure the “Show help balloons” check box on the File | Defaults General tab is selected.

The following buttons are available on the toolbar:



Export - Export data to a text file



Print Report - Print a Report of Calibration and/or Table



Defaults - Setup default settings



Platinum Probe Coefficient Calculation - Calculate Platinum probe coefficients



Thermistor Probe Coefficient Calculation - Calculate Thermistor probe coefficients



Thermocouple Probe Coefficient Calculation - Calculate Thermocouple probe coefficients



Help - Opens the Help file Search Dialog

2 Calculating Coefficients

The Generate-*it* Software calculates coefficients and generates tables using the data collected by the Calibrate-*it* Software. Therefore, before this software can be used, one or more calibration tests must be performed with the Calibrate-*it* Software.

The Generate-*it* Software may be run by double-clicking the appropriate icon or by selecting the Utilities | Run Generate-*it* Software menu option from the Calibrate-*it* Software.

To calculate coefficients, follow the steps below:

1. Select the option for the appropriate type of probe from the Coefficients menu. The Probe Coefficient Calculation dialog appears. See Section 4.1, 4.2, or 4.3.
2. Select the type of coefficients you wish to calculate. For Platinum probes, the choices are ITS-90, IPTS-68, Callendar-Van Dusen and Polynomial. For Thermistor probes, the only choice is Polynomial. For Thermocouple probes, select the thermocouple type (B, E, J, K, N, R, S, T or AuPt). Select any other applicable options on this dialog and click the OK button.
3. Select the Test Number or Model Number for the test probe(s) on the Calculate Coefficients dialog. The test probes are listed in the “Select probe” list. Select the test probe(s) from the list provided and click the Continue button. See Section 4.4.
4. The Select Set-points dialog is displayed with a list of data collected by the Calibrate-*it* Software for the first selected test probe. Choose the set-points to use to calculate the coefficients by clicking on them one by one. The instructions at the top of the dialog indicate how many and what type of set-points can and should be chosen to perform the calculations. Select the Calculate button to perform the calculations. See Section 4.5.
5. The Coefficients and Residuals dialog is displayed showing the results of the calculations. To save these coefficients in the database (required to print a Report of Calibration), click the Save button. If you do not wish to save these coefficients, click the Cancel button. See Section 4.6.

6. If more than one test probe was selected, steps 4 and 5 are repeated for each selected test probe.
7. When you have finished calculating coefficients, click the Exit button on the Calculate Coefficients dialog to return to the Generate-*it* Main Display.
8. To print a Report of Calibration or a Table, select the File | Print Reports and Tables menu option. See Section 3.5.
 - a. Select the Test Number or Model Number for the test probe(s) on the Print Report dialog. The test probes are listed in the Select probe list. Select the test probe(s) from the list provided.
 - b. To print a Report of Calibration, select the Print Report check box. Click the Report Options button to set various options for the Report of Calibration.
 - c. To print a table, select the Generate Table check box. Click the Table Options button to set various options for the table.
 - d. Click the Print button to print the report and table. Click the Exit button to return to the Generate-*it* Main Display.

3 File Menu

The File Menu (Figure 3) provides options for exporting data, exporting coefficients, setting program defaults, setting up the printer, printing reports and tables, and exiting the program.

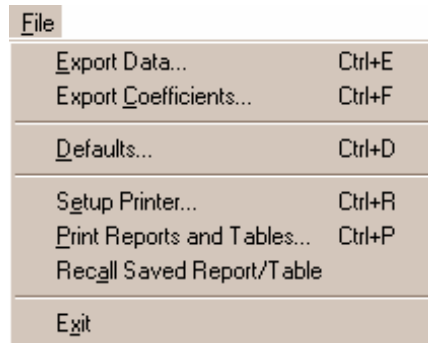


Figure 3 File Menu

Enabled and Disabled

All options are enabled.

3.1 Export Data

The Export Data menu option displays the Export Data dialog (Figure 4) for exporting test data to a text file. The Export Data dialog allows the user to retrieve test information from the database and save this information to a text file. The text file can be imported into other applications such as spreadsheet or statistical analysis software.

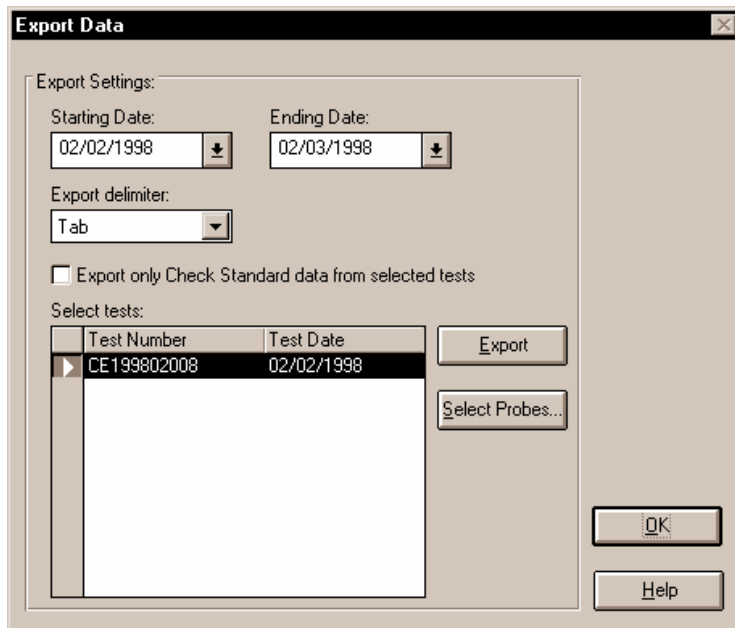


Figure 4 Export Data Dialog

Enabled and Disabled

The Select tests list is disabled if no tests are found over the specified date range.

The Export button is disabled until one or more tests are selected in the “Select tests” list.

The Select probes button is disabled except when only one test is selected in the “Select tests” list.

Dialog Information

To export data for one or more tests to an ASCII text file, select the date range of the test(s) to export by selecting the Starting Date and Ending Date. A list of tests that fall between the starting and ending dates appears below. Select the test(s) to export by clicking on them one by one in the “Select tests” list.

If you wish to export only data for probes that were marked as check standards from the selected tests, select the “Export only Check Standard data from selected tests” check box.

The type of delimiter to use can be selected using the “Export delimiter” drop-down list. The possible choices are Comma and Tab.

Note: As of version 2.3, Generate-*it* recognizes and uses the International/Regional settings such as the date, time, and number formats as set in the Windows® Control Panel’s Regional Settings or International icon. If a comma (“,”) is being used as the decimal separator, the Tab option must be selected as the export delimiter in order for the data to be properly imported into other software. A warning message is displayed when the Export button is clicked.

When selecting the Export button, the user is prompted to enter the path and name for the export file. The default path and filename can be changed on the File | Defaults Directories tab. A message is displayed stating the export operation was successful if no errors occurred.

If you wish to export data for one or more test probes from a particular test, select that test in the “Select tests” list. Then select the Select Probes button. The Export Probe Data dialog (Figure 5) is displayed. The “Select probes” list displays a list of all test probes that were calibrated for the selected test. Select the probes to export and then select the Export button. Select the OK button to return to the Export Data dialog.

Selecting the OK button on the Export Data dialog closes the dialog and returns to the Generate-*it* Main Display. The date that is in the Ending Date box when the OK button is selected is saved and becomes the Starting Date the next time this dialog is displayed.

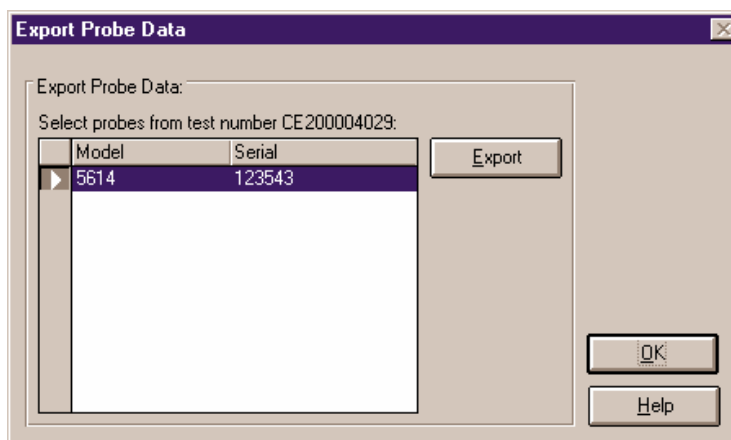


Figure 5 Export Probe Data Dialog

3.1.1 Example of Export Text File

Figure 7 illustrates a comma delimited export text file.

```
Test #,Report #,Test Date,Model,Serial,Description,Set-point,Reference,UUT,CJC
AC200003000,AC200003000-005,03/16/2000,5614,747320,Probe,0.00,-0.38227,101.39030,N/A
AC200003000,AC200003000-005,03/16/2000,5614,747320,Probe,50.00,50.00070,118.33990,N/A
AC200003000,AC200003000-005,03/16/2000,5614,747320,Probe,100.00,100.36993,138.20023,N/A
AC200003000,AC200003000-005,03/16/2000,5614,747320,Probe,150.00,150.05960,159.21063,N/A
AC200003000,AC200003000-005,03/16/2000,5614,747320,Probe,200.00,200.34820,178.39497,N/A
AC200003000,AC200003000-005,03/16/2000,5614,747320,Probe,250.00,250.26683,197.11690,N/A
AC200003000,AC200003000-005,03/16/2000,5614,747320,Probe,300.00,300.34273,215.62540,N/A
```

Figure 7 Example of an Exported Text File

3.2 Export Coefficients

The Export Coefficients menu option displays the Export Coefficients dialog (Figure 6). The Generate-*it* Software allows coefficients for one or more test probes to be exported to a text file.

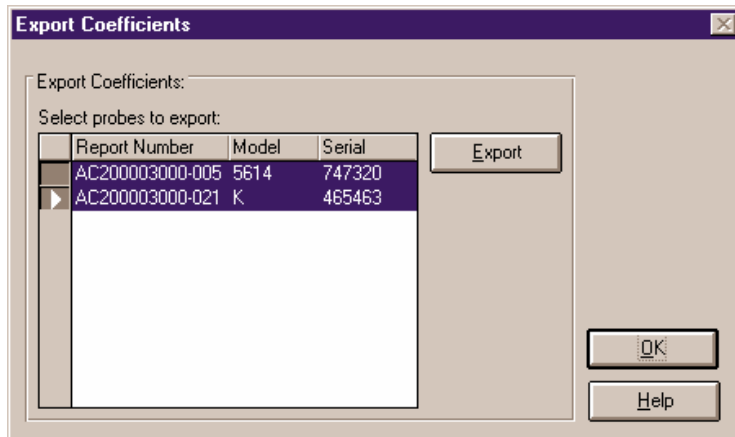


Figure 6 Export Coefficients Dialog

Enabled and Disabled

The Export button is disabled until one or more test probes are selected

in the “Select probes to export” list.

Dialog Information

To export coefficients from the database to a text file, select the File | Export Coefficients menu option. The Export Coefficients dialog is displayed

The “Select probes to export” list displays a list of all test probes in the database for which coefficients have been calculated. The probes are sorted by report number, model number, and then serial number. Select the probes to export by clicking on them one by one in the “Select probes to export” list. Then select the Export button.

When selecting the Export button, the user is prompted to enter the path and name for the export file. The default path and filename can be changed on the File | Defaults Directories tab. A message is displayed stating the export operation was successful if no errors occurred.

The OK button on the Export Coefficients dialog closes the dialog and returns to the Generate-*it* Main Display.

The following is an example of a coefficients export text file.

Report Number: CE199802008-009
Model: 5614 Serial Number: 360214

ITS-90
RTPW=100.598947
a4=-1.0358207 E-02
b4=1.4001044 E-02
a8=-9.3098362 E-03
b8=1.4543333 E-02

Report Number: EXAMPLE6-01
Model: 5630 Serial Number: 123456

Thermocouple
c0=5.3863510 E00
c1=1.2586630 E-02
c2=-2.3247800 E-05
c3=3.2202880 E-08
c4=-3.3146520 E-11
c5=2.5574430 E-14
c6=-1.2506890 E-17
c7=2.7144320 E-21

Deviations:
Delta c1=-1.6781629 E-02
Delta c2=-6.7945389 E-06

Figure 8 Example of a Coefficients Export Text File

3.3 Defaults

The Defaults menu options displays the Generate-it Defaults dialog (Figure 9) for selecting or modifying defaults settings.

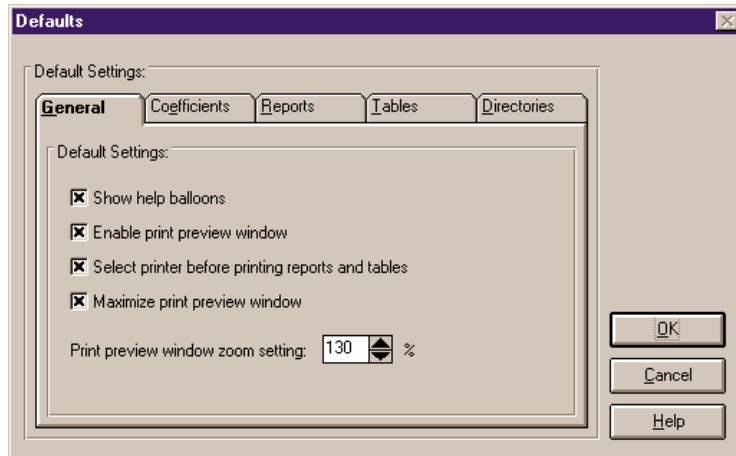


Figure 9 Generate-it Defaults Dialog

Enabled and Disabled

All tabs are enabled at all times.

Dialog Information

The Generate-it Defaults dialog allows the user to set default values or parameters by selecting one of the five tabs; General, Coefficients, Reports, Tables, or Directories. The default values are used to initialize values throughout the software.

3.3.1 General

The General tab (Figure 10) is for selecting setup defaults or preferences.

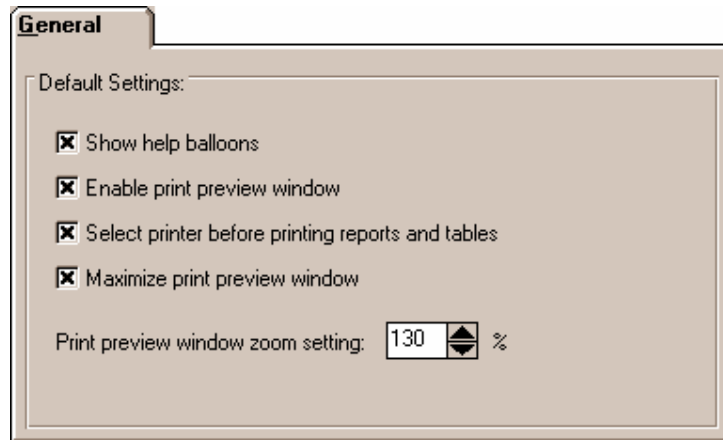


Figure 10 File | Defaults General Tab

Enabled and Disabled

All controls are enabled.

Dialog Information

The “Show help balloons” check box toggles the display of the help balloons. The default status for this check box is selected which means the yellow help balloons are displayed when the mouse pointer is placed over a button on the toolbar.

The “Enable print preview window” check box forces the reports and tables to be displayed in a Print Preview window on-screen when printing. If this check box is not selected, reports and tables are printed directly to the printer when the print button is selected.

The “Select printer before printing reports and tables” check box forces the software to display the Select Printer dialog when printing. The user can then select the printer to which reports and tables are printed. If this check box is not selected, reports and tables are printed on the default printer. To change the default printer, use the File | Setup Printer menu option.

The “Maximize print preview window” check box determines the size of the Print Preview window. If this check box is selected, the Print Preview window fills the entire screen.

The “Print preview window zoom setting” determines the default size of

the report or table within the Print Preview window. The zoom setting is limited to 40% to 190%. The zoom setting can also be changed from the Print Preview window once it is displayed.

3.3.2 Coefficients

The Coefficients tab (Figure 11) is for selecting default preferences pertaining to the calculation of coefficients.

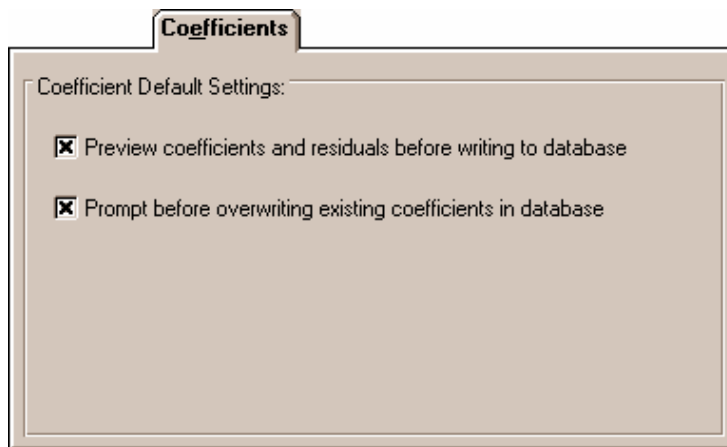


Figure 11 File | Defaults Coefficients Tab

Enabled and Disabled

All controls are enabled.

Dialog Information

The “Preview coefficients and residuals before writing to database” check box determines whether the user is prompted before the coefficients are written to the database. If this check box is selected, the coefficients and residuals are displayed on the Coefficients and Residuals dialog (Figure 37) before being written to the database. The user may choose to save the coefficients to the database or to cancel without saving. If this check box is not selected, the coefficients and residuals are written to the database without being displayed.

The “Prompt before overwriting existing coefficients in database” check box determines whether the newly calculated coefficients automatically overwrite existing coefficients for the same report number. If this check box is selected and if a set of coefficients with the same report number already exists in the database, the user is prompted whether to overwrite

the existing coefficients. If this check box is not selected, the new coefficients automatically overwrite the existing coefficients. The *Generate-it* Software allows only one set of coefficients to be stored in the database for each report number.

3.3.3 Reports

The Reports tab (Figure 12) is for selecting default preferences pertaining to Reports of Calibration.

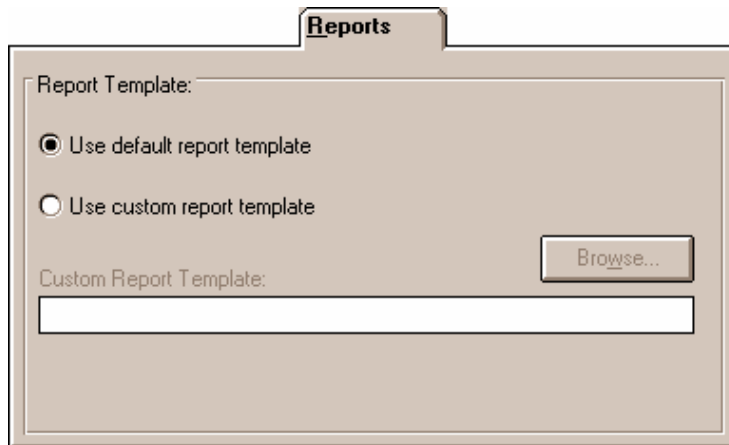


Figure 12 File | Defaults Reports Tab

Enabled and Disabled

The Custom Report Template box and Browse button are disabled if the “Use default report template” option is selected.

The Custom Report Template box and Browse button are enabled if the “Use custom report template” option is selected.

Dialog Information

The options selected on this tab determine the default report template used when printing a Report of Calibration. If the “Use default report template” option is selected, the software uses the Report of Calibration template that is built into the *Generate-it* Software. This option is selected by default.

The *Generate-it* Software also allows custom report templates to be used when printing reports. If the default report template isn’t exactly the type of report required for your application, contact Hart Scientific for information on obtaining custom report templates designed to your specifica-

tions. If a custom report template has been purchased from Hart Scientific, the “Use custom report template” option allows the user to specify the file that contains the custom report template. The Custom Report Template box and Browse button are enabled. Use the Browse button to select the custom report template to use.

Note: Custom report template files MUST be located in the \REPORTS subdirectory of the C:\HART9932 directory (or the directory where the Calibrate-*it* and Generate-*it* Software was installed) in order to operate properly.

3.3.4 Tables

The Tables tab (Figure 13) is for selecting default preferences pertaining to Table reports.

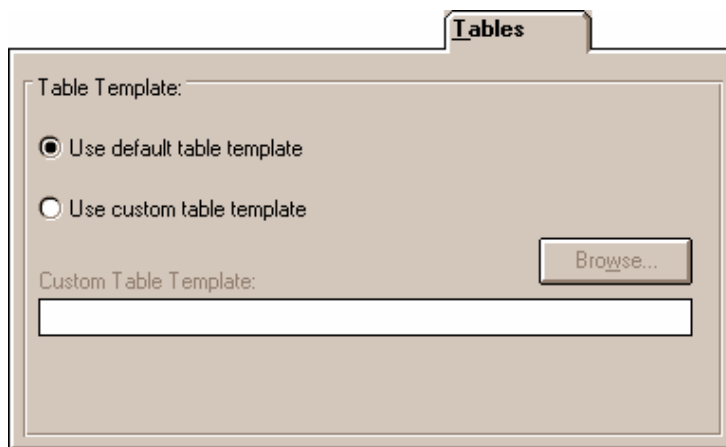


Figure 13 File | Defaults Tables Tab

Enabled and Disabled

The Custom Table Template box and Browse button are disabled if the “Use default table template” option is selected.

The Custom Table Template box and Browse button are enabled if the “Use custom table template” option is selected.

Dialog Information

The options selected on this tab determine the default table template used when printing a Table. If the “Use default table template” option is selected, the software uses the Table template that is built into the Gen-

erate-*it* Software. This option is selected by default.

The Generate-*it* Software also allows custom table templates to be used when printing tables. If the default table template isn't exactly the type of table required for your application, contact Hart Scientific for information on obtaining custom table templates designed to your specifications. If a custom table template has been purchased from Hart Scientific, the "Use custom table template" option allows the user to specify the file that contains the custom table template. Use the Browse button to select the custom table template to use.

Note: Custom table template files **must** be located in the \TABLES subdirectory of the C:\HART9932 directory (or the directory where the Calibrate-*it* and Generate-*it* Software was installed) in order to operate properly.

3.3.5 Directories

The Directories tab (Figure 14) is for setting default directory locations.

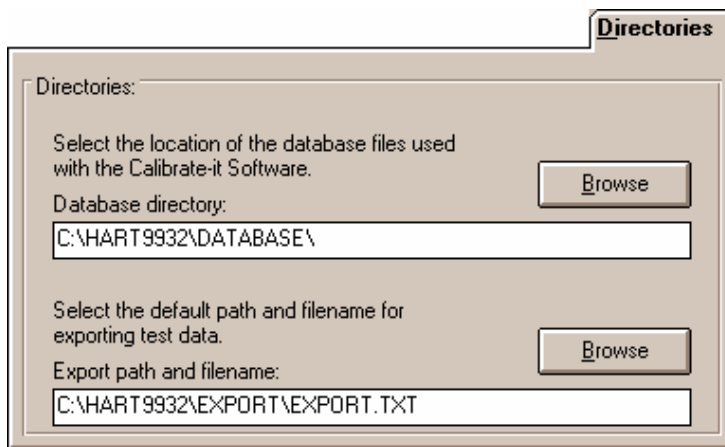


Figure 14 File | Defaults Directories Tab

Enabled and Disabled

All controls are enabled.

Dialog Information

The Database directory specifies the location of the Calibrate-*it* Software USERDRV.R.MDB database. This location is setup automatically when the Generate-*it* Software is installed and should not be changed. If the

USERDRVR.MDB database cannot be found in this directory, the user is prompted to select the location of this database when the software is executed. The Generate-*it* Software requires this database to calculate coefficients. Use the BROWSE button to select the database to use.

The Export path and filename specifies the path and filename to use when exporting test data to a text file. By default, this path and filename are set to the \EXPORT directory and to EXPORT.TXT. To change the default export path or filename, enter the new path and filename in the Export path and filename box or use the Browse button.

3.4 Setup Printer

The Setup Printer menu option allows the user to select and configure the default printer. For the Generate-*it* Software, the orientation should always be set to “Portrait” and the paper size should always be set to “Letter 8 1/2 x 11 in” or “A4 210 x 297 mm”.

3.5



Print Reports and Tables

The Print Reports and Tables menu option displays the Print Report and Tables dialog (Figure 15).

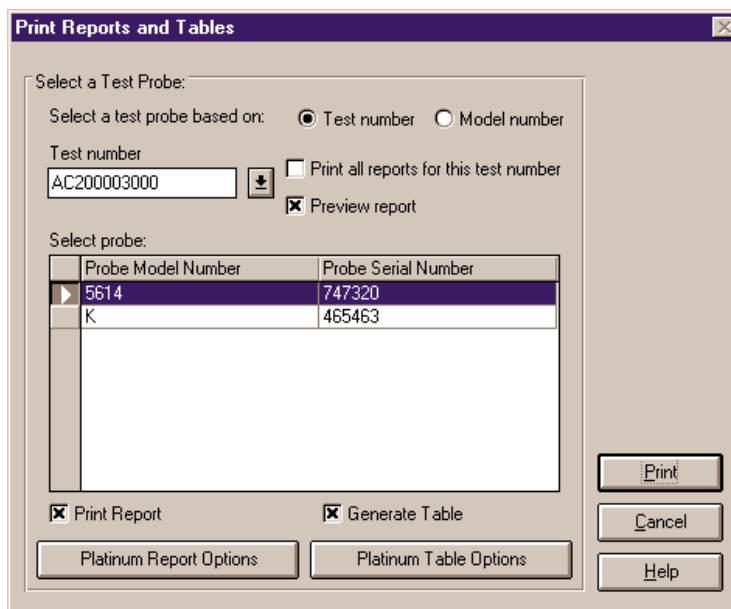


Figure 15 Print Reports and Tables Dialog

Enabled and Disabled

The “Select probe” list is disabled until a test number is selected in the Test number drop-down list or a model number is selected in the Model number drop-down list.

The “Print all reports for this test number” check box is disabled if the Model number option is selected. If there is only one test probe for the test number, this check box is disabled.

The Print button is disabled until one or more test probes have been selected in the “Select probe” list and the “Print Report” and/or “Generate Table” check boxes are selected.

The Report Options button is disabled unless the “Print Report” check box is selected.

The Table Options button is disabled unless the “Generate Table” check box is selected.

Dialog Information

To print a report and/or table for a test probe, you must select either a test number or a model number on which to base the test probe selection.

If the Test number option is selected, a list of test numbers becomes available. Once a test number is selected, probe model numbers and serial numbers appear in the “Select probe” list.

If the Model number option is selected, a list of test probe model numbers becomes available. Once a model number is selected, probe serial numbers and test numbers appear in the “Select probe” list.

Select or deselected individual test probes in the “Select probe” list. Selecting the “Print all reports for this test number” check box selects all test probes in the “Select probe” list.

After selecting one or more test probes, the “Print Report” and “Generate Table” check boxes can be selected. Selecting these check boxes enables the Report Options and Table Options buttons respectively. See Section 3.5.1, Report Options and Section 3.5.2, Table Options, for more information on the various report and table options.

Note: When a test probe is selected, the Report Options and Table Options button captions change to reflect the type of coefficients stored in the database for that test probe. The *Generate-it* Software *remembers* the last settings used for each type of coefficients. When selecting multiple test probes, the Report Options and Table Options buttons are based on the selected test probe closest to the top of the “Select probe” list.

Modifying the Report Options or Table Options only affect reports and tables for the test probes that have the same type of coefficients as the first test probe. Test probes that have other coefficients will use the *remembered* settings for that type of coefficients. For best results, you may want to only print reports and tables for one test probe at a time.

After the test probe has been selected and the Report Options and Table Options have been set, select the Print button to print the reports and/or tables. An example report and table are shown in Figure 26 and Figure 27 respectively.

If the “Preview Report” check box is selected, the reports and tables are displayed in a Print Preview window instead of being sent to the printer. See Section 3.5.6 for more information on the Print Preview Window.

The Cancel button closes this dialog.

3.5.1 Report Options

The Report Options dialog (Figure 16) is displayed when the Report Options button is selected on the Print Reports and Tables dialog.

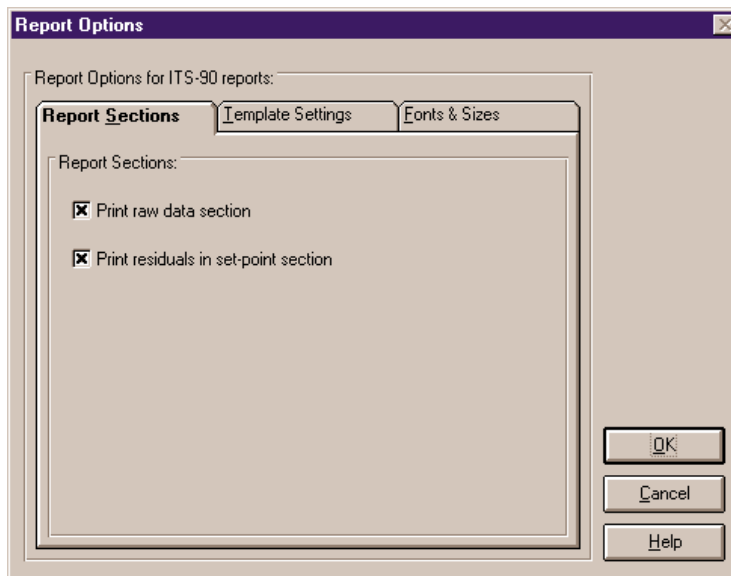


Figure 16 Report Options Dialog

Enabled and Disabled

All tabs are enabled at all times.

Dialog Information

The Generate-*it* Software Report Options dialog allows the user to specify options for the Report of Calibration for each type of coefficients by selecting either of the three tabs: Report Sections, Template Settings, and Fonts & Sizes.

The Generate-*it* Software *remembers* the last settings used for each type of coefficients. When this dialog is displayed, the last settings for the current type of coefficients are shown.

The OK button accepts the selected settings and closes this dialog. Selecting the Cancel button ignores any changes made and closes this dialog.

3.5.1.1 Report Sections

The Report Sections tab (Figure 17) is displayed from the Report Options dialog.

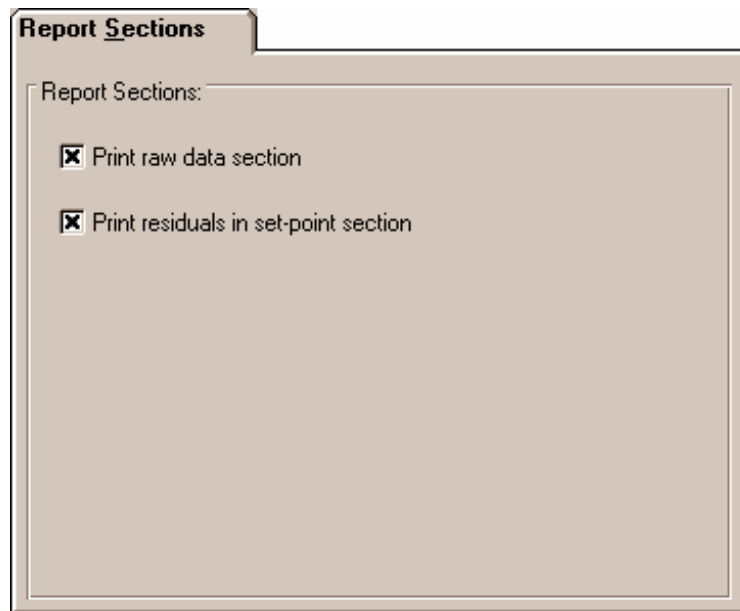


Figure 17 Report Sections Tab

Enabled and Disabled

The “Print residuals in set-point section” check box is enabled only if the “Print raw data section” check box is selected.

Dialog Information

The Report Sections tab allows the user to specify whether or not the raw data section is printed on the Report of Calibration.

If the “Print raw data” check box is selected, the raw data is printed on the Report of Calibration.

If the “Print residuals in set-point section” check box is selected, the raw data section of the report displays a column for the set-point residuals.

3.5.1.2 Template Settings

The Template Settings tab (Figure 18) is displayed from the Report Options dialog.

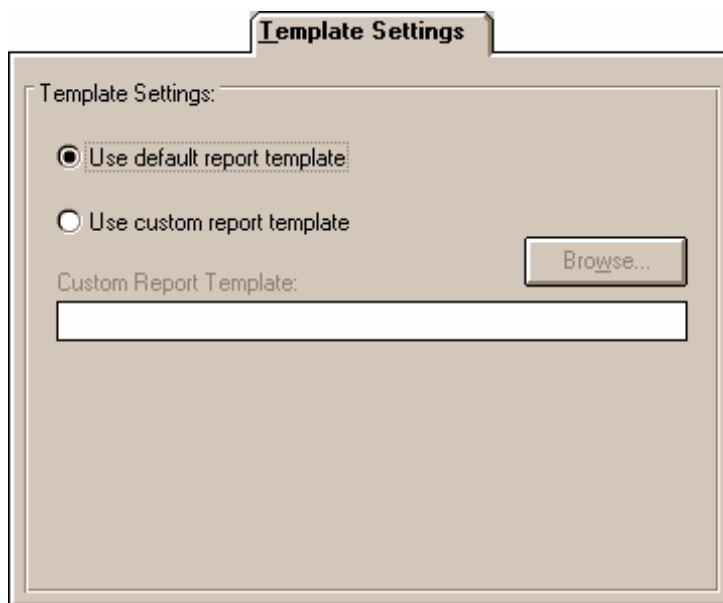


Figure 18 Template Settings Tab

Enabled and Disabled

The Custom Report Template box and Browse button are disabled unless the “Use custom report template” option is selected.

Dialog Information

The Template Settings tab determines the default report template used when printing a Report of Calibration.

If the “Use default report template” option is selected, the software uses the report template that is built into the Generate-*it* Software. This option is selected by default.

The Generate-*it* Software also allows custom report templates to be used when printing Reports of Calibration. If the default report template isn't exactly the type of report required for your application, contact Hart Scientific for information on obtaining custom report templates designed to your specifications. If a custom report template has been purchased from Hart Scientific, the “Use custom report template” option allows the user to specify the file that contains the custom report template. Use the Browse button to select the custom report template to use.

Note: Custom report template files MUST be located in the \REPORTS subdirectory of the C:\HART9932 directory (or the directory where the Calibrate-*it* and Generate-*it* Software was installed) in order to operate properly.

3.5.1.3 Fonts & Sizes

The Fonts & Sizes tab is used for selecting the default font names, sizes, and styles to be used when printing the default Report of Calibration.

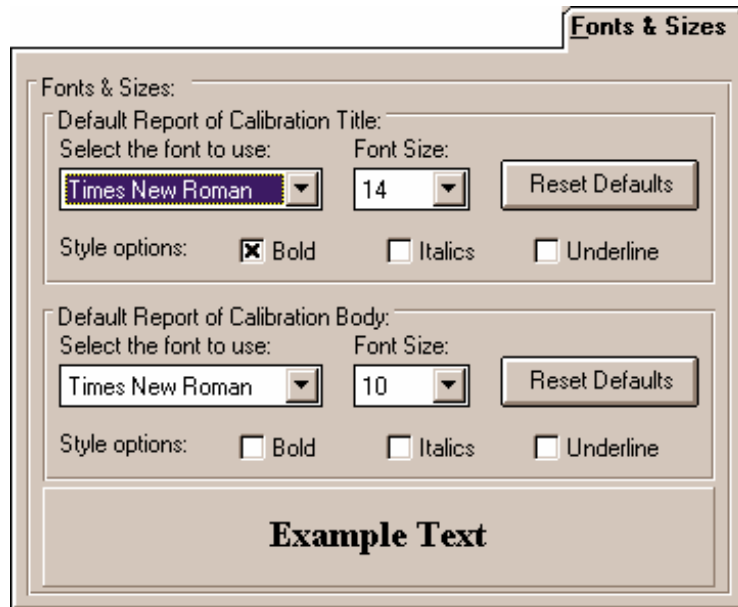


Figure 19 Fonts & Sizes Tab

Enabled and Disabled

All controls are enabled.

Dialog Information

To set the font that is used when printing the title on the default Report of Calibration, change the settings in the Default Report of Calibration Title section. To set the font that is used when printing the rest of the text (main body) on the default Report of Calibration, change the settings in the Default Report of Calibration Body section.

- Select the name of the font to use from the Select the font to use drop-down list.
- Increase or decrease the size of the font by selecting a setting from the Font Size drop-down list.
- Change the font style options by checking or unchecking the Bold, Italics and/or Underline boxes.
- The current settings are displayed in the Example Text box at the bottom of this tab.

The Reset Defaults button can be clicked to restore the default settings. The default settings are as follows:

- Title font settings - Times New Roman, 14 point, Bold
- Body font settings - Times New Roman, 10 point

Note: Changing these settings does **not** change the font settings used on custom Reports of Calibration. The changes are applied **only** to the default Report of Calibration that is built into the *Generate-it* Software.

3.5.2 Table Options

The Table Options dialog (Figure 20) is displayed when the Table Options button is selected on the Print Reports and Tables dialog.

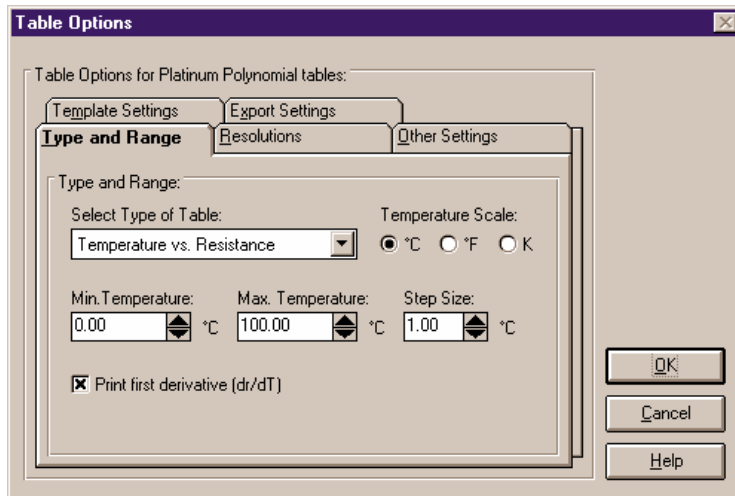


Figure 20 Table Options Dialog

Enabled and Disabled

All tabs are enabled.

Dialog Information

The Generate-*it* Software Table Options dialog allows the user to specify options for each type of coefficients by selecting any of the five tabs: Type and Range, Resolutions, Other Settings, Template Settings, and Export Settings.

The Generate-*it* Software *remembers* the last settings used for each type of coefficients. When this dialog is displayed, the last settings for the current type of coefficients are shown.

The OK button accepts the selected settings and closes this dialog. Selecting the Cancel button ignores any changes made and closes this dialog.

3.5.2.1 Type and Range

The Type and Range tab (Figure 21) is displayed from the Table Options dialog.

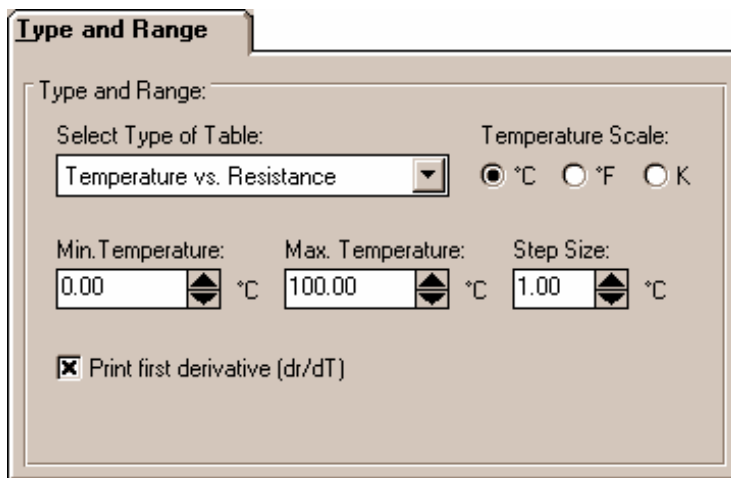


Figure 21 Type and Range Tab

Enabled and Disabled

All controls are enabled.

Dialog Information

The Type and Range tab determines the type of table, the temperature range, scale, and columns for the table.

The choices for the type of table are:

- **Temperature vs. Resistance** - For ITS-90, IPTS-68, Callendar-Van Dusen, and Polynomial coefficients
- **Temperature vs. Ratio** - For ITS-90 and IPTS-68 coefficients only
- **Temperature vs. EMF (μV)** - For Thermocouple coefficients only
- **Temperature vs. EMF (mV)** - For Thermocouple coefficients only

The choices for temperature scales are °C, °F, and K.

The minimum temperature, maximum temperature and step size must be entered. These values are in the currently selected temperature scale.

The minimum temperature and maximum temperature values are limited to -273°C and 2650°C (-459°F and 4802°F) respectively. However, the equations used to generate table values may not be able to calculate values over the full range. If a message is displayed during calculations stating that a calculation error occurred, you may need to increase the

minimum temperature or decrease the maximum temperature. The Table Temperature Ranges chart in Section 3.5.3 lists the recommended ranges for generating tables.

Note: Changing the selected temperature scale converts the minimum and maximum temperature values to that scale.

The step size is the increment between each temperature value on the table and must be between 0.01 and 100.00

Below the temperature settings are various options for the selected type of table.

- For Temperature vs. Resistance tables, the first derivative column can be printed by selecting the “Print first derivative (dr/dT)” option.
- For Temperature vs. Ratio tables, the inverse difference column can be printed by selecting the “Print inverse difference (dT/dW)” option.
- For Temperature vs. EMF (μV or mV) tables, the error column can be printed by selecting the “Print Error (μV or mV)” option.

3.5.2.2 Resolutions

The Resolutions tab (Figure 22) is displayed from the Table Options dialog.

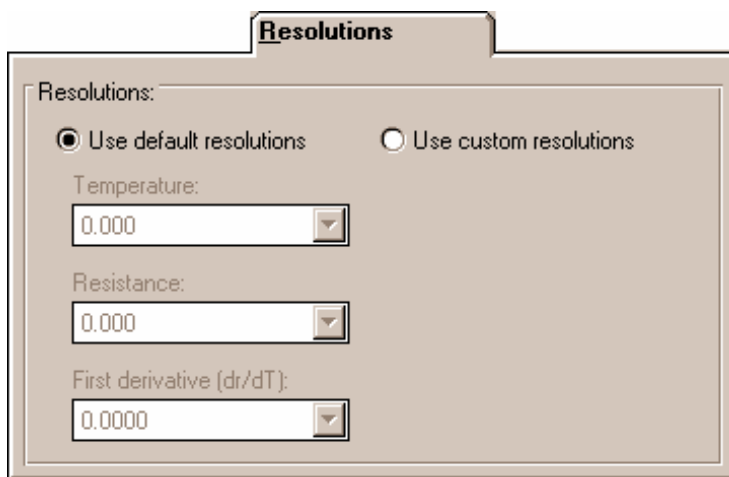


Figure 22 Resolutions Tab

Enabled and Disabled

The resolution selection boxes are disabled unless the “Use custom res-

olutions” option is selected.

Dialog Information

The Resolutions tab allows the user to specify the resolutions to use when printing table values. There are two options: “Use default resolutions” and “Use custom resolutions”.

When the “Use default resolutions” option is selected, the values on the table are printed using the default method: temperature values are always 2 decimal places and all other values depend upon the magnitude of the value:

- For values between -10 and 10: seven decimal places
- For values between -100 and 100: six decimal places
- For values between -1,000 and 1,000: five decimal places
- For values between -10,000 and 10,000: four decimal places
- For values between -100,000 and 100,000: three decimal places
- All other values: two decimal places

When the “Use custom resolutions” option is selected, the values on the table are printed using the formats selected by the user. Select the format for temperature readings with the Temperature drop-down list. Select the format for resistance, ratio or voltage readings with the appropriate drop-down list. Select the format for the first derivative, inverse difference or error readings with the appropriate drop-down list.

3.5.2.3 Other Settings

The Other Settings tab (Figure 23) is displayed from the Table Options dialog.

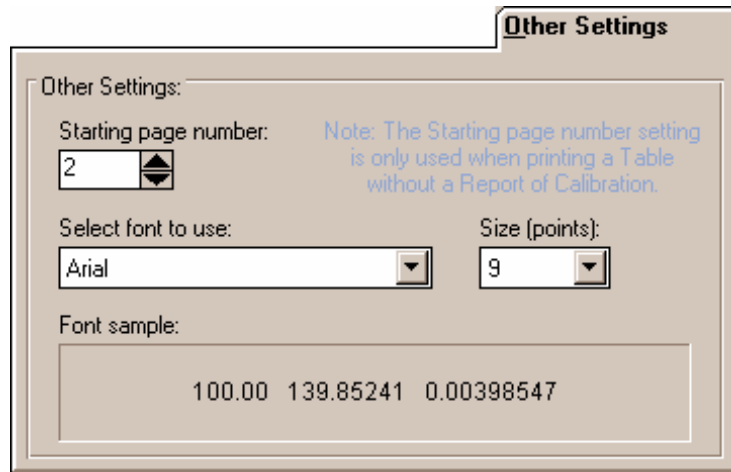


Figure 23 Other Settings Tab

Enabled and Disabled

All controls are enabled.

Dialog Information

The Other Settings tab allows the user to select the starting page number and font for printing tables.

The Starting page number box allows the user to enter the page number of the first page of the table. The starting page number must be between 1 and 10.

Note: This setting is only used when printing a table by itself and is ignored when printing a table and a Report of Calibration at the same time.

The “Select font to use” drop-down list allows the user to select the font type. The list of fonts consists of all fonts supported by the currently selected default printer. The “Size (points)” drop-down list allows the user to select the font size. Allowable font sizes are from 6 point to 12 point. A sample of the selected font is displayed below the font selection.

3.5.2.4 Template Settings

The Template Settings tab (Figure 24) is displayed from the Table Options dialog.

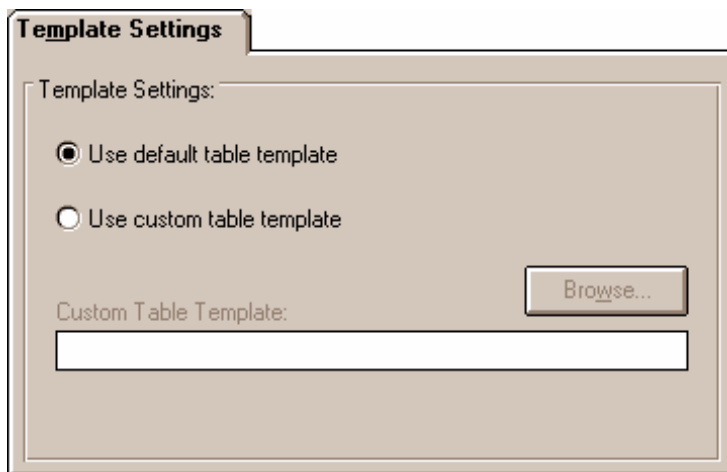


Figure 24 Template Settings Tab

Enabled and Disabled

The Custom Table Template box and Browse button are disabled until the “Use custom table template” option is selected.

Dialog Information

The Template Settings tab determines the default table template used when printing a table.

If the “Use default table template” option is selected, the software uses the table template that is built into the Generate-*it* Software.

The Generate-*it* Software also allows custom table templates to be used when printing tables. If the default table template isn’t exactly the type of table required for your application, contact Hart Scientific for information on obtaining custom table templates designed to your specifications. If a custom table template has been purchased from Hart Scientific, the “Use custom table template” option allows the user to specify the file that contains the custom table template. Use the Browse button to select the custom table template to use.

Note: Custom table template files **MUST** be located in the \TABLES sub-directory of the C:\HART9932 directory (or the directory where the Calibrate-*it* and Generate-*it* Software was installed) in order to operate properly.

3.5.2.5 Export Settings

The Export Settings tab (Figure 25) is displayed from the Table Options dialog.

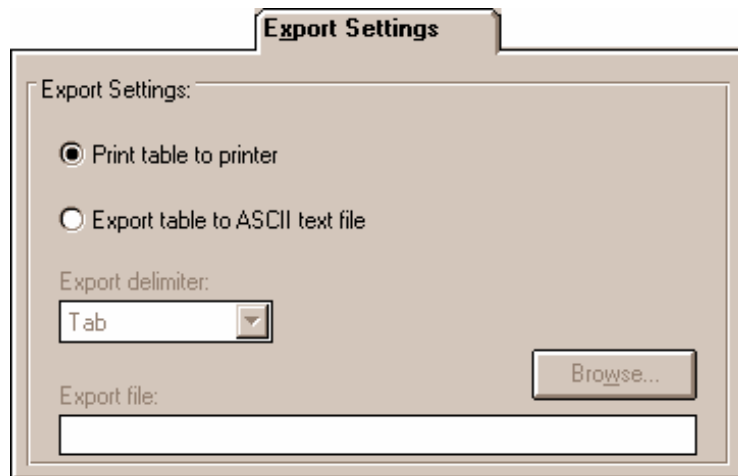


Figure 25 Export Settings Tab

Enabled and Disabled

The Export delimiter drop-down list, Export file box, and Browse button are disabled until the “Export table to ASCII text file” option is selected.

Dialog Information

The Export Settings tab determines whether the table is printed to the default printer or saved to an ASCII text file.

If the “Print table to printer” option is selected, the table will be printed to the default printer.

If the “Export table to ASCII text file” option is selected, the user can select the export delimiter and enter or select the export file. When the Print button is selected on the Print Reports and Tables dialog, the user is prompted to specify the path and filename of the file and the table exported to that file. The path and filename default to the values entered in the Export file box.

The Export delimiter drop-down list allows the user to specify the delimiter used to separate values when exporting a table to an ASCII text file. The user may select either a Tab or a Comma as the delimiter.

Use the Browse button to select the name of the export file or enter the

path and filename in the Export file box.

3.5.3 Table Temperature Range Charge

Due to the nature of the equations used to generate tables, the temperature range that can or should be used to generate a table depends on the type of coefficients used. Table 1 provides details on the temperature range for specific coefficients.

Table 1 Temperature Range Recommendations

ITS-90		°C		°F		K	
Range	Min Temp	Max Temp	Min Temp	Max Temp	Min Temp	Max Temp	
4	-189.0	0.0	-308.2	32.0	84.2	273.2	
5	-39.0	30.0	-38.2	86.0	234.2	303.2	
6	0.0	962.0	32.0	1763.6	273.2	1235.2	
7	0.0	660.0	32.0	1220.0	273.2	933.2	
8	0.0	420.0	32.0	788.0	273.2	693.2	
9	0.0	232.0	32.0	449.6	273.2	505.2	
10	0.0	157.0	32.0	314.0	273.2	430.2	
11	0.0	30.0	32.0	86.0	273.2	303.2	
IPTS-68		°C		°F		K	
	Min Temp	Max Temp	Min Temp	Max Temp	Min Temp	Max Temp	
	-230.0	2650.0	-382.0	4802.0	43.2	2923.2	
CVD		°C		°F		K	
BETA	Min Temp	Max Temp	Min Temp	Max Temp	Min Temp	Max Temp	
No	0.0	2650.0	32.0	4802.0	273.2	2923.2	
Yes	-260.0	2650.0	-436.0	4802.0	13.2	2923.2	
POLYNOMIAL		°C		°F		K	
Probe Type	Min Temp	Max Temp	Min Temp	Max Temp	Min Temp	Max Temp	
Platinum	-260.0	1480.0	-436.0	2696.0	13.2	1753.2	
Thermistor	-10.0	200.0	-14.0	392.0	263.2	473.2	
THERMOCOUPLE		°C		°F		K	
Type	Range	Min Temp	Max Temp	Min Temp	Max Temp	Min Temp	Max Temp
B	1	0.0	631.0	32.0	1167.8	273.2	904.2
B	2	631.0	1820.0	1167.8	3308.0	904.2	2093.2
E	1	-270.0	0.0	-454.0	32.0	3.1	273.2
E	2	0.0	1000.0	32.0	1832.0	273.2	1273.2
J	1	-210.0	760.0	-346.0	1400.0	63.2	1033.2
J	2	760.0	1200.0	1400.0	2192.0	1033.2	1473.2
K	1	-270.0	0.0	-454.0	32.0	3.1	273.2
K	2	0.0	1372.0	32.0	2501.6	273.2	1645.2
N	1	-270.0	0.0	-454.0	32.0	3.1	273.2
N	2	0.0	1300.0	32.0	2372.0	273.2	1573.2
R	1	-50.0	1064.0	-58.0	1947.2	223.2	1337.2

R	2	1064.0	1664.0	1947.2	3027.2	1337.2	1937.2
R	3	1664.0	1768.0	3027.2	3214.4	1937.2	2041.2
R	N/A*	-50.0	1768.0	-58.0	3214.4	223.2	2041.2
S	1	-50.0	1064.0	-58.0	1947.2	223.2	1337.2
S	2	1064.0	1664.0	1947.2	3027.2	1337.2	1937.2
S	3	1664.0	1768.0	3027.2	3214.4	1937.2	2041.2
S	N/A*	-50.0	1768.0	-58.0	3214.4	223.2	2041.2
T	1	-270.0	0.0	-454.0	32.0	3.1	273.2
T	2	0.0	400.0	32.0	752.0	273.2	673.2
AuPt	8th Order	0.0	1000.0	32.0	1832.0	273.2	1273.2
AuPt	9th Order	0.0	1000.0	32.0	1832.0	273.2	1273.2

*This range can be selected by choosing the “-50.0°C to 1768.1°C (using extrapolation)” option.

3.5.4 Report of Calibration

The default Report of Calibration (Figure 26) contains the report number, the test probe information, the test probe status, customer name and address, calibration test paragraph and notes, the raw data (if requested), the coefficients, a list of the test equipment, the test information, technician name, and a place for the technician and supervisor approval signatures.

The fonts, sizes, and styles used on the default Report of Calibration can be changed on the Fonts & Sizes Tab of the Report Options dialog.

Reports of Calibration can be saved to a report file from the Print Preview window and opened, viewed, and printed by selecting the Recall Saved Reports and Tables option from the File menu or by running the Report Viewer Utility.

Report of Calibration			Report No: EXAMPLE1-01 Page 1 of 1																																																																							
Our Company 12 Our Street Our Town, USA 09876																																																																										
Model: 5614 Serial: 358254 Description: Secondary Standard RTD Probe	Customer: Our Customer One Customer Way This Town, USA																																																																									
Calibration Range: FULLL Received Condition: New Current: N/A Procedure: TEST_PROC																																																																										
<p>This is the paragraph. The paragraph may contain any text that needs to be displayed in this section of the Report of Calibration. The paragraph text must be saved in an ASCII text file with a .PGH extension. The file to be used as the paragraph text can be specified on the File Defaults Reports tab and on the Test Information dialog.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Actual Value (Reference) (°C)</th> <th>ULT (Test Sensor) (Ohms)</th> <th>Residuals (°C)</th> </tr> </thead> <tbody> <tr><td>-90.10000</td><td>16.23400</td><td>-0.0001</td></tr> <tr><td>-38.83400</td><td>21.56750</td><td>0.0001</td></tr> <tr><td>0.01200</td><td>25.54950</td><td>N/A</td></tr> <tr><td>156.59900</td><td>41.12680</td><td>0.0001</td></tr> <tr><td>231.92800</td><td>48.35590</td><td>-0.0001</td></tr> <tr><td>300.00000</td><td>54.74330</td><td>0.0001</td></tr> </tbody> </table> <p>ITS-90 Coefficients:</p> <p style="text-align: center;">RTPW = 25.549296 Ohms</p> <p>a4 = 8.0074745 E-06 a8 = -1.6577511 E-04 b4 = 3.7630372 E-04 b8 = 2.1866045 E-06</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="5">Test Equipment</th> </tr> <tr> <th>Manufacturer</th> <th>Model</th> <th>Description</th> <th>Serial Number</th> <th>Recall Date</th> </tr> </thead> <tbody> <tr><td>Hart Scientific</td><td>1560</td><td>'Black Stack' Base Unit</td><td>65432</td><td>NCR</td></tr> <tr><td>Hart Scientific</td><td>2560</td><td>SPRT Module</td><td>64356</td><td>08/23/2001</td></tr> <tr><td>Hart Scientific</td><td>2563</td><td>Thermistor Module</td><td>67854</td><td>08/23/2001</td></tr> <tr><td>Hart Scientific</td><td>2566</td><td>Thermocouple Scanner Module</td><td>64387</td><td>08/23/2001</td></tr> <tr><td>Burns Engineering</td><td>5614</td><td>Secondary Standard RTD Probe</td><td>380215</td><td>08/23/2001</td></tr> <tr><td>Hart Scientific</td><td>9105</td><td>Low-Temperature Drywell</td><td>54367</td><td>08/23/2001</td></tr> </tbody> </table> <p>Notes: This is the text that is referred to as the Notes text. The notes may contain any text that needs to be displayed in this section of the Report of Calibration. The notes text must be saved in an ASCII text file with a .TXT extension. The file to be used as the notes text is specified on the Test Information dialog.</p> <table style="width: 100%;"> <tr> <td style="width: 50%;">Calibration Date: 08/23/2000</td> <td style="width: 50%;">Technician: _____</td> </tr> <tr> <td>Recall Date: 09/22/2000</td> <td style="text-align: center;">Cal E. Breight</td> </tr> <tr> <td>Temperature: 25°C</td> <td>Approved By: _____</td> </tr> <tr> <td>Humidity: 30%</td> <td></td> </tr> <tr> <td>Customer Order: Order_1</td> <td></td> </tr> </table> <p style="text-align: center;"><i>This report shall not be reproduced except in full without written approval of Our Company.</i></p>				Actual Value (Reference) (°C)	ULT (Test Sensor) (Ohms)	Residuals (°C)	-90.10000	16.23400	-0.0001	-38.83400	21.56750	0.0001	0.01200	25.54950	N/A	156.59900	41.12680	0.0001	231.92800	48.35590	-0.0001	300.00000	54.74330	0.0001	Test Equipment					Manufacturer	Model	Description	Serial Number	Recall Date	Hart Scientific	1560	'Black Stack' Base Unit	65432	NCR	Hart Scientific	2560	SPRT Module	64356	08/23/2001	Hart Scientific	2563	Thermistor Module	67854	08/23/2001	Hart Scientific	2566	Thermocouple Scanner Module	64387	08/23/2001	Burns Engineering	5614	Secondary Standard RTD Probe	380215	08/23/2001	Hart Scientific	9105	Low-Temperature Drywell	54367	08/23/2001	Calibration Date: 08/23/2000	Technician: _____	Recall Date: 09/22/2000	Cal E. Breight	Temperature: 25°C	Approved By: _____	Humidity: 30%		Customer Order: Order_1	
Actual Value (Reference) (°C)	ULT (Test Sensor) (Ohms)	Residuals (°C)																																																																								
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Recall Date: 09/22/2000	Cal E. Breight																																																																									
Temperature: 25°C	Approved By: _____																																																																									
Humidity: 30%																																																																										
Customer Order: Order_1																																																																										

Figure 26 Default Report of Calibration Example

The Generate-*it* Software automatically numbers the pages of the Report of Calibration. If a table is being generated and printed with the Report of Calibration, the page numbering is continuous (.e. the Report of Calibration pages are numbered 1 to i where i is the number of pages in the Report of Calibration and the table pages are numbered $i+1$ to n where n is the sum of the number of pages in the Report of Calibration and the table).

3.5.5 Table Report

The Table report (Figure 27) contains the date, title, report number and the generated Table information.

08/23/2000 Temperature vs. Resistance Table				Report No: EXAMPLE1-01 Page 2 of 4				
°C	Resistance	dR/dT	°C	Resistance	dR/dT	°C	Resistance	dR/dT
0.00	25.548277	0.1018719	65.00	32.105584	0.0998661	130.00	38.53409	0.0978863
1.00	25.650149	0.1018408	66.00	32.205450	0.0998355	131.00	38.631295	0.0978560
2.00	25.751990	0.1018096	67.00	32.305286	0.0998049	132.00	38.729151	0.0978258
3.00	25.853799	0.1017785	68.00	32.405091	0.0997742	133.00	38.826977	0.0977955
4.00	25.955578	0.1017474	69.00	32.504865	0.0997436	134.00	38.924773	0.0977652
5.00	26.057325	0.1017163	70.00	32.604608	0.0997130	135.00	39.022538	0.0977349
6.00	26.159042	0.1016852	71.00	32.704322	0.0996824	136.00	39.120273	0.0977047
7.00	26.260727	0.1016541	72.00	32.804004	0.0996518	137.00	39.217977	0.0976744
8.00	26.362381	0.1016230	73.00	32.903656	0.0996212	138.00	39.315682	0.0976442
9.00	26.464004	0.1015920	74.00	33.003277	0.0995907	139.00	39.413296	0.0976139
10.00	26.565596	0.1015609	75.00	33.102868	0.0995601	140.00	39.510910	0.0975837
11.00	26.667157	0.1015299	76.00	33.202428	0.0995295	141.00	39.608494	0.0975535
12.00	26.768687	0.1014989	77.00	33.301957	0.0994989	142.00	39.706047	0.0975232
13.00	26.870186	0.1014678	78.00	33.401456	0.0994684	143.00	39.803570	0.0974930
14.00	26.971653	0.1014368	79.00	33.500925	0.0994378	144.00	39.901063	0.0974628
15.00	27.073090	0.1014058	80.00	33.600362	0.0994073	145.00	39.998526	0.0974326
16.00	27.174496	0.1013748	81.00	33.699770	0.0993767	146.00	40.095959	0.0974024
17.00	27.275871	0.1013439	82.00	33.799146	0.0993462	147.00	40.193361	0.0973722
18.00	27.377215	0.1013129	83.00	33.898493	0.0993157	148.00	40.290733	0.0973420
19.00	27.478529	0.1012819	84.00	33.997808	0.0992851	149.00	40.388075	0.0973118
20.00	27.579810	0.1012510	85.00	34.097093	0.0992546	150.00	40.485387	0.0972816
21.00	27.681061	0.1012200	86.00	34.196348	0.0992241	151.00	40.582669	0.0972514
22.00	27.782281	0.1011891	87.00	34.295572	0.0991936	152.00	40.679920	0.0972213
23.00	27.883470	0.1011582	88.00	34.394766	0.0991631	153.00	40.777141	0.0971911
24.00	27.984628	0.1011273	89.00	34.493929	0.0991325	154.00	40.874332	0.0971609
25.00	28.085755	0.1010964	90.00	34.593061	0.0991021	155.00	40.971493	0.0971308
26.00	28.186852	0.1010655	91.00	34.692163	0.0990716	156.00	41.068624	0.0971006
27.00	28.287917	0.1010346	92.00	34.791235	0.0990411	157.00	41.165725	0.0970705
28.00	28.388952	0.1010037	93.00	34.890276	0.0990106	158.00	41.262795	0.0970403
29.00	28.489955	0.1009728	94.00	34.989287	0.0989801	159.00	41.359835	0.0970102
30.00	28.590928	0.1009420	95.00	35.088267	0.0989496	160.00	41.456846	0.0969801
31.00	28.691870	0.1009111	96.00	35.187216	0.0989192	161.00	41.553826	0.0969499
32.00	28.792781	0.1008803	97.00	35.286135	0.0988887	162.00	41.650776	0.0969198
33.00	28.893662	0.1008494	98.00	35.385024	0.0988582	163.00	41.747695	0.0968897
34.00	28.994511	0.1008186	99.00	35.483882	0.0988278	164.00	41.844585	0.0968596
35.00	29.095330	0.1007878	100.00	35.582710	0.0987973	165.00	41.941445	0.0968295
36.00	29.196117	0.1007569	101.00	35.681508	0.0987669	166.00	42.038274	0.0967994
37.00	29.296874	0.1007261	102.00	35.780274	0.0987365	167.00	42.135074	0.0967693
38.00	29.397600	0.1006953	103.00	35.879011	0.0987060	168.00	42.231843	0.0967392
39.00	29.498296	0.1006645	104.00	35.977717	0.0986756	169.00	42.328582	0.0967091
40.00	29.598960	0.1006337	105.00	36.076393	0.0986452	170.00	42.425291	0.0966790
41.00	29.699594	0.1006030	106.00	36.175038	0.0986148	171.00	42.521970	0.0966489
42.00	29.800197	0.1005722	107.00	36.273652	0.0985844	172.00	42.618619	0.0966189
43.00	29.900769	0.1005414	108.00	36.372237	0.0985539	173.00	42.715238	0.0965889
44.00	30.001311	0.1005107	109.00	36.470791	0.0985235	174.00	42.811827	0.0965588
45.00	30.101821	0.1004799	110.00	36.569314	0.0984932	175.00	42.908386	0.0965288
46.00	30.202301	0.1004491	111.00	36.667807	0.0984628	176.00	43.004915	0.0964987
47.00	30.302750	0.1004184	112.00	36.766270	0.0984324	177.00	43.101414	0.0964687
48.00	30.403169	0.1003877	113.00	36.864703	0.0984020	178.00	43.197882	0.0964387
49.00	30.503556	0.1003569	114.00	36.963105	0.0983716	179.00	43.294321	0.0964087
50.00	30.603913	0.1003262	115.00	37.061476	0.0983412	180.00	43.390730	0.0963786
51.00	30.704240	0.1002955	116.00	37.159817	0.0983109	181.00	43.487108	0.0963486
52.00	30.804535	0.1002648	117.00	37.258128	0.0982805	182.00	43.583457	0.0963186
53.00	30.904800	0.1002341	118.00	37.356409	0.0982502	183.00	43.679775	0.0962886
54.00	31.005034	0.1002034	119.00	37.454659	0.0982198	184.00	43.776064	0.0962586
55.00	31.105237	0.1001727	120.00	37.552879	0.0981895	185.00	43.872323	0.0962286
56.00	31.205410	0.1001420	121.00	37.651068	0.0981591	186.00	43.968551	0.0961986
57.00	31.305552	0.1001113	122.00	37.749227	0.0981288	187.00	44.064750	0.0961687
58.00	31.405663	0.1000807	123.00	37.847356	0.0980985	188.00	44.160919	0.0961387
59.00	31.505744	0.1000500	124.00	37.945455	0.0980681	189.00	44.257057	0.0961087
60.00	31.605794	0.1000193	125.00	38.043523	0.0980378	190.00	44.353166	0.0960787
61.00	31.705813	0.0999887	126.00	38.141561	0.0980075	191.00	44.449245	0.0960488
62.00	31.805802	0.0999580	127.00	38.239568	0.0979772	192.00	44.545294	0.0960188
63.00	31.905760	0.0999274	128.00	38.337545	0.0979469	193.00	44.641312	0.0959889
64.00	32.005687	0.0998967	129.00	38.435492	0.0979166	194.00	44.737301	0.0959589

Figure 27 Example Table Report

The Generate-it Software automatically numbers the pages of the table. If

a Report of Calibration is being generated and printed with the table, the page numbering is continuous (i.e. the Report of Calibration pages are numbered 1 to i where i is the number of pages in the Report of Calibration and the table pages are numbered $i+1$ to n where n is the sum of the number of pages in the Report of Calibration and the table).

If the table is being printed by itself, the Generate-*it* Software numbers the pages starting with the starting page number specified on the Other Settings tab of the Table Options dialog.

3.5.6 Print Preview Window

The Print Preview window (Figure 28) is used to view reports and tables on the screen without having to print a hard copy. The Print Preview window is activated by selecting the “Enable print preview” check box on the File | Defaults General tab. Other settings on the General tab can be changed to manipulate the default behavior of the Print Preview window.

selected.

The buttons on the toolbar of the Print Preview window perform the following functions:



Close - Closes the Print Preview window



Save As - Saves the current Report of Calibration or Table to a report file



Print - Prints all pages of the report or table in the Print Preview window



First Page - Navigates to the first page of the report or table (if more than one page)



Previous Page - Navigates to the previous page of the report or table (if more than one page)



Next Page - Navigates to the next page of the report or table (if more than one page)



Last Page - Navigates to the last page of the report or table (if more than one page)



Zoom In - Zooms in to (enlarge) the report or table



Zoom Out - Zooms out from (reduce) the report or table

The toolbar also indicates the current page and the number of pages in the current report or table.

3.6 Recall Saved Reports and Tables

The Recall Saved Reports and Tables option allows previously saved report files to be opened, viewed and printed from the Print Preview window.

For more information on report files, see Section 7.2, Report Files.

3.7 Exit

The Exit menu options exits the Generate-*it* Software.

4 Coefficients Menu

The Coefficients Menu (Figure 29) provides options for calculating coefficients for Platinum, Thermistor, or Thermocouple probes.

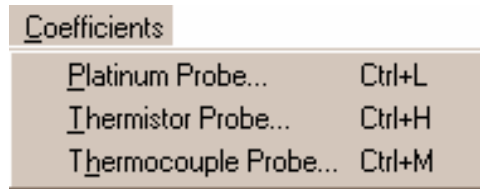


Figure 29 Coefficients Menu

Enabled and Disabled

All options are enabled.

4.1 Platinum Probe

The Platinum Probe Coefficients dialog (Figure 30) is used for calculating coefficients for platinum probes.

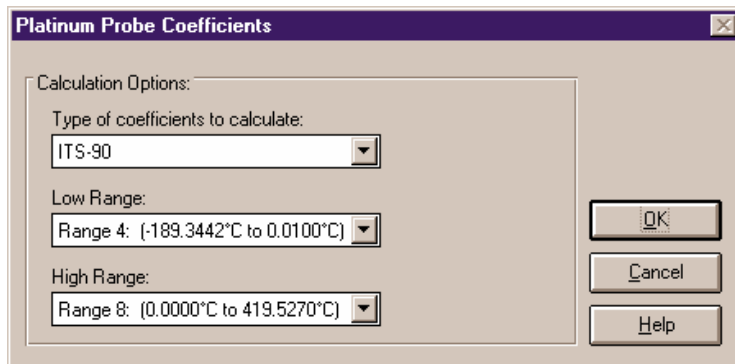


Figure 30 Platinum Probe Coefficient Calculation Dialog (ITS-90 Selected)

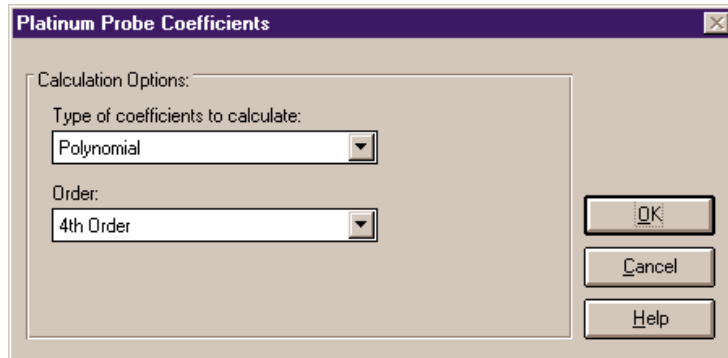


Figure 31 *Platinum Probe Coefficient Calculation Dialog (Polynomial Selected)*

Enabled and Disabled

All options are enabled.

Dialog Information

The choices for platinum probes are ITS-90, IPTS-68, Callendar-Van Dusen, and Polynomial. Depending on the selected coefficient type, additional information may or may not be required.

- If the type selected is ITS-90, the low range and high range selection are required. The low range choices are Range 4, Range 5 or None. The default is Range 4. The high range choices are Range 6 through Range 11 or None. The default is Range 8.
- If the type selected is Polynomial, the order of the polynomial is required. The valid orders of the polynomial for platinum probes are from 3rd to 9th order. The default for platinum probes is 4th order. The number of coefficients calculated is one more than the order of the polynomial (i.e. for a 4th order polynomial, 5 coefficients are calculated). The minimum number of set-points needed must exceed the order by 1 or more.
- If the type selected is IPTS-68 or Callendar-Van Dusen, additional information is not required.

The OK button displays the Calculate Coefficients dialog. See Section 4.4.

The Cancel button returns to the Generate-*it* Main Display.

4.2 Thermistor Probe

The Thermistor Probe Coefficients dialog (Figure 32) is used for calculating coefficients for thermistor probes.

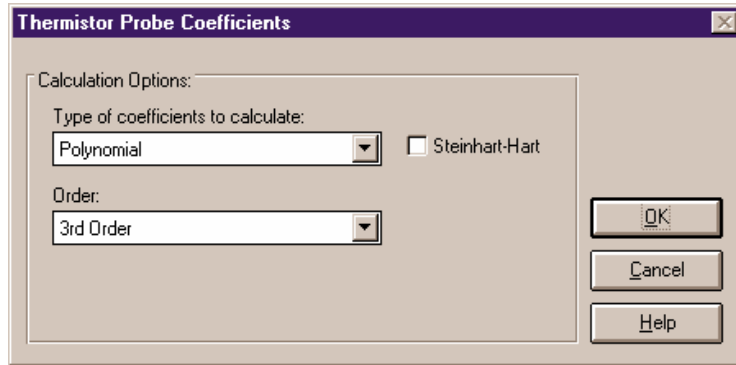


Figure 32 Thermistor Probe Coefficient Dialog

Enabled and Disabled

All options are enabled.

Dialog Information

The only type of coefficients that can be calculated for thermistor probes is polynomial. Both T(R) and R(T) polynomial coefficients are calculated.

The valid orders of the polynomial for thermistor probes are from 3rd to 6th order. The default for Thermistor probes is 3rd order. The number of coefficients calculated is one more than the order of the polynomial (i.e. for a 3rd order polynomial, 4 coefficients are calculated). The minimum number of set-points needed must exceed the order by 1 or more.

The user is allowed to select whether or not the Steinhart-Hart method is used when the coefficients are calculated. When Steinhart-Hart is selected, the third coefficient (squared term) is set to 0.0. Refer to Section 4.10, Polynomial Requirements for more information about the Steinhart-Hart method.

Note: The accepted thermistor model is based upon the logarithmic resistance-temperature characteristic in terms of absolute temperature (Kelvin). The accuracy of a model based upon °F or °C has not been tested. Therefore, Generate-*it* always calculates polynomial coefficients for thermistor probes using Kelvin. If Reference readings are entered in °F or °C, Generate-*it* converts the readings to their Kelvin equivalent val-

ues before the fit is computed.

The OK button displays the Calculate Coefficients dialog. See Section 4.4.

The Cancel button returns to the Generate-*it* Main Display.

4.3 Thermocouple Probe

The Thermocouple Probe Coefficients dialog (Figure 33) is used for calculating coefficients for thermocouple probes.

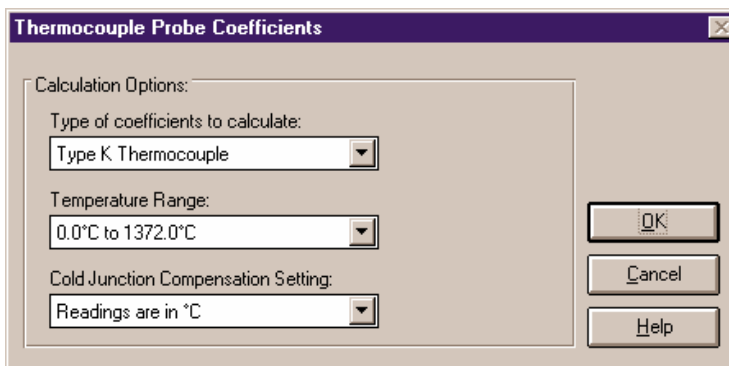


Figure 33 Thermocouple Probe Coefficient Dialog

Enabled and Disabled

All options are enabled.

Dialog Information

The type of coefficient choices are: B, E, J, K, N, R, S, T, and Gold-Platinum. The default is Type K.

The temperature range is dependent on the thermocouple type and requirements. Thermocouple requirements are explained in Section 4.11, Thermocouple Requirements.

The Calibrate-*it* Software can be configured to take CJC readings for thermocouple probes. The Generate-*it* Software needs to know the scale of those readings. If CJC readings are not required or were not taken, select “Do not use CJC in calculations”. The CJC readings are ignored. If you select any other option, the test probe readings are compensated according to the CJC readings for each set-point before calculating the coefficients.

The OK button displays the Calculate Coefficients dialog. See Section 4.4.

The Cancel button returns to the Generate-*it* Main Display.

4.4 Calculate Coefficients

The Calculate Coefficients dialog (Figure 34) is displayed when the OK button is pressed from the Coefficient Calculation dialog.

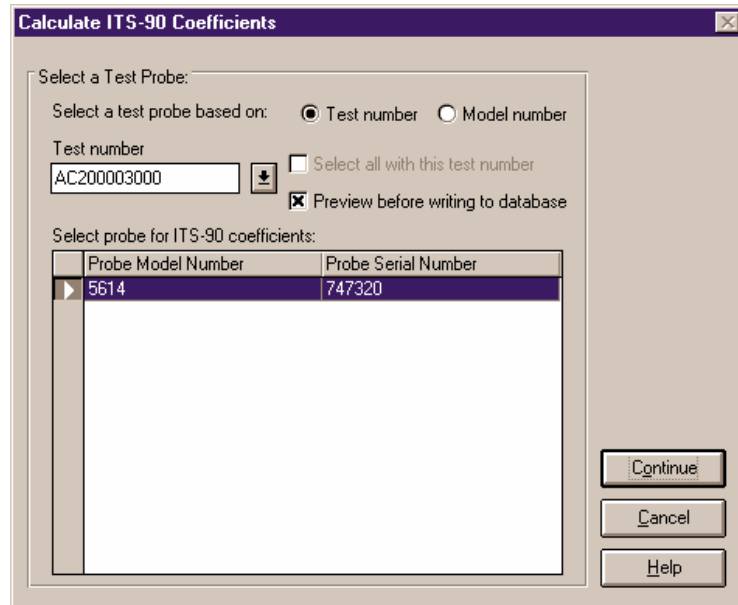


Figure 34 Calculate Coefficients Dialog

Enabled and Disabled

The Continue button is disabled until either a test number or model number is selected and test probes are selected. A test number must be selected if the “Select a test probe based on” option is set to test number. If the “Select a test probe based on” option is set to model number, then a model number must be selected.

The “Select all with this test number” check box is enabled only when selecting test probes based on a test number.

Dialog Information

To calculate coefficients for a test probe, you must select either a test

number or a model number on which to base the test probe selection.

If the test number option is selected, a list of test numbers becomes available. Select a test number. Once the test number is selected, the probe model numbers and serial numbers appear in the “Select probe” list.

If the model number option is selected, a list of probe model numbers becomes available. Select a model number. Once the model number is selected, the probe serial numbers and test numbers for this model appear in the “Select probe” list.

Select the test probes that the selected type of coefficients are to be calculated from the “Select probe” list.

If the “Select all with this test number” check box is selected, coefficients are calculated for all probes associated with this test number. If not selected, coefficients are calculated only for the highlighted test probe in the “Select Probe” list.

If the “Preview before writing to database” check box is selected, the coefficients and residuals are displayed on the Coefficients and Residuals dialog after being calculated. The user is asked whether to save the coefficients. If this check box is not selected, the user is not prompted to save the coefficients to the database after they are calculated.

The Continue button causes the Generate-*it* Software to verify that the reference probe and test probe scales (readout units) meet the requirements and that there are a sufficient number of set-points to calculate the selected type of coefficients. If all requirements are met, the Select Set-points dialog (Figure 35) is displayed. If the requirements are not met, a message is displayed explaining the requirements.

The Cancel button returns to the Generate-*it* Main Display.

4.5 Select Set-points

The Select Set-points dialog (Figure 35) is displayed when the Continue button is pressed from the Calculate Coefficients dialog.

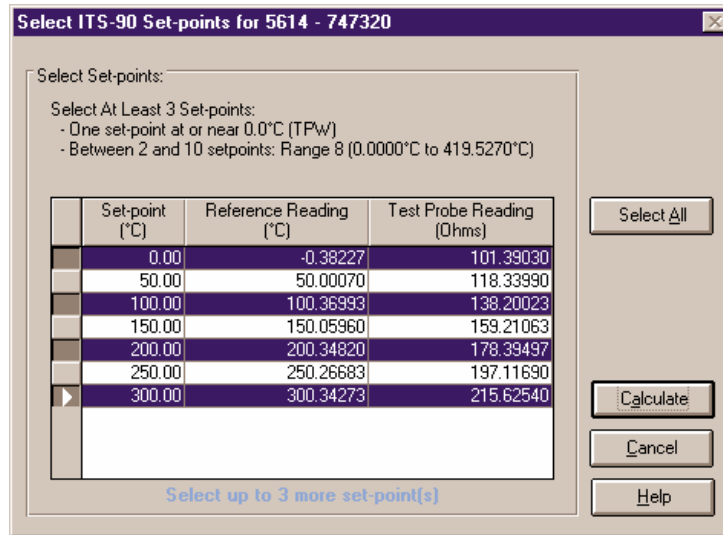


Figure 35 Select Set-points Dialog

Enabled and Disabled

The Calculate button is disabled until acceptable set-points have been selected.

The Select All button is enabled only when all set-points can be used to calculate the coefficients.

Dialog Information

The Select Set-points dialog (Figure 35) displays all of the set-points that were collected by the Calibrate-*it* Software for the selected test probe. Select the set-points to use for calculating coefficients. Instructions pertaining to the set-point requirements for the selected coefficients are displayed at the top of this dialog. For more information on these requirements see the following:

- ITS-90 Requirements Section 4.7 on page 58.
- IPTS-68 Requirements Section 4.8 on page 60.
- Callendar-Van Dusen Requirements Section 4.9 on page 61.
- Polynomial Requirements Section 4.10 on page 62.
- Thermocouple Requirements Section 4.11 on page 63.

Information about the number of set-points that can be selected appears at the bottom of the dialog. All of the displayed set-points can be selected by pressing the Select All button.

If the “Preview before writing to database” check box was selected on the Calculate Coefficients dialog, the Coefficients and Residuals dialog is displayed after the Calculate button is selected. Otherwise, the coefficients are automatically written to the database.

The Calculate button causes the software to evaluate your choice of set-points and to calculate the coefficients.

- If a problem or error is detected, a message is displayed.
- If there are no problems detected, the software calculates the coefficients.

When calculating Polynomial coefficients for Platinum probes, the Select Calculation Scale dialog (Figure 36) is displayed prior to calculating coefficients. Some instruments that use Polynomial coefficients require the coefficients to be calculated using a specific temperature scale. The Generate-*it* Software allows the user to select the scale to use:

- If the Reference readings are in °C, the user may select between °C and K.
- If the Reference readings are in °F, the user may select between °F and K.
- If the Reference readings are in K, coefficients will automatically be calculated using K.

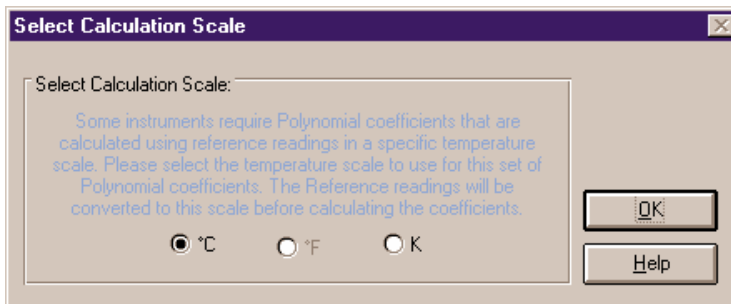


Figure 36 Select Calculation Scale Dialog

Many readout instruments that accept Polynomial coefficients require that the coefficients be calculated using Reference readings in a particular temperature scale. This feature allows Reference readings to be used as acquired by Calibrate-*it* (with no conversion) or to be converted auto-

matically to Kelvin by *Generate-it*.

Note:

- *Generate-it* does not provide the option of converting Reference readings from °F to °C nor vice-versa. Also, if Reference readings were acquired in Kelvin, the Select Calculation Scale dialog will not appear and Polynomial coefficients will automatically be calculated using Kelvin.
- The accepted thermistor model is based upon the logarithmic resistance-temperature characteristic in terms of absolute temperature (Kelvin). The accuracy of a model based upon °F or °C has not been tested. Therefore, *Generate-it* always calculates polynomial coefficients for thermistor probes using Kelvin. If Reference readings are entered in °F or °C, *Generate-it* converts the readings to their Kelvin equivalent values before the fit is computed.

Select the OK button in the Select Calculation Scale dialog to calculate the coefficients.

The Cancel button returns to the Calculate Coefficients dialog where another test probe can be selected.

4.6 Coefficients and Residuals

The Coefficients and Residuals dialog (Figure 37) is displayed when the Calculate button is pressed from the Select Set-points dialog if the “Preview before writing to database” check box was selected on the Calculate Coefficients dialog.

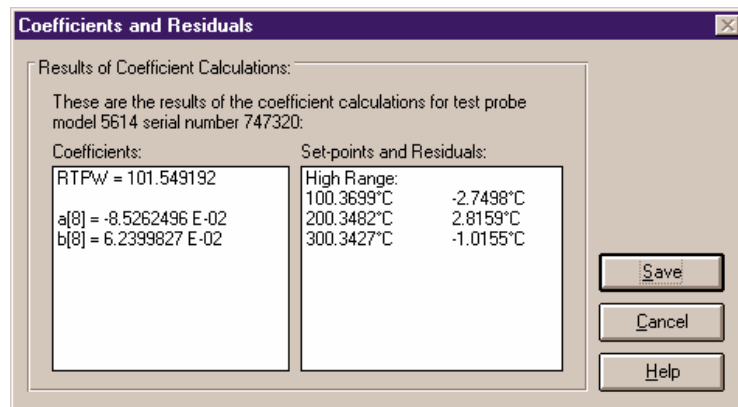


Figure 37 Coefficients and Residuals Dialog

Enabled and Disabled

The Set-points and Residuals list is disabled when calculating IPT-68 coefficients because residuals are not calculated.

Dialog Information

The calculated coefficients are displayed in the scrollable “Coefficients” list. The set-points used to calculate the coefficients and the resulting residuals are displayed in the scrollable “Set-points and Residuals” list.

If ITS-90 coefficients were calculated, the set-points used for the low and the high ranges (as applicable) are displayed in separate sections. The Triple-Point of Water set-point does not appear in the “Set-points and Residuals” list because the residual at the Triple-Point of Water is always 0.0.

The Residuals are always displayed in the same scale as the Reference readings (resistance based probes) or UUT readings (thermocouples). For Thermistor probes, residuals are always displayed in millidegrees.

The Save button attempts to write the coefficients, residuals, and raw data used to perform the calculations to the database for use in printing the Report of Calibration. If a set of coefficients already exists in the database and the “Prompt before overwriting existing coefficients in database” check box is selected on the File | Defaults Coefficients tab, the user is prompted whether to overwrite the existing coefficients.

The Cancel button returns to the Calculate Coefficients dialog or continues on to the next probe when calculating coefficients for multiple probes.

4.7 ITS-90 Requirements

The following requirements must be met when ITS-90 is selected as the type of coefficients to calculate for Platinum probes. For more information concerning the method used to calculate the ITS-90 coefficients, see Section 4.12, Methods Used for Calculating Coefficients.

1. The reference probe readings must be in temperature (°C, °F or K).
2. The UUT (test probe) readings must be in resistance (Ohms or KOhms).
3. At least 2 set-points must be used, but no more than 21 set-points can be used. The actual minimum and maximum num-

ber of set-points that can be used depends on the selected Low Range and High Range.

4. There must be one set-point within a few degrees of the Triple-Point of Water (preferably as close to it as possible).
5. Low Range criteria:
 - a) The following Low Ranges can be selected
 - i) None
 - ii) Range 4 (-189.3442°C to 0.01°C)
 - iii) Range 5 (-38.8344°C to 29.7646°C)
 - b) Both Ranges 4 and 5 require the Triple-Point of Water set-point and at least 2 and no more than 10 additional set-points.
 - c) All set-points should fall within the temperature range of the selected Low Range.
6. High Range criteria:
 - a) The following High Ranges can be selected
 - i) None
 - ii) Range 6 (0.0°C to 961.78°C)
 - iii) Range 7 (0.0°C to 660.323°C)
 - iv) Range 8 (0.0°C to 419.527°C)
 - v) Range 9 (0.0°C to 231.928°C)
 - vi) Range 10 (0.0°C to 156.5985°C)
 - vii) Range 11 (0.0°C to 29.7646°C)
 - b) All Ranges require the Triple-Point of Water set-point and the following:
 - i) Range 6 requires at least 4 and no more than 10 set-points.
 - ii) Range 7 requires at least 3 and no more than 10 set-points.
 - iii) Ranges 8 and 9 require at least, 2 but no more than 10 set-points.
 - iv) Ranges 10 and 11 require at least 1 but no more than 10 set-points.
 - c) All set-points should fall within the temperature range of the se-

lected High Range.

7. Selecting None for both the Low Range and the High Range is not permitted.
8. The following ITS-90 coefficients are calculated for each range:
 - a) Resistance of the Triple-Point of Water (RTPW) (always calculated)
 - b) Low Ranges
 - i) Range 4: a4 and b4
 - ii) Range 5: a5 and b5
 - c) High Ranges
 - i) Range 6: a6, b6, c6 and d
 - ii) Range 7: a7, b7 and c7
 - iii) Range 8: a8 and b8
 - iv) Range 9: a9 and b9
 - v) Range 10: a10
 - vi) Range 11: a11
9. The residuals are calculated for each set-point used in calculating the coefficients with the exception of the Triple-Point of Water set-point. Residuals are always in the same scale as the Reference Probe readings.

4.8 IPTS-68 Requirements

The following requirements must be met when IPTS-68 is selected as the type of coefficients to calculate for Platinum probes. For more information concerning the method used to calculate the IPTS-68 coefficients, see Section 4.12, Methods Used for Calculating Coefficients.

1. The Reference Probe readings must be in temperature ($^{\circ}\text{C}$, $^{\circ}\text{F}$ or K).
2. The UUT (test probe) readings must be in resistance (Ohms or $\text{K}\Omega$ s).
3. Exactly 4 set-points must be used:

- a) One set-point must be within a few degrees of 0°C (32°F or 273.15K) (preferably as close to 0°C as possible).
 - b) One set-point must be below 0°C.
 - c) Two set-points must be above 0°C.
4. The following IPTS-68 coefficients are always calculated:
 - a) R0
 - b) ALPHA
 - c) DELTA
 - d) a4
 - e) c4
 5. The residuals are not calculated when calculating IPTS-68 coefficients.

4.9 Callendar-Van Dusen Requirements

The following requirements must be met when Callendar-Van Dusen is selected as the type of coefficients to calculate for Platinum probes. For more information concerning the method used to calculate the Callendar-Van Dusen coefficients, see Section 4.12, Methods Used for Calculating Coefficients.

1. The Reference Probe readings must be in temperature (°C, °F or K).
2. The UUT (test probe) readings must be in resistance (Ohms or KOhms).
3. At least 3 set-points must be used but no more than 10 set-points can be used. If any one of the set-points is below 0°C (32°F or 273.15K), at least 4 set-points must be used.

Note: This software automatically determines if the BETA coefficients need to be calculated based on the following criteria:

- The Reference reading closest to 0°C is not used to determine whether BETA is calculated.
- If any other Reference reading is below 0°C, BETA will be calculated.

- Otherwise, BETA will not be calculated.
- 4. One of the set-points used should be close to 0°C. This is not a requirement, however, results of the calculations become less reliable when no reading is near 0°C because the software must extrapolate this reading.
- 5. The following Callendar-Van Dusen coefficients are calculated:
 - a) R0
 - b) ALPHA
 - c) DELTA
 - d) BETA (only calculated according to step 3 above)
- 6. The residuals are calculated for each set-point used in calculating the coefficients. Residuals are always in the same scale as the Reference Probe readings.

4.10 Polynomial Requirements

The following requirements must be met when Polynomial is selected as the type of coefficients to calculate for Platinum or Thermistor probes. For more information concerning the method used to calculate the Polynomial coefficients, see Section 4.12, Methods Used for Calculating Coefficients.

1. The Reference Probe readings must be in temperature (°C, °F or K).

Note: The accepted thermistor model is based upon the logarithmic resistance-temperature characteristic in terms of absolute temperature (Kelvin). The accuracy of a model based upon °F or °C has not been tested. Therefore, Generate-*it* always calculates polynomial coefficients for thermistor probes using Kelvin. If Reference readings are entered in °F or °C, Generate-*it* converts the readings to their Kelvin equivalent values before the fit is computed.

2. The UUT (test probe) readings must be in resistance (Ohms or KOhms).
3. The order of the polynomial must be selected. Allowable choices

are from 3rd order to 9th order for platinum probes and from 3rd order to 6th order for thermistor probes.

4. For thermistor probes, the Steinhart-Hart method may be selected. Studies have indicated no significant loss in accuracy when using the Steinhart-Hart method (eliminating the squared term) over the range of -2°C to 70°C (28°F to 158°F). The formula used when the Steinhart-Hart method is selected is:

$$\frac{1}{T} = a + b \ln(R_T) + d \ln^3(R_T)$$

For more information on this topic, refer to “Worldwide Capability in Thermistors”, Thermometrics, Inc., 1993, pages 14-15.

5. For normal calculations, at least 4 set-points must be used but no more than 10 set-points can be used.
6. For Steinhart-Hart calculations, only 3 set-points should be used.
7. The minimum number of set-points used must exceed the order of the polynomial by at least 1 (i.e. for a 5th order polynomial, at least 6 set-points must be used).
8. The following Polynomial coefficients are calculated:
 - a) $T(R)$ - Temperature as a function of Resistance: A, B, \dots, N (depending on the order of the polynomial)
 - b) $R(T)$ - Resistance as a function of Temperature: a, b, \dots, n (depending on the order of the polynomial)
9. The residuals are calculated for each set-point used in calculating the coefficients. Residuals are always in the same scale as the reference probe readings. For Platinum probes, the residuals are in degrees. For Thermistor probes, residuals are in millidegrees.

4.11 Thermocouple Requirements

The following requirements must be met when calculating coefficients for Thermocouple probes. For more information concerning the method used to calculate the Thermocouple coefficients, see Section 4.12, Methods Used for Calculating Coefficients.

1. The Reference Probe readings must be in temperature ($^{\circ}\text{C}$, $^{\circ}\text{F}$ or K).

Note: The algorithm used to calculate thermocouple coefficients forces the EMF at 0°C to $0.0\mu\text{V}$. Therefore, using a set-point at or near 0°C when calculating thermocouple coefficients may cause erroneous results. For best results, use at least two set-points that are not near 0°C (more than $\pm 5^{\circ}\text{C}$).

2. The UUT (test probe) readings must be in Voltage (mV or μV). At least 2 set-points must be used but no more than 10 set-points can be used.
3. The CJC readings, if used, can be in either temperature ($^{\circ}\text{C}$ or $^{\circ}\text{F}$) or voltage (mV or μV). If no CJC readings are needed, a scale does not need to be selected.
4. The Thermocouple type must be selected. The following types can be selected:
 - a. Type B
 - b. Type E
 - c. Type J
 - d. Type K
 - e. Type N
 - f. Type R
 - g. Type S
 - h. Type T
 - i. Type AuPt (Gold-Platinum)
5. The temperature range for the Thermocouple type must be selected. The following ranges can be selected:

Type	Range 1	Range 2	Range 3	Other
Type B	0 to 630.615°C	630.615 to 1820°C	N/A	N/A
Type E	-270 to 0°C	0 to 1000°C	N/A	N/A
Type J	-210 to 760°C	760 to 1200°C	N/A	N/A
Type K	-270 to 0°C	0 to 1372°C	N/A	N/A
Type N	-270 to 0°C	0 to 1300°C	N/A	N/A
Type R	-50 to 1064.18°C	1064.18 to 1664.5°C	1664.5 to 1768.1°C	-50°C to 1768.1°C (using extrapolation)*
Type S	-50 to 1064.18°C	1064.18 to 1664.5°C	1664.5 to 1768.1°C	-50°C to 1768.1°C (using extrapolation)*
Type T	-270 to 0°C	0 to 400°C	N/A	N/A
Type AuPt	0 to 1000°C (8th order Canadian Polynomial)	0 to 1000°C (9th order American Polynomial)	N/A	N/A

*Selecting this range allows *Generate-it* to automatically select the appropriate reference function to use to calculate the EMF at each temperature. Selecting one of the other ranges forces *Generate-it* to use the reference function for the selected range to calculate the EMF for ALL temperatures.

6. Each set-point for Thermocouple probes can have an associated Cold Junction Compensation (CJC) reading. The UUT reading at each set-point is adjusted according to the CJC value for that set-point prior to calculating coefficients. The UUT readings are not adjusted prior to calculating coefficients if the “Do not use CJC in calculations” option is selected.
7. The residuals are calculated for each set-point used in calculating the coefficients. For Thermocouple probes, the residuals are in the same scale as the UUT readings (mV or μ V).
8. The following Thermocouple coefficients are calculated: (The values of these coefficients are the sum of the standard coefficients and the deviation calculated using the selected set-points.)
 - a. c1
 - b. c2
9. The following standard Thermocouple coefficients are also produced unaltered:

Type	Range 1 Coefficients	Range 2 Coefficients	Range 3 Coefficients	Other
Type B	c3...c6	c0, c3...c8	N/A	N/A
Type E	c3...c13	c3...c10	N/A	N/A
Type J	c3...c8	c0, c3...c5	N/A	N/A
Type K	c3...c10	c0, c3...c9	N/A	N/A
Type N	c3...c8	c3...c10	N/A	N/A
Type R	c3...c9	c0, c3...c5	c0, c3...c4	c3...c9
Type S	c3...c8	c0, c3...c4	c0, c3...c4	c3...c8
Type T	c3...c14	c3...c8	N/A	N/A
Type AuPt	c3...c8	c3...c9	N/A	N/A

4.12 Methods Used for Calculating Coefficients

4.12.1 General

The thermometric expressions used by this software are well known expressions and as such are described in detail elsewhere. This section touches on some specifics as they relate to the methods used to arrive at solutions.

The coefficients for all solutions with the exception of the IPTS-68 platinum probe are calculated using matrix methods. The IPTS-68 platinum probe solution is calculated using iteration. The solutions are either exact solutions or over-determined solutions depending on the number of test points used in relation to the number of test points required. Exact solutions result when the exact number of test points required for simultaneous solution of sets of equations are used (i.e., two coefficients from two test points). Over-determined solutions result when more test points are used than the unknowns require (i.e., two coefficients from three or more test points).

4.12.2 ITS-90

The ITS-90 is expressed in terms of resistance ratio (W) vs. temperature (K) rather than resistance (R) vs. temperature. The resistance ratio is defined as the resistance at a temperature divided by the resistance at the Triple-Point of Water, or:

$$W = R(t)/R(tpw)$$

Because ratios are used in the ITS-90, the R_{TPW} is required in addition to the resistance values at the test temperatures, thus, three test points are required to solve for two coefficients. The example below shows a set of four equations representing data at five temperatures (R_{TPW} and resistance at four test temperatures) along with the matrix method used to

solve the over-determined set.

$$\begin{aligned} \Delta W_{T_1} &= [a(W_{T_1} - 1) + b(W_{T_1} - 1)^2] \\ \text{A } \Delta W_{T_2} &= [a(W_{T_2} - 1) + b(W_{T_2} - 1)^2] \\ \Delta W_{T_3} &= [a(W_{T_3} - 1) + b(W_{T_3} - 1)^2] \\ \Delta W_{T_4} &= [a(W_{T_4} - 1) + b(W_{T_4} - 1)^2] \end{aligned}$$

$$\text{B } \text{Matrix}_1 = \begin{bmatrix} \Delta W_{T_1} \\ \Delta W_{T_2} \\ \Delta W_{T_3} \\ \Delta W_{T_4} \end{bmatrix} \quad \text{Matrix}_2 = \begin{bmatrix} (W_{T_1} - 1) + b(W_{T_1} - 1)^2 \\ (W_{T_2} - 1) + b(W_{T_2} - 1)^2 \\ (W_{T_3} - 1) + b(W_{T_3} - 1)^2 \\ (W_{T_4} - 1) + b(W_{T_4} - 1)^2 \end{bmatrix}$$

$$\text{C } \text{Solution} = (\text{Matrix}_2^T \bullet \text{Matrix}_2)^{-1} \bullet \text{Matrix}_2^T \bullet \text{Matrix}_1$$

An exact solution (i.e., two unknowns in two equations) would be arrived at with the following operation:

$$\text{C' } \text{Solution} = \text{Matrix}_2^{-1} \bullet \text{Matrix}_1$$

4.12.3 IPTS-68

Like the ITS-90, the IPTS-68 is expressed in terms of resistance ratios. The denominator, however, is the resistance at the ice point (0.000°C) rather than the resistance at the Triple-Point of Water (0.010°C). This software allows only exact solutions for the IPTS-68 and uses iteration or simple algebra for the solutions.

4.12.4 Callendar-Van Dusen

The Callendar-Van Dusen expression is basically a third order polynomial with the third coefficient (β) set to zero above 0°C. The polynomial is expressed in terms of resistance vs. temperature in °C. It is solved by matrix methods in a similar manner as the ITS-90 expression shown above with temperature on the left of the equal sign and the polynomial on the right. The software allows for over-determined solutions. Only data above 0°C is used for solution of the first two coefficients (α and δ), data both above and below 0°C is used for solution of β .

4.12.5 Polynomial and Thermocouple

Polynomial solutions are arrived at using matrix methods as with the ITS-90 and the Callendar-Van Dusen. Platinum probes require polynomials expressed in terms of resistance vs. temperature. Thermistor probes exhibit exponential resistance vs. temperature relationships and the polynomials used are exponential expressions in terms of resistance vs. temperature. The polynomials can be of any order up to 9th for platinum

probes and up to 6th for thermistor probes. The software allows for over-determined solutions. Thermocouple probes require polynomials expressed in terms of μV vs. temperature.

5 Utilities Menu

The Utilities Menu (Figure 38) allows the user to compact and repair the databases and to maintain test results stored in the database.

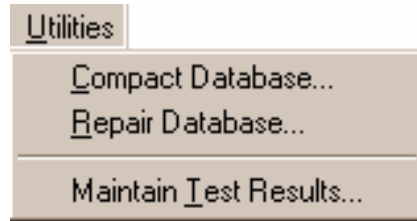


Figure 38 Utilities Menu

The HART2932.MDB database contains the calculated coefficients and raw data. The only time compact or repair is required is when the program prompts the user that the database is corrupt or needs compacting.

Enabled and Disabled

All options are enabled.

5.1 Compact Database

Selecting the Compact Database menu option displays the Windows® Open dialog. Select the database file to compact, then select the OK button. To abort the compact operation, select the Cancel button.

The following details outline the compact process:

1. The selected .MDB file is compacted to a file of the same name with a .CMP extension.
2. If a file of the same name with a .BAK extension exists, it is deleted.
3. The original .MDB file is renamed with a .BAK extension.
4. The .CMP file is renamed with a .MDB extension.

5.2 Repair Database

A database may become invalid if the application terminates irregularly due to a power outage or a computer shutdown. The Repair Database option attempts to fix the invalid database. The software attempts to compact the database automatically after it has been repaired.

5.3 Maintain Test Results

The Maintain Test Results dialog (Figure 39) is displayed when the Utilities | Maintain Test Results menu option is selected. The results of coefficient calculations performed by the Generate-*it* Software are stored in a database. Over time, this database can become very large and very slow. The Maintain Test Results menu option allows the user to remove old or unwanted coefficients from the database.

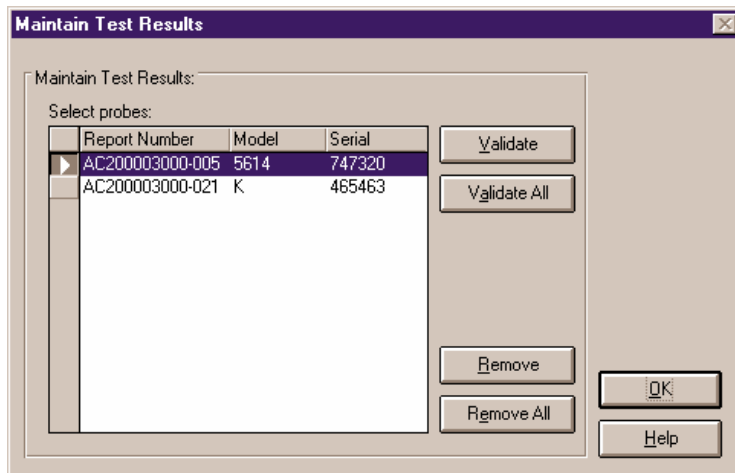


Figure 39 Maintain Test Results Dialog

Note: This feature does NOT determine the validity of coefficients calculated by the software. It determines only if a test probe is valid based on the presence or absence of information for the test in the database.

Enabled and Disabled

The Validate and Remove buttons are disabled until one or more test probes are selected.

The Validate All and Remove All buttons are disabled if there are no test probes.

Dialog Information

This dialog allows the user to determine the validity of test probe data and to remove data from the database. To validate or remove test probes from the database, select the test probes from the list provided and select the Validate or Remove button. To validate or remove all test probes, select the Validate All or Remove All button respectively. Test probe validation is explained in the following section.

Warning: Use caution when removing test probes. Once a test probe has been removed the Generate-*it* Software will not be able to print Reports of Calibration or tables for that test probe! All coefficient data is deleted permanently. For this reason the user must confirm removing records from the database.

5.3.1 Test Probe Validation

The Generate-*it* Software stores results of coefficient calculations in a table in the database. Other information required to print a Report of Calibration for the test probes is stored in many separate tables within the Calibrate-*it* Software database in a relational manner. If a test has been removed from the Calibrate-*it* Software, it may no longer be possible to print a Report of Calibration for a test probe in the Generate-*it* Software. If the database became corrupt, some of the data for a particular test probe may have been lost. These are a couple of the reasons why test probe data may not be valid.

The validation feature of the Generate-*it* Software can be used to determine if there are records for every test in every table.

Selecting the Validate or Validate All buttons on the Maintain Test Results dialog performs a check on the selected test probes to see if there are records required to print a Report of Calibration in each of the database tables for the test probe. If the software determines that required records are missing (a test probe is invalid), the Invalid Test Probe dialog (Figure

40) is displayed. Otherwise, a message appears stating the validity of the test probes.

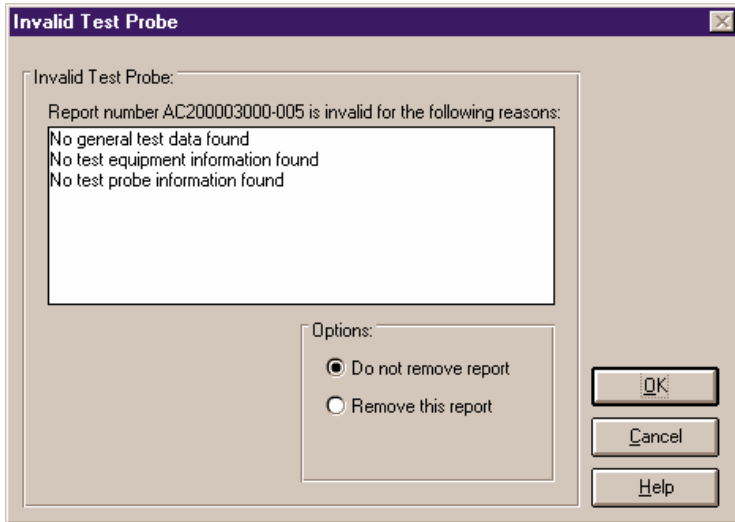


Figure 40 Invalid Test Probe Dialog

The Invalid Test Probe dialog displays information about the test probe that is being validated. The “Report number is invalid for the following reasons” list at the top of the dialog shows the reasons why the test probe is invalid.

Based on the information provided, the user must decide what to do with the test. The options available to the user are to not remove or to remove the selected test probes. Selecting the “Do not remove report” option leaves the test probe as is. Selecting the “Remove this report” option permanently removes the test probe coefficients data from the Generate-*it* database. Information about the test, test equipment, and test readings are located in the Calibrate-*it* database and cannot be removed by the Generate-*it* Software.

The OK button performs the selected option and continues on to the next test probe or returns to the Maintain Test Results dialog.

The Cancel button closes this dialog and ignores the selected option.

6 Help Menu

The Help Menu (Figure 41) provides a method for accessing help through the help file contents, search on a specific topic of the software, and on how to get started. The Technical Support phone numbers and software version number are also available from the Help menu.

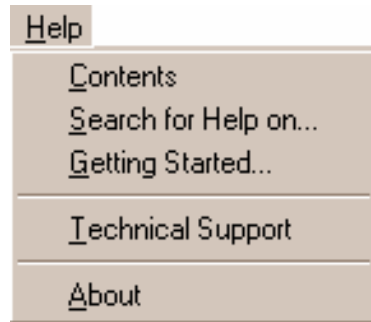


Figure 41 Help Menu

Enabled and Disabled

All options are enabled.

6.1 Contents

The Contents menu option displays the Generate-*it* Software Help contents.

6.2 Search for Help On

The Search for Help on menu option opens the Generate-*it* Software help file with the Windows® Help Search dialog open. Select or enter a keyword to search for a topic or select Cancel to exit to the help file.

6.3 Getting Started

The Getting Started menu option opens the Help file Getting Started topic and explains how to begin using the Generate-*it* Software. The Generate-*it* Software requires the user to select the type of probe for which coefficients are to be calculated, the type of coefficients to calculate and to select the set-points to use. To select the type of probe, use the Coefficients menu. The software guides you through the next steps.

The Generate-*it* Software cannot be used without the Calibrate-*it* Software. The software requires access to test information stored in the Calibrate-*it* Software database. If you have run a test using the Calibrate-*it* Software proceed with the Generate-*it* Software.

6.4 Technical Support

Technical support for the Generate-*it* Software can be obtained by calling, faxing, or sending E-Mail to Hart Scientific, Technical Support.

- Phone: 1-800-438-4278 or (801) 763-1600
- Fax: (801) 763-1010
- E-Mail Address: support@hartscientific.com

Before calling for Technical Support, check the Help file topics listed below to see if the problem you are having is described there:

1. Messages
2. Requirements
3. Calculating Coefficients

When calling or sending a fax, please send or have the following information ready:

1. Name of Software (2932 Generate-*it* Software)
2. Software version as found on the Help | About dialog
3. Detailed description of the problem
4. What you were doing when the problem arose
5. The exact wording of any messages you received
6. Any other information that may help to solve the problem

6.5 About

The About Generate-*it* dialog (Figure 42) displays the software version

number, the year the version was released, and specific information about the computer.

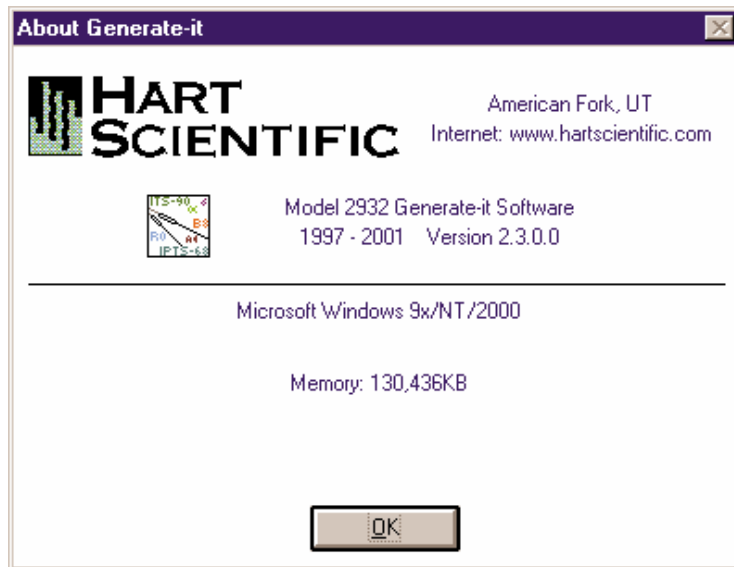


Figure 42 About Generate-it Dialog

7 Report Viewer Utility

A new feature in Generate-*it* version 2.3 allows a Report of Calibration or table to be saved to a report file, which can then be stored on diskette or e-mailed to someone else.

The Report Viewer Utility (Figure 43) allows report files to be opened, viewed, and printed. This utility can be installed on any computer where report files need to be accessed.

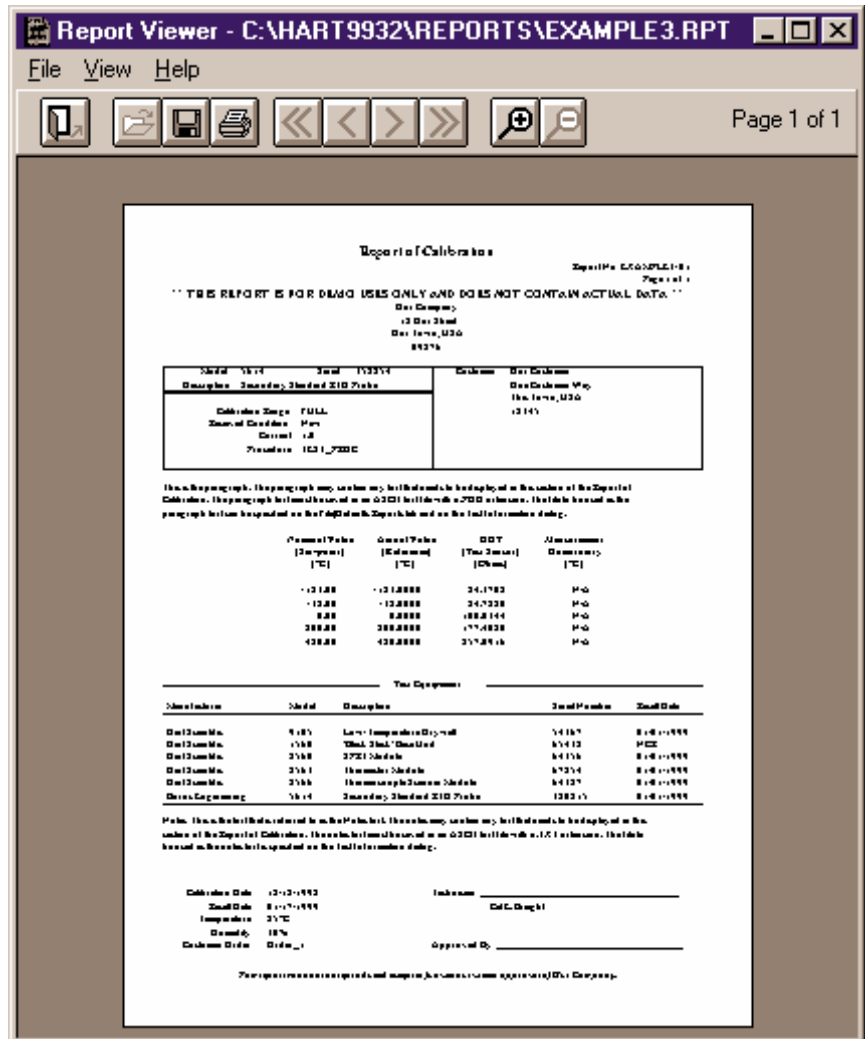


Figure 43 Report Viewer Utility

The Report Viewer Utility is very similar to the Print Preview window with a few enhancements. This utility allows a single report file to be opened and viewed at a time. The currently open report file must be closed before another file can be opened.

Report files can be saved only from the Print Preview window and have an extension of .RPT.

There are three menus: File, View, and Help.

File Menu - The File menu provides options for opening, saving, closing and printing report files.

View Menu - The View menu provides options for navigating multi-page report files and zooming.

Help Menu - The Help menu provides an option to view the About dialog.

7.1 Limitations

There are a few known limitations to using the Report Viewer Utility. Please read the following information to avoid potential problems:

- Report files are somewhat dependent on the currently selected Windows® printer driver. For this reason, select the driver for the printer that is used to print the report prior to saving the report to a file. For example, if the report file is being e-mailed to a person who prints the report on a Hewlett-Packard LaserJet 4MP printer, select the same print driver is selected prior to previewing and saving the report to a file. Otherwise, reports may appear fine in the preview window but print incorrectly.
- Report files use a proprietary format and are not viewable by any other software such as Adobe® Acrobat Reader, word processors, or graphics applications. The Report Viewer Utility can be distributed freely to anyone who needs to view or print a report file. To create a distribution diskette for the Report Viewer Utility, please read the Making Report Viewer Utility Setup Diskette Section 7.3.
- Report files which contain a table may contain one or more “blank” pages before the actual table data starts. This is done to preserve the correct page numbering as selected when the table was generated. To avoid “blank” pages, start the page numbering for the table at page 1. Otherwise, simply discard the “blank” pages after printing the table.

7.2 Report Files

A new feature in Generate-*it* version 2.3 allows a Report of Calibration or table to be saved to a report file. Report files can be saved to a hard disk, floppy disk, burned onto a CD-ROM, or e-mailed to someone who may need to view or print the Report of Calibration or table.

The Recall Saved Report option has been added to the File menu to allow report files to be opened, viewed, and printed from within Generate-*it*.

Report files are stored in a proprietary file format. For this reason, report files cannot be viewed using Adobe® Acrobat Reader, word processors, or other graphics applications. For more information on installing and distributing this utility, see Section 7.3, Making Report Viewer Utility Setup Diskette.

Report files can only be saved from the Print Preview window. To save a Report of Calibration or table to a report file, follow the steps below.

1. Select the Print Reports and Tables option from the File menu.
2. On the Print Test Report dialog, select the appropriate test and probe.
3. Make sure the Preview Report check box is selected.
4. Make sure the 'Use default report template' option is selected on the Report Options dialog and/or the 'Use default table template' option is selected on the Table Options dialog.
5. Click the Print button to display the Report of Calibration in the Print Preview window.
6. When prompted, select the printer to which the Report of Calibration and/or table will be printed.

Note: Selecting the appropriate printer before saving the report file is very important. Please read Section 7.1, Limitations before continuing!

7. When the Print Preview window is displayed, click the Save As button on the toolbar (the Save As button has a picture of a floppy diskette on it).

8. Select the destination and enter the name of the report file. Report files should always be saved with an .RPT extension. Click the OK button to save the file.
9. Close the Print Preview window by clicking the Close button.

7.3 Making Report Viewer Utility Setup Diskette

Report files require a special utility to open, view, and print the Report of Calibration or table. Report files cannot be viewed using Adobe® Acrobat Reader, word processors, or other graphics applications.

For this reason, a special Report Viewer Utility has been included with *Generate-it* and *Calibrate-it*. This utility can be installed by selecting the Install Report Viewer Utility option when the software is installed.

This utility may be freely distributed to anyone who may need to open, view, and print a Report of Calibration or table from a report file. To distribute this utility, a Report Viewer Utility Setup Diskette needs to be created. To create a setup diskette, follow the instructions below.

1. Insert the *Calibrate-it* and *Generate-it* CD-ROM into your CD-ROM drive (if you received *Calibrate-it* and *Generate-it* on floppy diskettes, insert *Calibrate-it* Disk 4 of 4 into your floppy disk drive).
2. Using the File Manager (Windows® 3.x) or Windows® Explorer (Windows® 95/98/NT4/2000), locate the \9932\VIEWER directory (or the \VIEWER directory on floppy diskette).
3. Copy all of the files from this directory to a blank floppy diskette.

Note: Do not remove the \VIEWER directory or any of the files in it from the *Calibrate-it* floppy diskette as many of these files are required to install *Calibrate-it* itself.

4. Label the diskette: **Hart Scientific Report Viewer Utility Setup Diskette.**
5. From the floppy diskette, run the SETUP.EXE program to install the utility.

Optionally, you may create a ZIP file, which includes all of the files from the \9932\VIEWER (or \VIEWER) directory to facilitate attaching the utility to an e-mail.

Note: The Generate-*it* software itself may NOT be freely distributed!

8 Messages

The Generate-*it* Software Messages are divided into two categories: Error Messages and Other Messages. The Error Messages are all of the messages displayed because of an error due to input or conflict. The Other Messages are those messages displayed as feedback or information to the user.

Note: Not all of the messages the Generate-*it* Software generates are explained in this section of the manual. This section attempts to explain some of the more difficult-to-understand messages.

8.1 Error Messages

General Error Message

Message “An error occurred while *action*.”

[Error: *error number* - *error description*]"

Remarks This is a general error message. The *action* describes what the software was attempting to do when the error occurred. The *error number* – *error description* describes the error that occurred.

Database Messages

Message “An error occurred while attempting to *action* the database. [*other information*][Code: *code information*]

[Error: *error number* - *error description*]"

Remarks This error message appears when the software is not able to access the database. The *action* describes what the software was attempting to do when the error occurred. The other information gives more specific information as to the cause of the error. The *code information* describes the place in the software that the error occurred. The *error number* – *error description* describes the error that occurred. All of this information should be recorded when contacting Hart Scientific Technical Support for help.

Message “The database *filename* is currently locked by another application or computer. Select Retry to try again or Cancel to abort.”

Remarks The Generate-*it* Software is attempting to open the *file-name* database which is locked because it is opened exclusively either by another application on the same computer or, if on a network, by another computer. Close the database from the other application or computer, then select the Retry button. If the same error message appears again, the computer may need to be rebooted to unlock the database. Close all applications and reboot the computer.

Message “An error occurred attempting to connect to the databases. The databases may be corrupt.

[Error: *error number - error description*]

Select OK to attempt to repair and compact the databases or select Cancel to end.”

Remarks This error message may appear when the Generate-*it* Software is loading. The error number – error description describes the error that occurred. Most often, databases become corrupted by an unexpected power failure or other unexpected or fatal event. In most cases, repairing and compacting the database fixes this problem. Select the OK button. The Generate-*it* Software must be restarted.

Message “You must upgrade your Calibrate-*it* Software to version 3.0 or later to use this version of the Generate-*it* Software.”

Remarks The Generate-*it* Software version 2.0 and later requires the Calibrate-*it* Software version 3.0 or later to operate properly. Contact Hart Scientific Technical Support or Sales about upgrading the Calibrate-*it* Software.

8.2 Other Messages

Message “The report cannot be printed because there are no records in the table name table for test number test number. [Information required to print a Report of Calibration may have been deleted from the Calibrate-*it* Software.]”

Remarks The Generate-*it* Software cannot produce Reports of Calibration for a test probe if the information in the database is incomplete. This may occur if the test data for a test probe has been removed from the Calibrate-*it* Soft-

ware or from a loss of data due to database corruption. A test probe can be validated (checked for incomplete information) and/or removed from the database using the Utilities Maintain Test Results menu option.

Message “Custom [report][table] template files must be located in the *path* directory.”

Remarks In order to use a custom report or table template file, the file must be located in the directory specified by *path*. Custom template files must be able to find and access the Calibrate-*it* and Generate-*it* databases.

Message “The custom [table] template file *filename* does not exist. Select a valid custom [table] template file or select the ‘Use default [table] template’ option.”

Remarks The Generate-*it* Software was not able to locate the custom template file *filename*. Select a valid custom template or select the “Use default template” option.

Message “The Calibrate-*it* Software databases were not found in *path*. Click OK to specify the location of the Calibrate-*it* Software database files or click Cancel to abort.”

Remarks The Generate-*it* Software must access the Calibrate-*it* database to calculate coefficients or print Reports of Calibration. The location of the Calibrate-*it* database is set when the Generate-*it* Software is installed. This database has been moved or deleted. The new location of the Calibrate-*it* database must be specified.

Message “The database does not indicate the scale of the type measurements. Cannot continue.”

Remarks The Generate-*it* Software must know the scale of the readings taken by the Calibrate-*it* Software in order to properly calculate coefficients. The Calibrate-*it* database does not specify the scale for the readings specified by type. As a result, coefficients cannot be calculated.

Message “Cannot calculate coefficients for model number *model* serial number *serial* due to the following problems:

[The reference probe readings for this test probe are not in °C, °F or K.]

[The test probe readings for this test probe are not in *scale*]"

Remarks The Generate-*it* Software requires reference readings to be taken in temperature and test probe (UUT) readings to be taken in either resistance or voltage. The Generate-*it* Software cannot calculate coefficients for test probes where readings were not taken in these scales.

Message “The temperature value cannot be used because it does not fall within the selected ITS-90 range. Click OK to proceed without using this temperature in the coefficient calculations or click Cancel to re-select set-points.”

Remarks To calculate ITS-90 coefficients, the set-points used must fall within the temperature range of the selected ITS-90 low or high range.

Message “Warning: The selected temperature range exceeds the recommended range of *minimum* to *maximum*. Select OK to continue or select Cancel to abort.”

Remarks The selected minimum and maximum temperatures for generating a table exceed the recommended temperature range for the coefficients being used. In order to generate a table over the range specified, the Generate-*it* Software must use extrapolation. For recommended temperature ranges for generating tables, see the Table Temperature Range Chart. If the selected minimum and maximum temperatures are too extreme, the algorithms used to calculate the table values may not produce correct results. The Generate-*it* Software has been thoroughly tested over the recommended temperature ranges and found to produce correct results.

9 Glossary

actual value

The value read from the reference probe.

ambient humidity

The room humidity when the test was started.

ambient temperature

The room temperature when the test was started.

approver

The person who approves the Report of Calibration.

calibration date

The date on which the instrument or probe was last calibrated.

calibration interval

The length of time, from the time the probe is calibrated, until the next calibration is due.

calibration range

The range over which the test probe was calibrated (full or limited.)

Check Standard

Used to indicate that the probe is a statistical check standard.

coefficients

The requested calculated coefficients.

compact database

Compacting the database speeds access to the records in the database.

company address

The address of the company performing the test.

company name

The name of the company performing the test.

current

The amount of excitation or source current (in mA or μ A) used when taking readings from test probes.

customer address

The address of the company for which the calibration is being performed.

customer name

The name of the company for which the calibration is being performed.

customer order id

The Customer Order ID provides a place for entering a purchase order, sales order, or other order identifying information for each test probe.

help balloons

The yellow boxes with words that appear below and to the side of the toolbar buttons when the mouse is passed over them.

in-house calibration

The calibration test is being performed on test probe(s) used internal to the company performing the calibration.

model number

The model number of the probe.

notes

The notes can contain any miscellaneous information pertaining to the test. The notes are entered from the Calibrate-*it* Software.

paragraph

The paragraph should contain information specific to the traceability of the test equipment as well as conformity information. The paragraph is entered from the *Calibrate-it* Software.

RTPW

The resistance of a platinum probe at the Triple-Point of Water, which is 0.01°C.

raw data

The reference probe readings and test probe readings used to calculate the coefficients.

recall date

The date on which the instrument or probe is due for recalibration. Recall date is synonymous with recalibration date.

received condition

The received condition is the condition of the test probe when it was received.

reference probe readings

The reading taken from the reference readout device to which the reference probe is connected. These readings are taken by the *Calibrate-it* Software.

report number

The number printed on the Report of Calibration. The report number is a unique number consisting of the test number and the scanner channel to which the test probes is connected. These two pieces of information are concatenated together with a dash.

report template

The template used to preview and print the Report of Calibration.

residuals

The difference between the measured and actual values at the set-points used to calculate coefficients.

serial number

The serial number of the probe.

table template

The template used to preview and print the generated table information.

technician name

The name of the person performing the test.

test date

The date the test was performed.

test equipment

The reference readout, reference probe, scanner, and heat sources used to collect the test probe readings.

test number

A set of number and/or characters that uniquely identifies the test for which coefficients are being calculated.

test probe

A probe that was calibrated with the Calibrate-*it* Software. Test Probe is synonymous with UUT.

test probe information

Lists the model number, serial number, and a description of the test probe.

test procedure

The control number of the documented procedure used by your company to perform the calibration test.

Toolbar

The strip of buttons across the top of the screen on the Generate-*it* Main Display screen.

Triple-Point of Water

The temperature at which the 3 states of water are all present (0.01°C).

UUT

Stands for Unit Under Test. On the Report of Calibration, UUT refers to the value read from the test probe.

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