S430 CALIBRATION

SOFTWARE MANUAL

Part No. 09-0284

REVISION A

January 14, 2003

Document History

Rev A	**Initial Release**	**1/14/03**	**J. S. W.**

Proprietary Rights Notice

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1. GENERAL INFORMATION

1.1 Overview

The S6000 Load and DC Source Calibration Reference along with an external DMM and computer allow a user to calibrate individual S6000 modules. Other than connecting cables this calibration is completely automatic.

This Cal. Ref. includes three precision shunts 0.6 amp, 6 amp and 60 amp. These shunts are used to calibrate the current of both the load and sources. A 5 volt source is included in the Cal. Ref. to supply the current for the current calibration. Two voltage sources, 110V and 330V are also included in the Cal. Ref. These sources are used to calibrate voltage readback on the Load.

To maintain the high accuracy required the shunts are mounted to an aluminum mass, which is temperature controlled. There is a front panel LED, which illuminates indicating when the mass is being cooled.

Switching within the Cal. Ref. is controlled by the external computer via RS232. The external DMM is read via IEEE488. The module being calibrated is controlled via RS232 of the S430 chassis. All this communication is initiated by the external computer.

Measurements made during calibration of the Cal. Ref. are traceable to the U.S. National Institute of Standards and Technology. We recommend a two year calibration cycle. A calibration procedure, 19-0209 has been provided to allow any certified calibration facility to calibrate the Cal. Ref.

1.2 Calibration Support Equipment Required

The calibration process requires an external IEEE controlled HP3458A Digital Multimeter, a Wavetek 9100 precision voltage source or equivalent (without the 9100 only manual EMS calibration is capable) and a Computer with the following specifications:

1.2.1 Computer:

National Instruments IEEE488.1 card: GPIB-PC2/2A or AT-GPIB
IEEE488.1 Cable
RS232 communication cable which mates to a 15 pin RS232 connector on Cal. Ref.
RS232 communication cable which mates to a 15 pin RS232 connector on the EMS.
2 Serial COMM ports

1. N.H. Research emPower class computer.
   a) Celeron 400 Mhz or better.
   b) *em**Power*** ® 430 Version 1.00 or later.
   c) 2 available RS-232 ports.
   d) GPIB-PC, GPIB-AT, or GPIB-PCI Board.

e) Parallel printer port or LAN card with access to LAN printer. (Optional)

1.2.2 Required Hardware

2. Parallel Printer or access to LAN printer.
   (Optional: required for hardcopy of test results only).
3. N.H. #12-0035-04 Cable Assy, Coax RG174 BNC to BNC 4’
4. N.H. #12-0330-36 Cable Assy, Coax RG174 BNC to SMB w/Ballun 3’
5. N.H. #12-0643-02 Cable Assy, 430 Ext Mux Relays
6. N.H. #6354231 Dual Banana to BNC Female Adaptor
7. (P/N 12-0478-00) 25pin Load Interface Cable.
8. (P/N 12-0477-00) Load Calibration Cable.
9. (P/N 12-0510-00) Source Calibration Cable.
10. (P/N 12-0643-02) EMS Calibration Cable.
11. RS-232 Cable Straight 9-pin male to either 9-pin female (#8030596)
    or to 25-pin female depending on COM port configuration.
    (Connects to RS232 COMM on UUT)
12. Wavetek Model 9100 Universal Calibration System with Oscilloscope Calibration Module.
13. Fluke Model 5500A Multi-product Calibrator with Oscilloscope Calibration option.
14. Fluke Model 5520A Multi-product Calibrator with Oscilloscope Calibration option.
15. NHR Calibration Reference.
16. HP 3458A DMM

1.3 Calibration Reference Specification

The instrument is provided with universal AC input voltage.

Input range:	90 - 132 VAC
	180 - 264 VAC
Frequency:	47 - 63 Hertz

1.3.1 Accuracy

Current:	0.6 amp range ± 0.12 milliamps
	6.0 amp range ± 2.0 milliamps
	60 amp range ± 8.0 milliamps
Voltage:	110 volts ± 20.0 millivolts
	330 volts ± 70.0 millivolts

1.3.2 Physical

Size:	3¼"(h) x 16¾"(w) x 21¼"(d)
Weight:	26 lb.

1.3.3 Airflow

A cooling fan is located at the rear of the enclosure. Air is drawn in from the ventilation hole located on the right side of the front panel. The air exits through the rear panel.

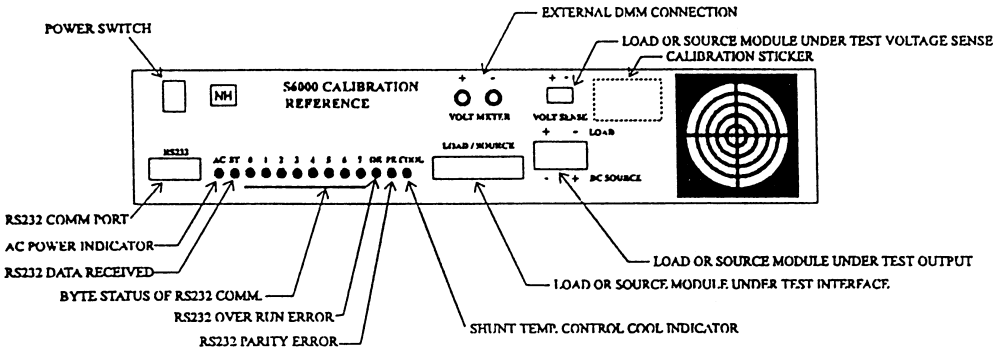
1.3.4 Serial Communications Port

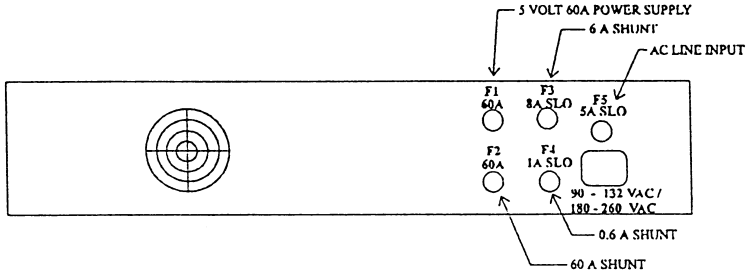
The S6000 Calibration Reference requires a serial communication line connected to the host computer. Make sure a valid port is selected before beginning the calibration process -- if the selected port is invalid a run-time error 68 (Device Unavailable) will be generated. In addition, the selected serial port must be capable of the following settings:

- 2400 Baud, No parity, 8 data bits, 1 stop bit

The settings will be programmed automatically by the calibration software.

1.3.5 Physical Description

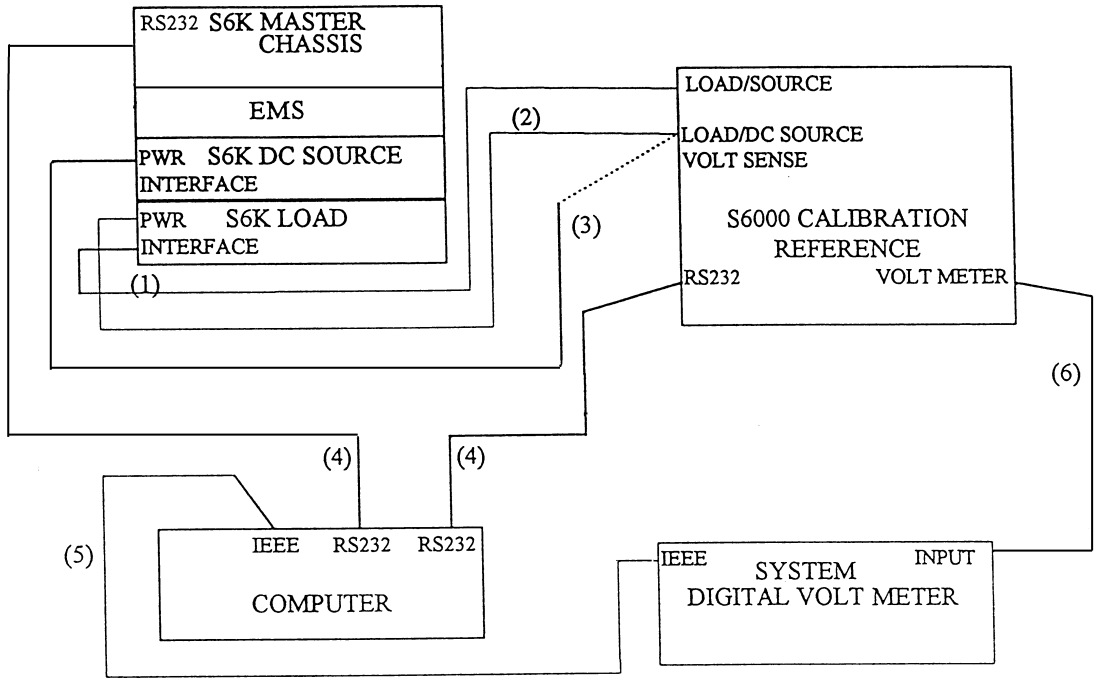




2. SETUP

2.1 Physical Hookup

S6k Source and Load Calibration



(1) This cable is provided with the S6000 Calibration Reference (P/N 12-0478-00). Connect one end to Load/Source of the Cal. Ref. and the other end to the Interface 25pin Interface connector of the Load Module being calibrated.

(2) Use only when calibrating Loads. This cable is provided with the S6000 Calibration Reference (P/N 12-0477-00). Connect one end to Load/DC Source of the Cal. Ref. and the other end to the Load power connector of the Load being calibrated.

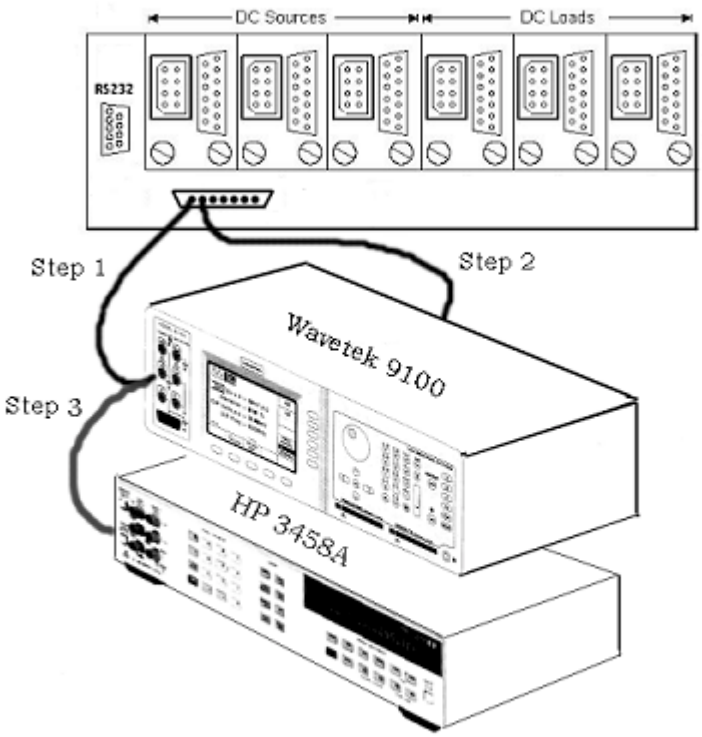
(3) Use only when calibrating DC Sources. This cable is provided with the S6000 Calibration Reference (P/N 12-0510-00). Connect one end to Load/DC Source of the Cal. Ref. and the other end to the DC Source power connector of the DC Source being calibrated.

(4) This cable connects the RS232 COMM port of the computer to the Calibration Reference. The Cal. Ref. end is a 9 pin DSUB. Connect the COMM port selected in software later to the other end of this cable.

(5) Standard IEEE488 cable. Two required.

(6) Dual Banana to BNC Female Adaptor NH #6354231

EMS Calibration Wiring



1. Connect EMS channel 1 to the front panel output of the Wavetek.
2. Connect EMS channel 2 to the back panel output "Sig Out" (O-Scope connection) of the Wavetek.
3. Connect the HP3458A front panel input to the front panel output of the Wavetek.

The EMS Calibration Cable P/N 12-0643-02.

WARNING: DURING PARTS OF THIS TEST, POWER SUPPLY VOLTAGES WILL BE SET TO LETHAL LEVELS. ASSUME THESE VOLTAGES ARE EVERYWHERE AND WILL GET YOU! EXERCISE EXTREME CAUTION AND DO NOT TOUCH ANYTHING ON THE S430 UNIT.

<u>Note:</u> *The specified **minimum** warm-up time for the HP3458A used for this calibration is 4 hours! This DMM should be left on at all times. Also perform the Auto Cal function on this DMM prior to starting this calibration procedure. See the instrument manual for more information.*

<u>Note:</u> *The S430 and the Wavetek 9100 Calibration System should be allowed to warm up **at least 30 minutes** prior to calibration, preferably 1 hour. Turn the Wavetek on if it is not already on and put a cover on the S430.*

2.2 Required Software

Windows 2000 or Windows XP operating system software must be loaded on the computer to perform this test. GPIB-PCII drivers (32-Bit) must be installed and configured based on the GPIB card and operating system being used. The *em**Power*** ® S430 Calibration Software N.H. #190xxxx is required to perform this test. National Instruments Visa 2.01 and IVI Engine version 1.83 or better.

3. INSTALLING EMPOWER CALIBRATION

To install S430 calibration you will need approximately 3 MB of free hard disk space. An automated SETUP program is provided to guide you through the installation. The default target directory (the directory where emPower Calibration resides) is C:\Program Files\NH Research\emPower\calibration
The setup program will walk you through the installation process.

To install *emPower*® Calibration:

1. Insert the *emPower*® Calibration CD into the appropriate drive.
2. The installation screen is automatically displayed.

Note: *If the install screen is not displayed then Click Start and select Run. In the Open text box type:*

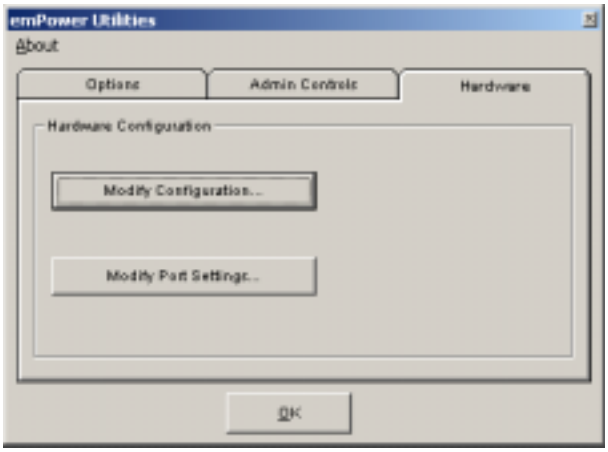
D:\ SETUP.EXE

(Enter the CD-ROM drive letter that contains the *emPower*® Calibration CD)

3. On the Welcome panel, click on the Next button.
4. Read the END-USER LICENSE AGREEMENT FOR EMPOWER SOFTWARE and click the Yes button if you accept the terms of the license agreement and wish to continue with the installation of the emPower calibration software.
5. A complete National Instruments IVI installation will commence. (required)
6. Select the installation directory from the Choose Destination Location dialog and click the Next button. Click the Browse button to select a different installation directory if desired.
7. *emPower*® calibration software will now be installed in the target directory.

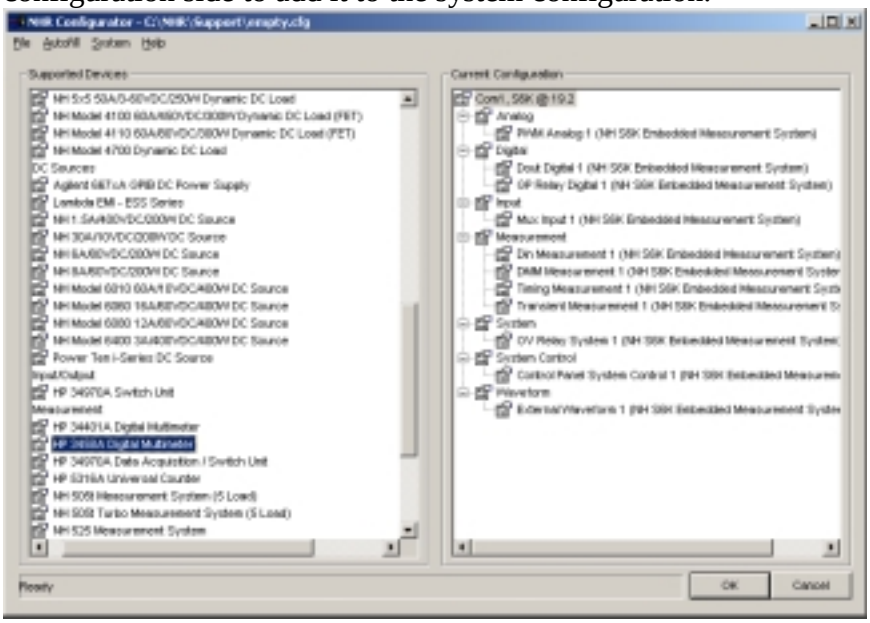
4. MODIFYING THE EMPOWER SYSTEM CONFIGURATION

After running the S430 installation the empower system configuration must be modified prior to using the calibration software. The HP3458A DMM must be added to the system configuration. Launch emPower and Click on the "Modify Configuration" button under the "Hardware" tab of "emPower Utilities".

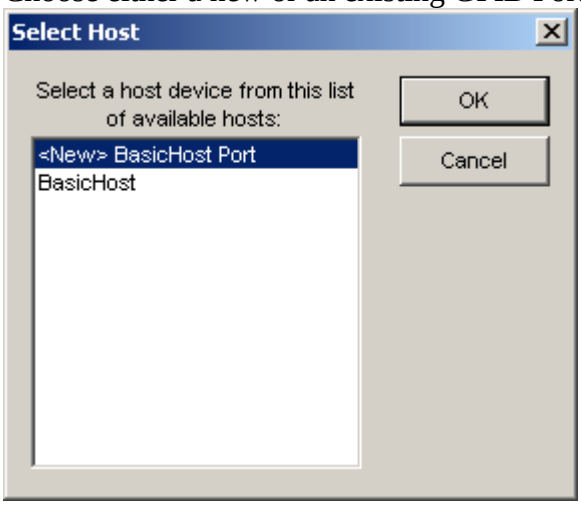


The NHR Configurator will be displayed.

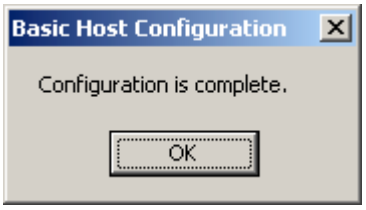
Double click or drag and drop the HP 3458A Digital Multimeter on to the current configuration side to add it to the system configuration.



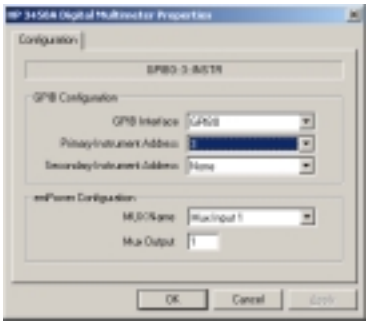
A series of configuration windows will appear.
Choose either a new or an existing GPIB Port and select “OK”.



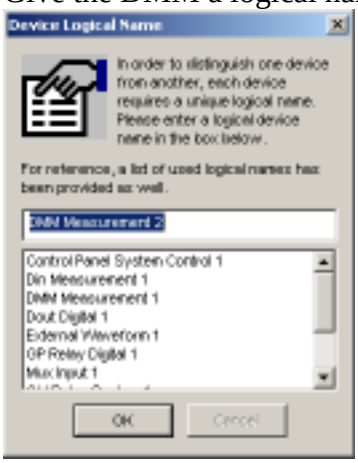
Select “OK”.



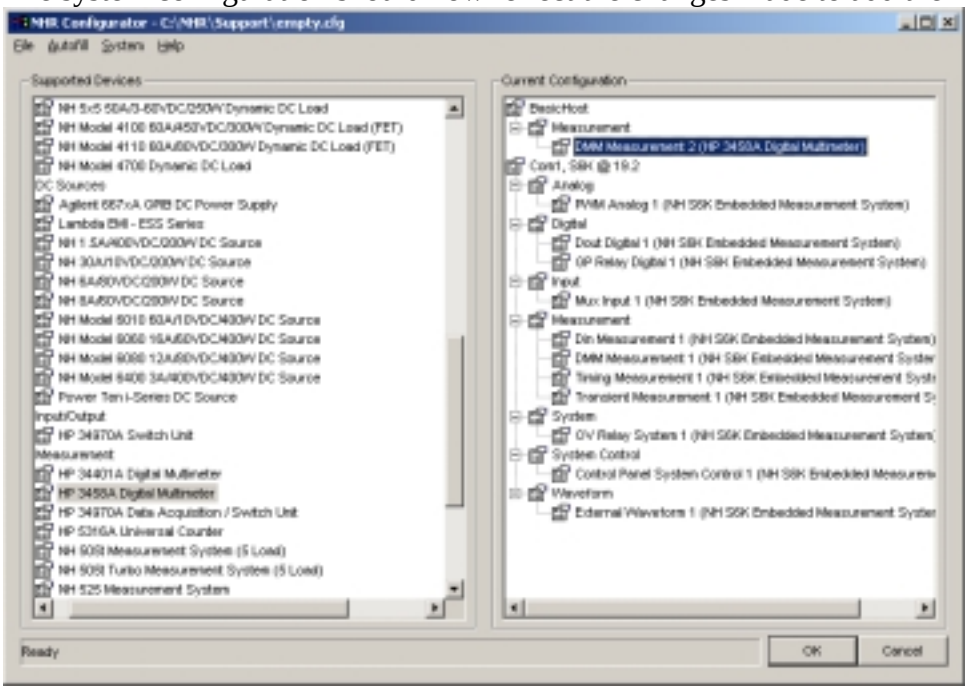
The *em**Power*** ® HP3458A DMM configuration screen will be displayed. Configure the DMM to GPIB address 3 and select “OK”. If address 3 is not possible then choose another address but this will require the VMC.EXE to be run (EMS Only) to configure the EMS calibration software to match the emPower address. Currently the calibration software installs with the DMM configured to address 3.



Give the DMM a logical name and select “OK”.

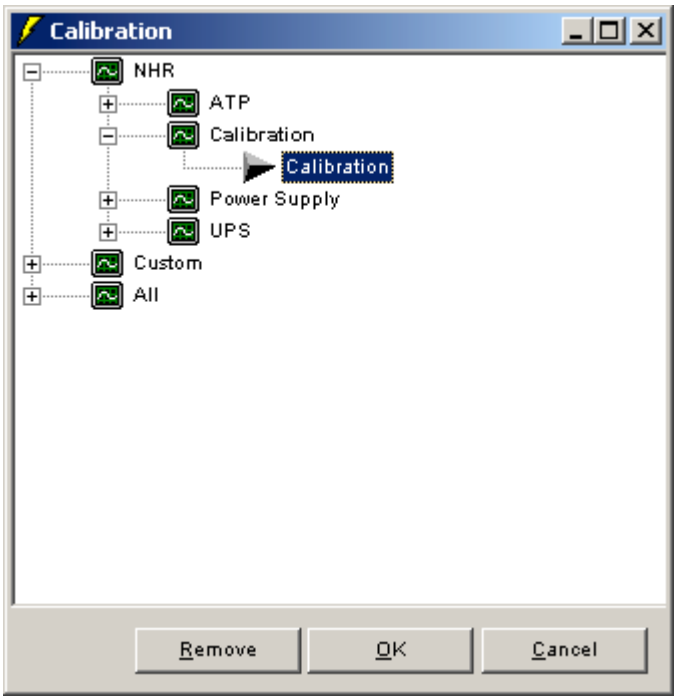


The system configuration should now reflect the changes made to add the HP3458A.

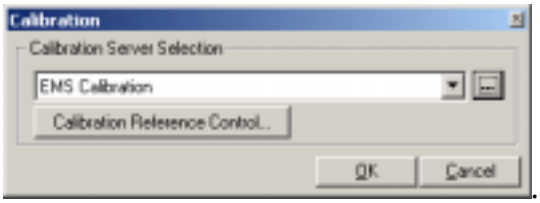


5. USING THE CALIBRATION TEST ROUTINE

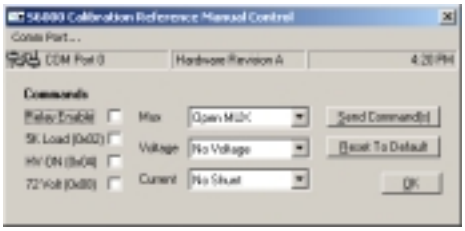
The calibration software package installs the calibration test routine on to the emPower system. The calibration test routine can then be used to calibrate any NHR device. Like all test routines in *emPower* ® the calibration test routine must be added to a program in order to use it. Create a new test program from "Edit" (poweredit.exe) then from within "Edit" under the program tab select an empty test routine cell to popup the test routine selection dialog. Go to the Calibration node and select the "Calibration" test routine and select "OK".



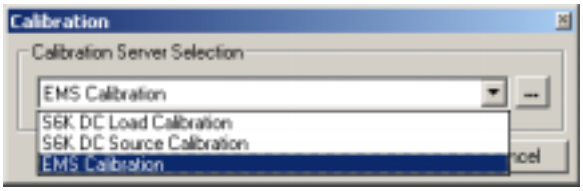
The calibration test routine dialog allows for calibration server selection as well as manual calibration reference control. The calibration reference control button is only available if there are devices detected that use the calibration reference.



The calibration reference manual control dialog allows for com port selection as well as manual hardware control.



The calibration test routine will automatically detect which calibration servers are needed for the current system configuration and display a list of them in the "Calibration Server Selection" drop down. Programmable calibration server features are accessed through the ellipsis "…" button.



5.1 Calibration Servers

Device specific calibration servers are developed as "Out of Process" COM objects. Calibration COM objects are referred to as "Calibration Servers". There is a unique calibration server per COM object and a unique file per calibration server. Calibration server files are stored with .exe file extensions and are registered with the system during the install process.

5.1.1 EMS Calibration Server(EMSCalSvr.exe)

Note: The Wavetek 9100 must be configured to GPIB address 9 in order for the EMS Calibration Server to automatically set the required voltages. Otherwise setting the voltage manually will be necessary.

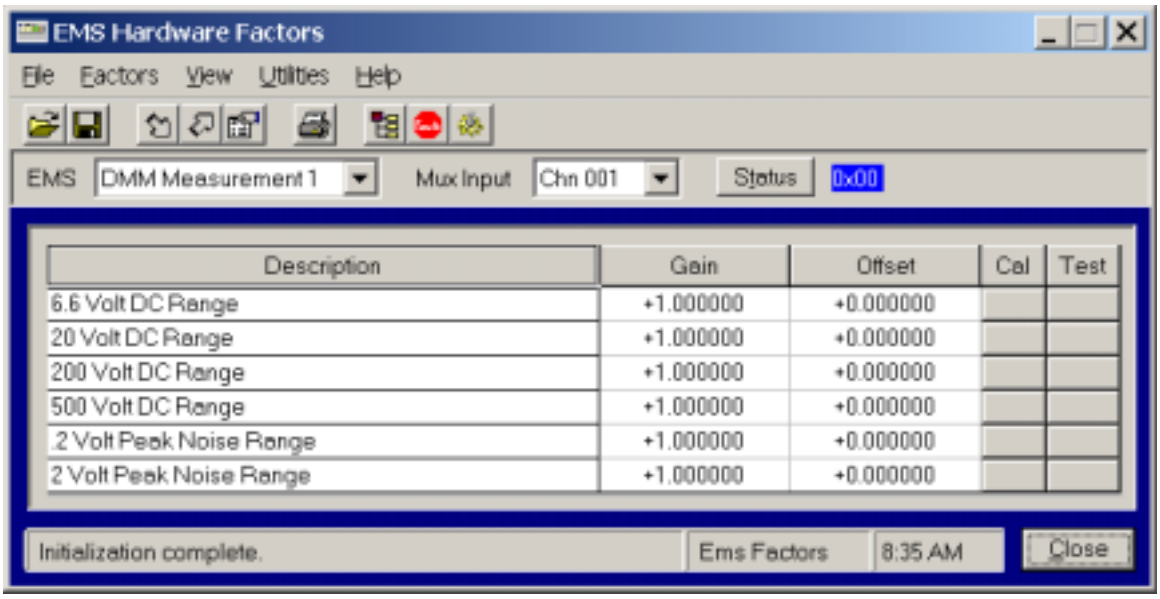
5.1.1.1 "Edit" (poweredit.exe)

There are no programmable features to this calibration server.

5.1.1.2 "Test" (powerexec.exe)

The Embedded Measurement System (EMS) calibration program contains functions for calibrating, testing and configuring the NHR S4xx EMS board.

For use with the S4xx Calibration Package, the calibration functions are all that are required. When the EMS calibration program starts, it verifies that an EMS is configured. If an EMS is detected, the program will read the calibration factors for the four DC ranges and the two peak-peak ranges and display them in a grid format as in the following example:



Description Column: Each row displays a particular function that may be calibrated.

Gain Column: Gain calibration data for each function.

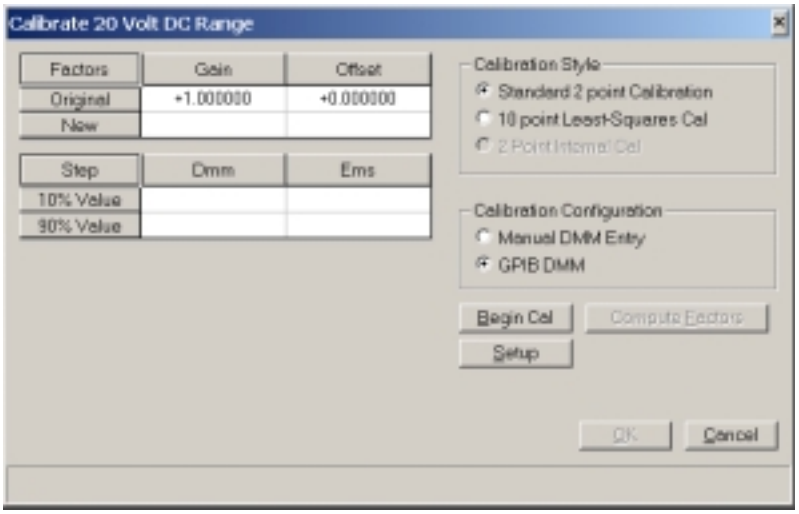
Offset Column: Offset calibration data for each function.

Cal Column: Button column that opens a calibration dialog for each function.

Test Column: Button column that opens a verification dialog for each function.

Calibration Steps

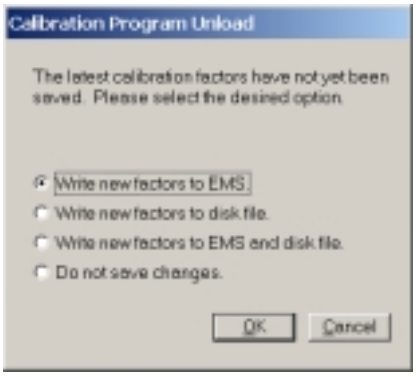
In general, to calibrate the EMS, all DC functions and peak-peak functions should be calibrated. To calibrate a specific function (such as 20 Volt DC Range), click the mouse on the **Cal** button corresponding to the function to be calibrated. This will display a dialog similar to the following:



Assuming that the DMM has been selected, click the **Begin Cal** button. A series of dialogs displaying instructions will appear. Follow the instructions for each dialog.

Once completed, the **Compute Factors** button will become enabled. Clicking this button will compute new calibration factors based on the new measurements. The newly computed gain and offset will be displayed in the New Factors grid row. In general, there are should normally be no large changes from Old calibration factors to New factors. Click OK to accept the factors.

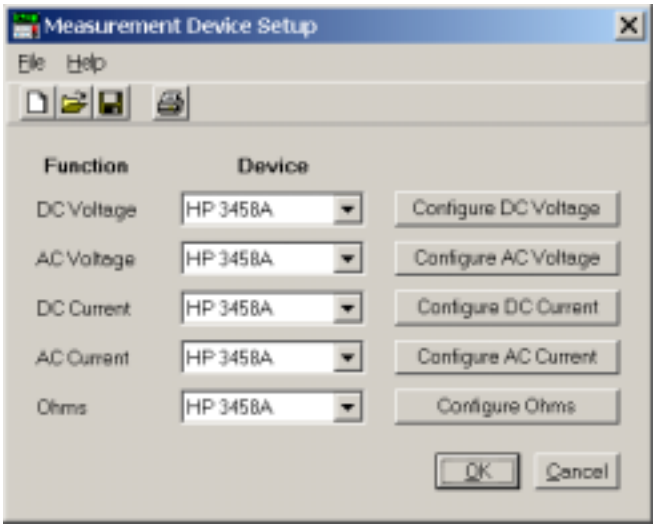
Ending Calibration
When all ranges have been calibrated, click the **Close** button. The following dialog should appear:



Make sure the **Write new factors to EMS** option is selected. Click the **OK** button to save the factors to the EMS non-volatile memory.

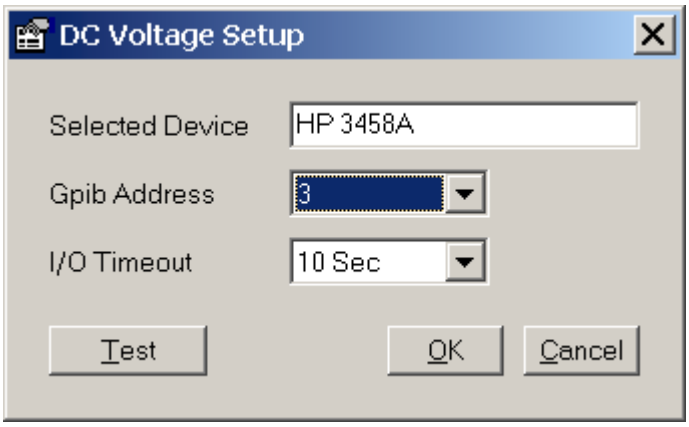
Virtual Measurement Configurator (VMC.EXE)
Note: This only needs to be performed if the HP3458A is not configured at address 3.

Setup
The **Utilities…Measurement Setup** menu item is used to setup the Digital Multimeter (DMM) used during calibration. The only important DMM function to setup for EMS calibration is DC Voltage (other DMM functions are not required). Clicking the Measurement Setup menu item will display the following dialog:



The example above shows that the HP 3458A DMM has been selected to perform DC voltage measurements.

Clicking on the **Configure DC Voltage** button will display the following dialog:



The critical item is the **Gpib Address** setting. Make sure the address is set correctly. Clicking the **Test** button will perform a DMM DC reading. If everything is setup and connected properly, a measurement will be made with no errors returned. Click the **OK** button when finished.

5.1.2 S6K Load Calibration Server(S6KDCLoadCalSvr.exe)

5.1.2.1 "Edit" (poweredit.exe)

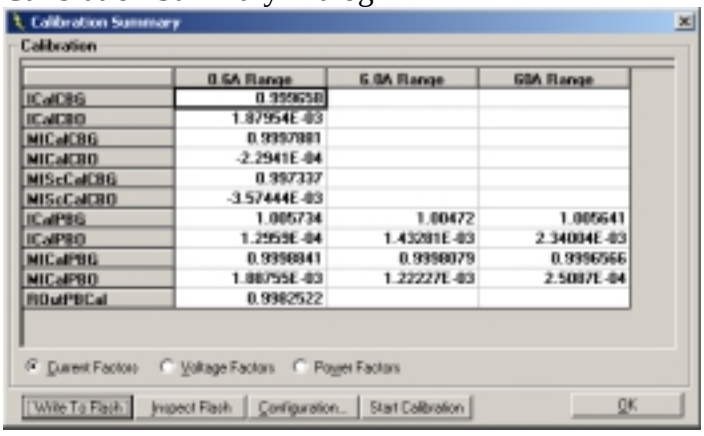
The "Edit" dialog for the S6K DC Load Calibration Server contains the load selection dropdown and the load calibration parameters checkboxes.

The S6K DC Load Calibration Server is capable of calibrating individual parameters on the load but it is not recommended that these parameters be calibrated separately. The ability to calibrate these parameters separate from one another is only for troubleshooting purposes only. Therefore, it is recommended that all parameters should be left checked.

5.1.2.2 "Test" (powerexec.exe)

The S6000 Calibration Software provides automatic "closed-box" calibration of S6000 Loads and DC Sources when used in conjunction with the S6000 Calibration Reference.

Calibration Summary Dialog



Start Calibration

This command button launches the calibration process for the selected module.
Once the calibration setup has been completed, pressing "Start Calibration" will load a screen which describes the required wiring setup and computer interconnects.

S6K Load Calibration Server (cont.)

After the interconnects are complete the user may press OK to perform the calibration, or Cancel to abort this process. Each calibration is performed automatically, with no interaction required by the operator.

S6000 Load modules are calibrated in an eight-step procedure:
1. Set Current, Control Board
2. Meter Current, Meter Short Circuit Current, and Set Current, Power Board
3. Meter Voltage
4. Set Voltage and Constant Voltage Mode
5. Constant Resistance Mode
6. Constant Power MI_TRIM
7. Constant Power MO_TRIM
8. Constant Power PDAC

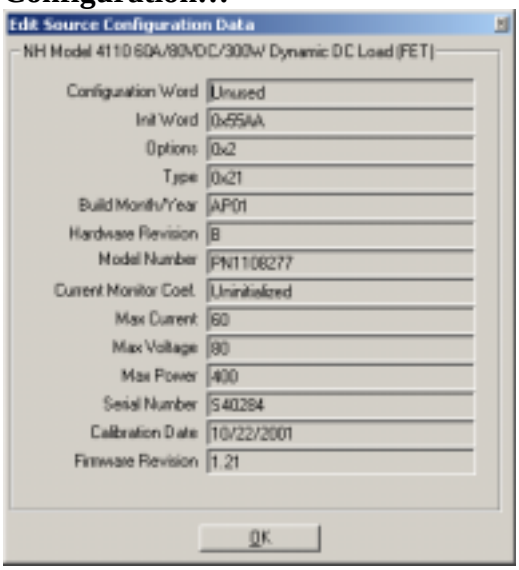
Displaying Calibration Results
The results of the calibration procedure are presented on the Calibration Summary dialog upon completion. If the calibration was not successful, calibration factors which are out of specification will be displayed in blue text and the “Write To Flash” button will be disabled. This implies that the module hardware is malfunctioning and must be repaired and/or re-calibrated.

Calibration factors for S6000 Load modules are provided in three tables - Current, Voltage and Power Factors. The user may view the results by selecting the desired option button listed below the grid. Please note that not all fields will contain data, even though the calibration was successful.

Write To Flash
If the calibration was successful then the “Write To Flash” permanently stores calibration factors in the flash memory on the load.

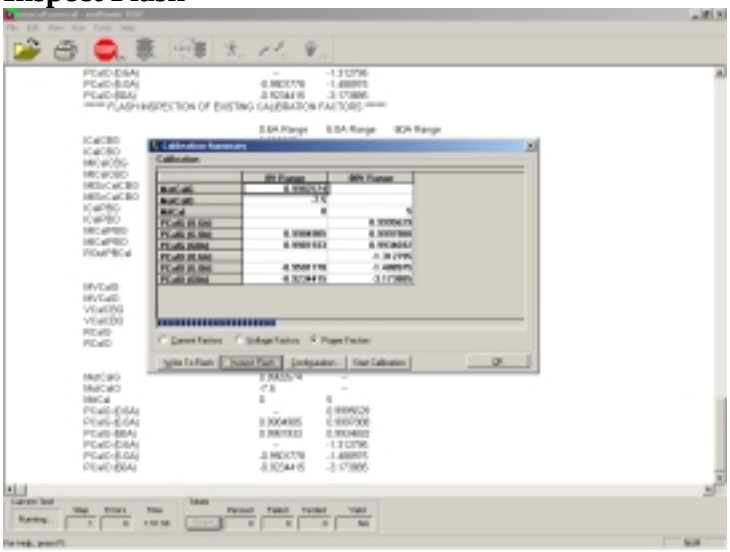
S6K Load Calibration Server (cont.)

Configuration…



This command button allows the user to review information that is stored on the load.

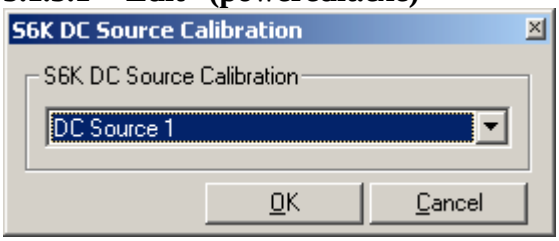
Inspect Flash



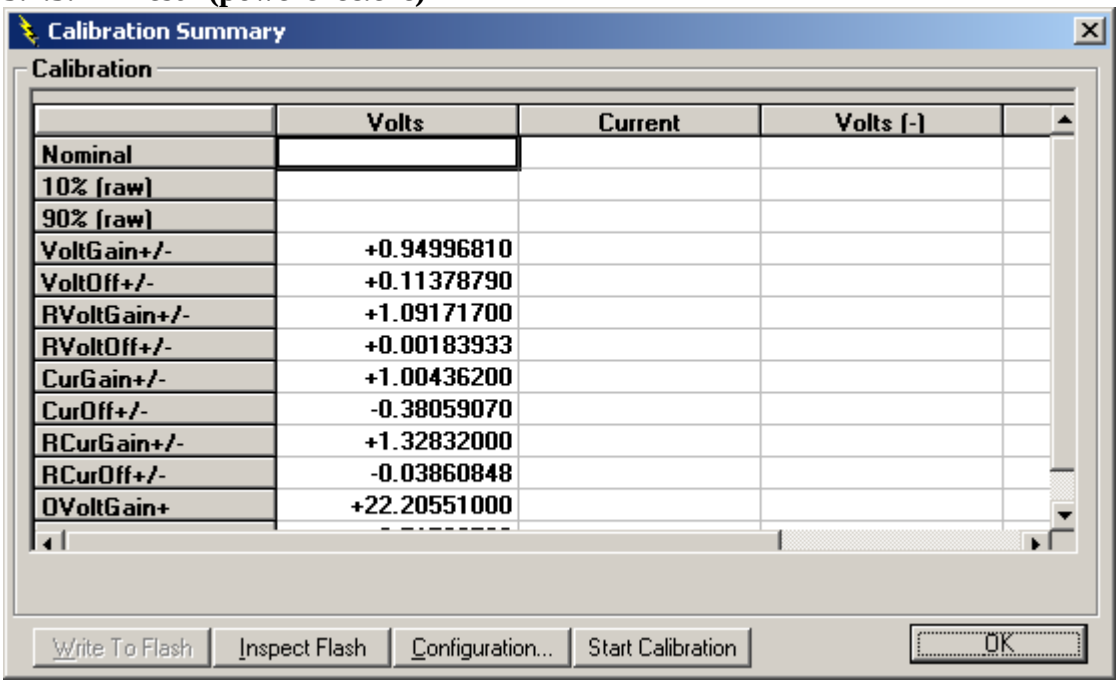
This command button allows the user to review the current calibration settings.

5.1.3 S6K Source Calibration Server(S6KDcSrcCalSvr.exe)

5.1.3.1 "Edit" (poweredit.exe)



5.1.3.2 "Test" (powerexec.exe)



DC Source Calibration

S6000 DC Source modules are calibrated in a four-step procedure:

1. 10% full-scale Voltage
2. 90% full-scale Voltage
3. 10% full-scale Current
4. 90% full-scale Current

If the module is a high-voltage module (400V) and contains the polarity reversal option, the above steps are repeated with the output polarity reversed.

Displaying Calibration Results

The results of the calibration procedure are presented on the Calibration Summary dialog upon completion. If the calibration was not successful, calibration factors which are out of specification will be displayed in blue text and the "Write To Flash" button will be

S6K Source Calibration Server (cont.)

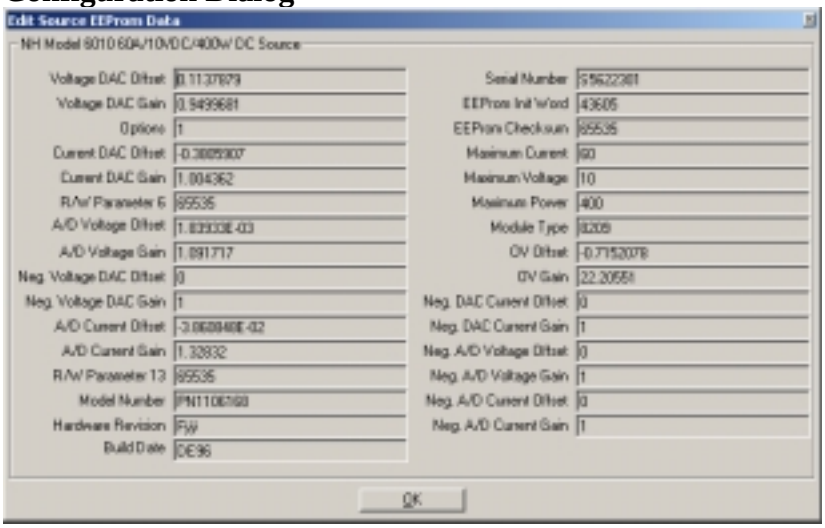
disabled. This implies that the module hardware is malfunctioning and must be repaired and/or re-calibrated.

The DMM-measured values which were presented to the module during the calibration procedure are displayed in a single table. High-voltage modules (400V) with the polarity reversal option will display data in the Volts (-) and Current (-) fields; these fields will appear blank for all other module types.

Write To Flash

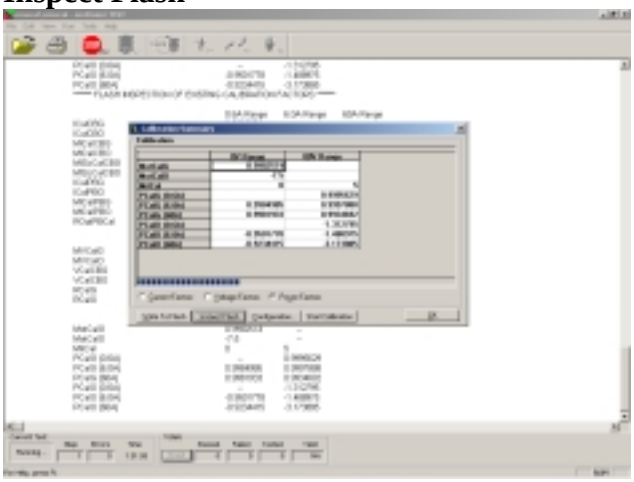
If the calibration was successful then the “Write To Flash” permanently stores calibration factors in the flash memory on the load.

Configuration Dialog



This command button allows the user to review information that is stored on the load.

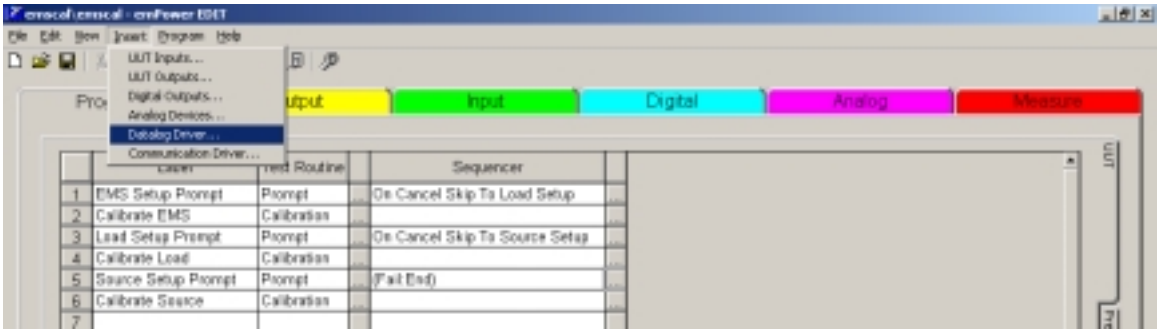
Inspect Flash



This command button allows the user to review the current calibration settings.

6. USING THE RTF DATALOG DRIVER

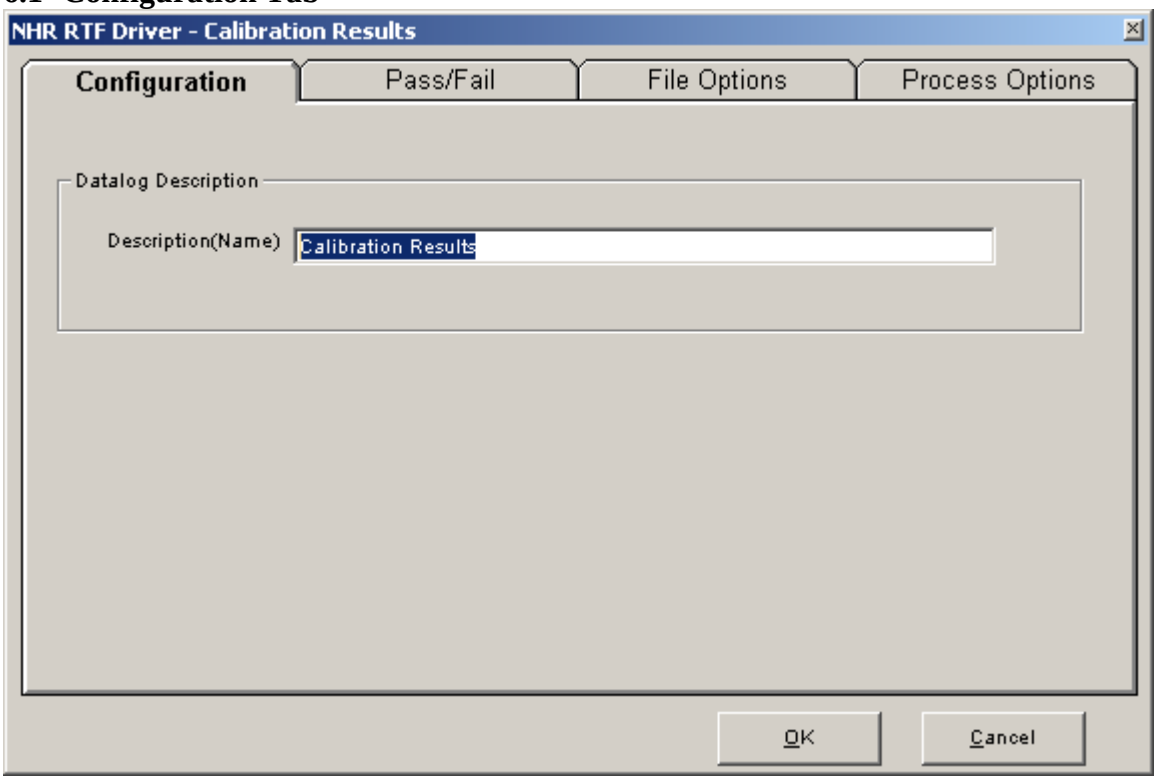
The calibration software package installs the Rich Text Format (RTF) datalog driver on to the *em**Power*** ® system. The RTF driver can then be used to physically store calibration results on the hard drive. Like all datalog drivers in *em**Power*** ® the RTF datalog driver must be added to a program in order to use it. From within "Edit" (poweredit.exe) under the "Insert" menu option select "Datalog Driver…" to add the RTF datalog driver to the calibration program.



The "Datalog Driver" dialog is displayed.

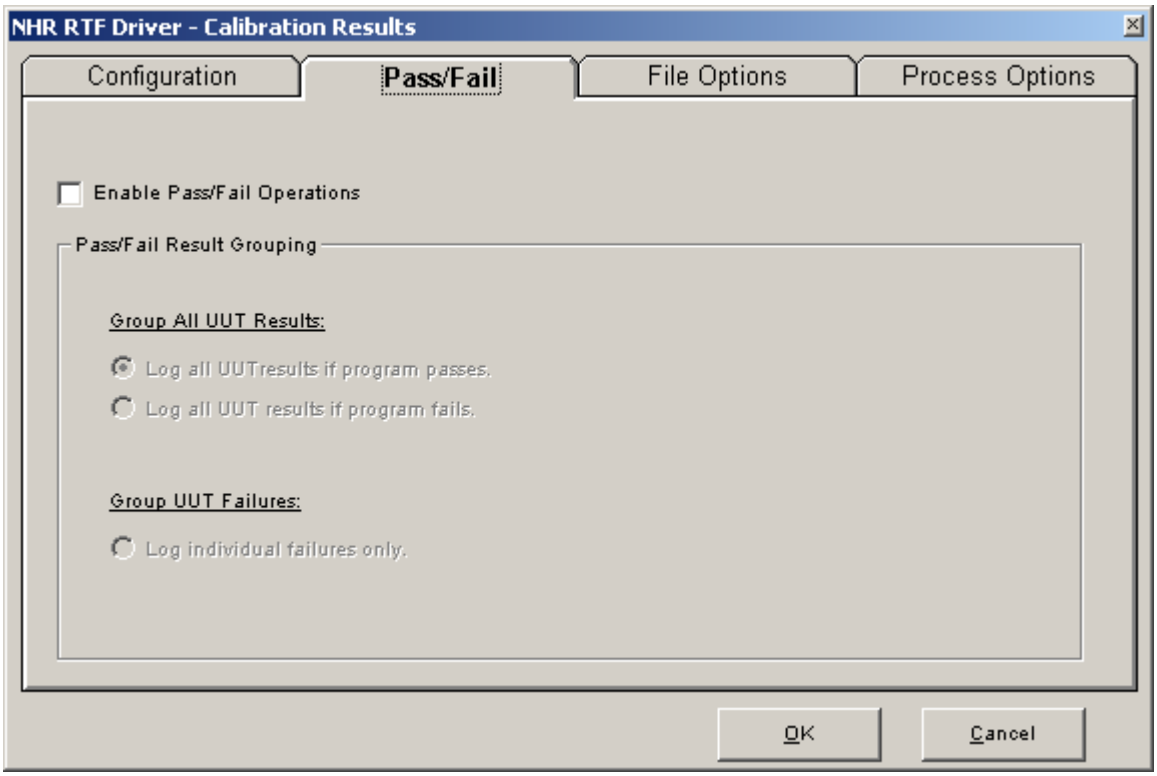
Double click, drag and drop or hit the "Add" button to add the RTF datalog driver to the program.

6.1 Configuration Tab



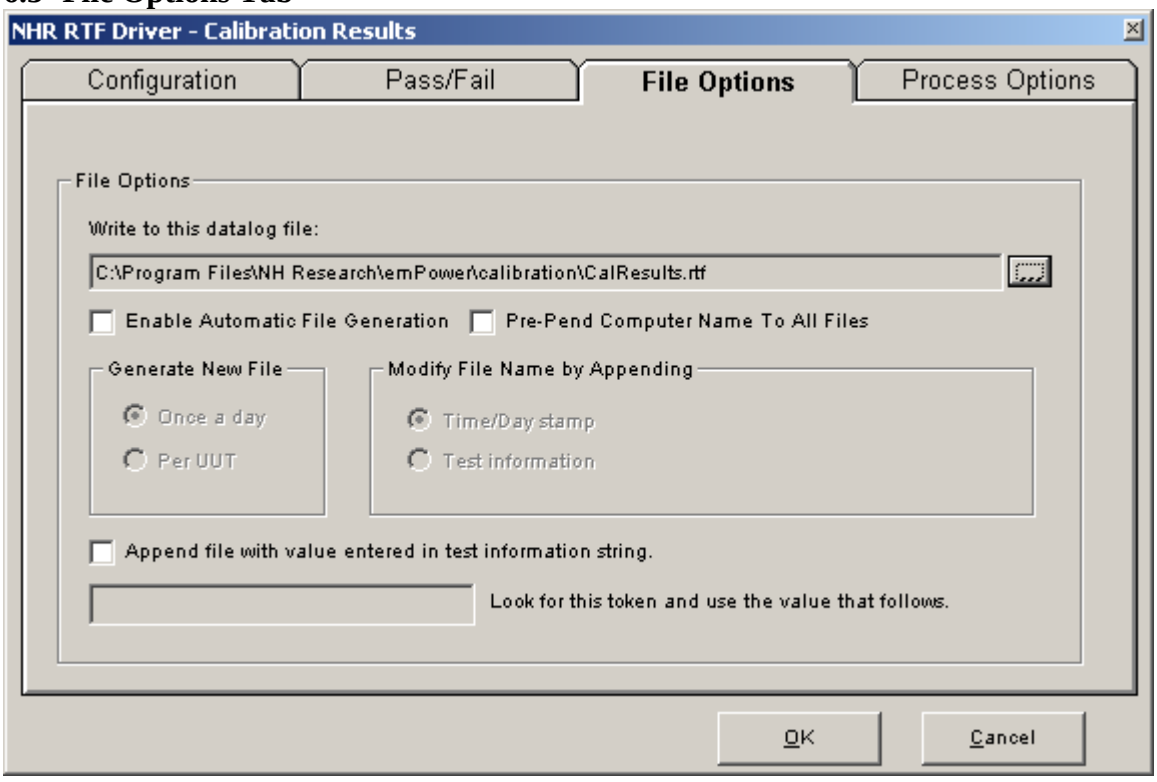
The configuration Tab of the RTF Driver allows for naming the datalog driver object.

6.2 Pass/Fail Tab



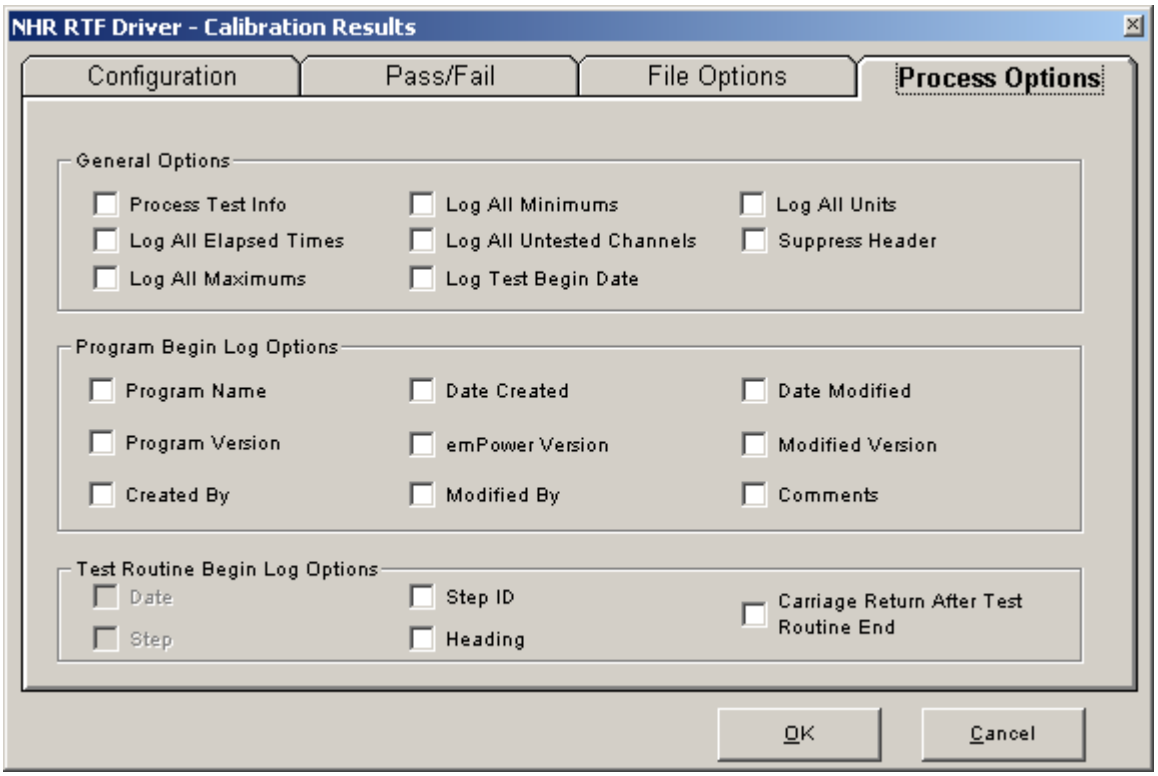
- Enable Pass/Fail Operations – enables Pass/Fail operations.
- Log all UUT results if test passes – logs all UUT results for the entire test program to the data file if the run passes.
- Log all UUT results if test fails – logs all UUT results for the entire test program to the data file if any part of the run fails.
- Log UUT Failures only – logs only the individual test failures to the data file without the context of the previous or subsequent test results.

6.3 File Options Tab



- Write to this datalog file – displays the full path of the data file.
- Enable Automatic File Generation – enables the driver to automatically generate a modification to the file name based on subsequent options.
- Generate New File – controls when a file name is modified.
  - Once a day – generates a data file once per day.
  - Per UUT – generates a file once per UUT test run.
- Modify File Name by Appending – defines what information modifies the file name.
  - Time/Day stamp – appends a time stamp to the data file.
  - Test Information – appends the test information entered at the beginning of the test run (i.e. serial number, lot code, etc.).
- Append file with value entered in the test information string – finds a token string in the test information (i.e. serial number, lot code, etc.) to use as the subsequent token to modify the file name. This enables file generation based on a specific piece of data entered at test time.

6.4 Process Options Tab



- General Options
  - Process Test Info – logs all entered information in the test information prompt at the beginning of a test.
  - Log All Elapsed Times – logs total elapsed test times and individual test routine times.
  - Log All Maximums – logs the upper limit for all test results.
  - Log All Minimums – logs the lower limit for all test results.
  - Log All Untested Channels – logs all untested channel data.
  - Log Test Begin Date – logs when the test began.
  - Log All Units – logs all test units.
- Program Begin Log Options – checks off the information to log to the file.
- Test Routine Begin Log Options
  - Step ID – actual program test step number as it appears in PowerEDIT.
  - Heading – program test step label.

7. CAL. BOX CALIBRATION PROCEDURE

This is a calibration procedure for the S6000 Calibration Box P/N 1107445.

REQUIRED EQUIPMENT(MUST BE TRACEABLE TO NTS)

CURRENT SOURCE

0.500 amps ± 0.03 milliamps
5.000 amps ± 0.5 milliamps
40.00 amps ± 2.00 milliamps

DVM

0.0 volts ± 0.1 millivolts
5.00 volts ± 0.2 millivolts
110 volts ± 5 millivolts
330 volts ± 30 millivolts

WARNING! HIGH VOLTAGES UP TO 240VAC AND 330VDC MAY BE PRESENT INSIDE THE CALIBRATION BOX. DO NOT TOUCH ANY COMPONENTS INSIDE THE CALIBRATION BOX UNLESS SPECIFICALLY INSTRUCTED. PROCEED WITH CAUTION!

1. Unplug the calibration box from AC power.
2. Remove the lid. There are three screws on each side.
3. Set dipswitch #S1 on the PCB as follows: (open = 1, closed = 0)

1: closed	[0.6A pwr]
2: closed	[0.6A meas]
3: open	[6A pwr]
4: open	[6A meas]
5: open	[60A pwr]
6: open	[60A meas]
7: open	[HV en]
8: open	

4. Attach a DVM with the + lead to the red "METER" banana receptacle on the front panel, and the - lead to the black "METER" banana receptacle.
5. Replace the cal box lid, but don't use the screws.
6. Connect the calibration box power cord to 120V or 240V AC power, 50/60Hz.
7. Switch on AC power via the front panel mounted power switch. The left most green LED labeled “AC” should be lit.
8. Wait 20 minutes for the box to warm up.
9. Remove the lid from the box.
10. Adjust pot R67 until the meter reads 0V.

11. Connect a 0.50000A +/- 0.03mA current source to the large black terminal block mounted to the bottom chassis at the rear. This terminal block is not labeled. Connect the current source so that the current passes IN(+) to the terminal marked “1” and passes OUT(-) of the terminal marked "2".
12. Adjust pot R38 until the meter reads +5.0000V.
13. Disconnect the current source
14. Set dipswitch #S1 as follows: (open = 1, closed = 0)

1: open	[0.6A pwr]
2: open	[0.6A meas]
3: closed	[6A pwr]
4: closed	[6A meas]
5: open	[60A pwr]
6: open	[60A meas]
7: open	[HV en]
8: open	[not used]

15. Adjust pot R72 until the meter reads 0V.
16. Connect a 5.0000A +/- 0.5 mA current source to the large black terminal block mounted to the bottom chassis at the rear. This terminal block is not labeled. Connect the current source so that the current passes IN(+) to the terminal marked “1” and passes OUT(-) of the terminal marked "2".
17. Adjust pot R40 until the meter reads 5.0000V.
18. Disconnect the current source
19. Set dipswitch #S1 as follows: (open = 1, closed = 0)

1: open	[0.6A pwr]
2: open	[0.6A meas]
3: open	[6A pwr]
4: open	[6A meas]
5: closed	[60A pwr]
6: closed	[60A meas]
7: open	[HV en]
8: open	[not used]

20. Adjust pot R77 until the meter reads 0V.
21. Connect a 40.000A +/- 2 mA current source to the large black terminal block mounted to the bottom chassis at the rear. This terminal block is not labeled. Connect the current source so that the current passes IN(+) to the terminal marked “1” and passes OUT(-) of the terminal marked "2".
22. Adjust pot R42 until the meter reads 4.0000V.
23. Unplug the calibration box from AC power.
24. Disconnect the current source

25. 110Vdc adjustment. USE EXTREME CAUTION. THE 110Vdc AND 330Vdc ARE NOT PRESENT UNTIL DIPSWITCH S1 IS SET TO ENABLE THEM.
26. Connect the DVM - lead to TP3. Connect the DVM + lead to TP4.
27. Set dipswitch #S1 as follows: (open = 1, closed = 0)

1: open	[0.6A pwr]
2: open	[0.6A meas]
3: open	[6A pwr]
4: open	[6A meas]
5: open	[60A pwr]
6: open	[60A meas]
7: closed	[HV en]
8: open	[not used]

28. Connect the calibration box power cord
29. Adjust pot R52 until the meter reads 110V
30. Unplug the calibration box from AC power.
31. Disconnect the DVM.
32. 330Vdc adjustment. **USE EXTREME CAUTION. THE 110Vdc AND 330Vdc ARE NOT PRESENT UNTIL DIPSWITCH S1 IS SET TO ENABLE THEM.**
33. Connect the DVM - lead to TP1. Connect the DVM + lead to TP2.
34. Connect the calibration box power cord
35. Adjust pot R22 until the meter reads 330V
36. Unplug the calibration box from AC power.
37. Set dipswitch #S1 as follows: (open = 1, closed = 0)

1: open	[0.6A pwr]
2: open	[0.6A meas]
3: open	[6A pwr]
4: open	[6A meas]
5: open	[60A pwr]
6: open	[60A meas]
7: open	[HV en]
8: open	[not used]

38. Disconnect the DVM.
39. Unplug the calibration box from AC power.
40. Replace lid on cal box, with the 6 screws that hold it on.
41. Attach the calibration sticker to the front panel in the upper right corner.