DSMLINK V2.90

INSTALLATION and OPERATION

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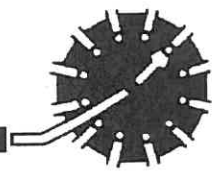


Table of Contents

INTRODUCTION 4
DSMLinkC Software 4
Host System Requirements 4

INSTALLATION 5
Equipment required 5
Ethernet Board and Packet Driver Installation 5
DSMLINK Software Installation 6

DSMLINK Operation 7
Getting Started 7
Windows 95 and Windows 98 Setup 7
Window NT Setup 8
Connection Test 9
Menu 10
File 11
ViewScan 12
DSM 13
Interface 14
Button Bar 15
Setup 19
Start 19
Network Connection 20
Profile Settings 21
Module Settings 22
Temperature Settings 24
Purge Setup 25
Digital Inputs and Outputs 26
Calibration Variables 27
Zero Calibration 28
Scan Groups 29
Save 30
Program Operation 31
Zero Correction 31
Scan 33
Digital Commands 38
Purge 40
Stop 41
Issue Command 42
Serial Setup 44
File Operation 45
Open Data Log File 45
Close Data Log File 47
Save Configuration 48
Save Master Correction Tables 49
UpLoad File 50
Calibration 51
Configuration 54
Log 55
Files 55

Initialization 56
Channel Setup 59
Calibrator Setup 61
Plumbing Tests 64
Noise, Rails, and Leak Tests 68
Noise Test 68
Rails Test 71
Leak Test 73
Calibration 76
Validation Test 78
Results 80
Program Shutdown 83

INTRODUCTION

The purpose of the DSMLINK Software is to provide a means of communication between DSM Modules and a PC. It is designed to give a user the tools necessary to be able to interface to a DSM Module. It is not intended to be an application software. It is designed to be operated in Microsoft Windows 95, Window 98 or Windows NT. It provides the following:

1. Easy setup of DSM Modules.
   DSMLINK is menu driven. That is, it permits a user to simply select the function(s) to be modified from a pull down menu. Setup of a DSM Module usually requires only a few mouse clicks.

2. Command and configuration information may be sent to DSM Modules from a disk file.
   This permits a very fast setup of a DSM Module. This is especially helpful when a module is to be modified during a test.

3. Display pressure and temperature values as numbers and in bar graph format.
   This permits easy setup of a module or group of modules. All data are displayed.

4. Display "scrolled" data from DSM Modules.
   When this window is opened, all communications from the DSM Modules are displayed.

5. Write data from DSM Modules to a disk file.
   Permits storage of data in a format specified during setup.

DSMLinkC Software

The DSMLINK Software has been written to allow a user to easily interface to a DSM. It is written in Visual Basic V5.0. It has been optimized for 32 bit operation. It will operate in Windows 95, Windows 98, or Windows NT. This software will not operate correctly in Windows 3.x.

Host System Requirements

Software Scanivalve Corp has tested and attempted to optimize the operation of this software in many environments. However, this software may not operate correctly in all environments. The following is the minimum requirements for proper operation:

Processor	Pentium Processor, or equivalent, operating at 100 MHz or faster
RAM	32 Mbytes minimum, 64 Mbytes recommended
Operating System	Windows 95(Version 4.00.950a or higher), Windows 98, or Windows NT

A user should read, and be completely familiar with, this manual and the DSM Software Requirements Specification (SRS). It is expected that a user will have an understanding of this document and the DSM operating software prior to operating this software.

INSTALLATION

Equipment required:

NE2000 Compatible Ethernet Card
Ethernet Card Utilities
DSMLINK Software, CD-ROM or Floppy Disks 1 - 4
Software is supplied on a CD-ROM. Floppy disks are available, by request. To obtain Floppy disks contact Scanivalve Corp, Product Support Department.
DSM 3000 Series Module or DSAENCL 3000
10Base-2 Operation
RG-58/U or equivalent cable
Two line terminators
Two BNC tees
10Base-T Operation
Cable terminated with RJ-45 Connectors

It is recommended that a user read and fully understand this procedure before attempting to install the DSMLINK software.

Ethernet Board and Packet Driver Installation

NOTE: If an older version of DSMLINK is installed, skip to the DSMLINK Installation section.

1. Install the Ethernet board in the PC.

2. Configure and test the Ethernet board. For Windows 95 or 98 operation, it is best to use the "Plug and Play" feature. If "Plug and Play" is used, skip to the next section.

   Do Not install the network software from the Ethernet Board manufacturer. Installation of this software will set up a network environment that may cause conflicts with the DSMLINK software.

   Using the Setup Utility provided by the Ethernet board manufacturer, set the Ethernet board to the following:
   Base address: 360 Hex (also shown as 0x360 or 360H)
   Interrupt: 5 Hex (also shown as 0x05 or 5H)

   Most setup utilities provide a contention test for the base address and interrupt. It is very important that all of these tests are run. This will insure that no other peripheral is using the selected base address and interrupt. If a contention is found, you must select another base address and/or interrupt. Once you are certain that the Ethernet board is installed and functioning correctly, move on to the next step.

   Enter the base address selected _____

   Enter the Hardware Interrupt selected _____

DSMLINK Software Installation

1. Install the DSMLINK software.
   Start Windows
   Old DSMLINK programs may be uninstalled before installing a new version, but it is not necessary. If the old programs are uninstalled, Windows may ask the user if certain shared files should be removed before proceeding, **DO NOT** remove any possibly shared files.
   Insert the CD-ROM in the CD Drive (If using floppy disks, install disk 1 in drive A or B).
   Select: Start
   Select: Run.
   Select: Browse
   Select the CD -ROM Drive and click on Disk One, setup.exe. Follow the on screen instructions.
   (If Floppy disks are used, Enter a:\setup.exe in the box after Run is selected.)

2. If the installation is successful, a new program group and icon named DSMLinkC will be installed in Program Manager.

3. This completes the installation. Exit windows, reboot your computer and restart Windows before attempting to operate the DSMLINK program.

WARNING: The installation of DSMLinkC may not be successful in some older versions of Windows 95. Users with Windows 95 versions 4.00.950 and 4.00.950a may have problems if they have not had current Microsoft Service Packs installed. This does not mean that all users with these versions of Windows 95 will have problems. If errors occur during the installation, Service Packs are available for download from the Microsoft Web Site: www.Microsoft.com
For more information, contact Scanivalve Corp, Product Support Department.

DSMLINK Operation - Getting Started

Windows 95 and Windows 98 Setup

Select: Start
Select: Settings
Select: Control Panel
Select: Network
Add Microsoft TCP/IP Properties to the Network Setup.

Highlight the TCP/IP setup of the Ethernet card installed.

Select: Properties
- Select: IP Address
- Select: Specify an IP Address
  Set the IP Address to 200.30.5.5
  Set the SubnetMask to 255.255.0.0
- Select: WINS Configuration
  Disable WINS Resolution
- Select: DNS Configuration
  Disable DNS
- Select: Advanced
  No properties should be entered
- Select: Gateway
  Do not establish a Gateway
- Select: Bindings
  Check Client for Microsoft Networks

Click on OK
Select Windows Logon for the Primary Network Logon.

Click on OK

Windows will have to be restarted before these changes take effect.

Window NT Setup

Select: Start
Select: Settings
Select: Control Panel
Select: Network
Select: Identification
Fill in the name of the workgroup if one is to be used
Select: Protocols
Click: Properties
Set the IP Address to 200.30.5.5
Set the Subnet Mask to 255.255.0.0
Click: DNS
Leave blank
Click: WINS
Leave Blank
Click: Routing
None
Select: Adapter
Highlight the network card being used
Select: Properties
Set IRQ to 5
Set I/O Port Address to 0x300
If the card is already set up and operating correctly, do not change the properties.
Restart Windows NT

DSMLINK Operation - Connection Test

1. Connect the DSM module to the Ethernet card. A line terminator must be used at both ends of the cable if the connection is 10Base-2.

2. Test the host.

Click:	Start	
Click:	Programs	
Click:	MS DOS Prompt	A DOS window will open
Type:	ping 200.30.5.5	This is the IP address of the host.

This utility will test the socket. If the socket is functioning correctly, the program will display the turn around time. If not, an error will be indicated. The error could indicate that there is a problem with the Ethernet card, or the setup.

3. Test the module connection

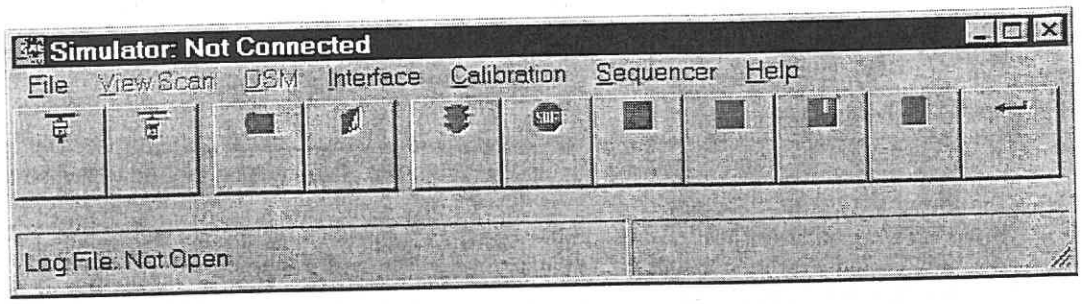
Click:	Start	
Click:	Programs	
Click:	MS DOS Prompt	A DOS window will open
Type:	ping 200.30.y.x	This is the IP Address of the module. Substitute the numbers entered on the module address label for x and y.

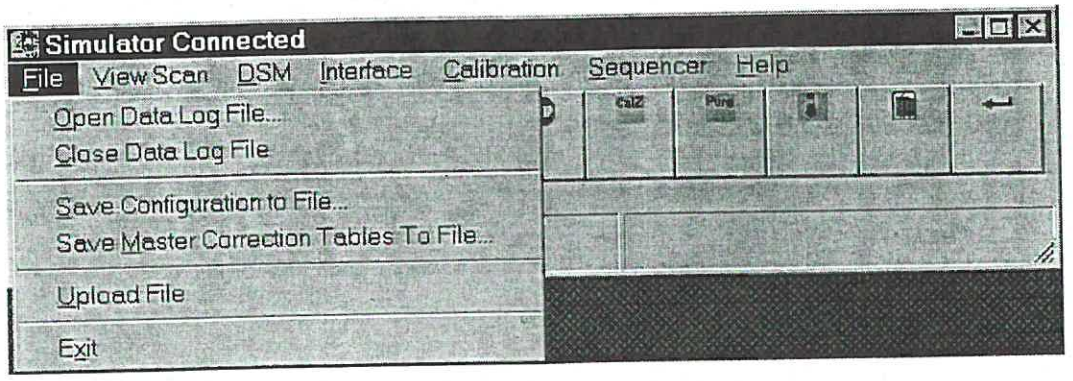
This utility will test the network. If the network is functioning correctly, the program will display the turn around time. If not, an error will be indicated. The error could indicate that there is a problem with the Network connection, the Ethernet card, or the setup.

DSMLINK Operation - Menu

The DSMLINK Window has six menu options:

File
ViewScan
DSM
Interface
Calibration
Sequencer
Help.





File This option contains file activity options for a DSM Module.

Open DSM Data Log File...

This option will open a window which will prompt the user to name a destination file for DSM data. When a file is named, the file will be displayed Data will be logged to the file named when this option is selected.

Close DSM Data Log File

This option will close the data log file named in the option above.

Save Configuration to File...

This option will allow a user to name a configuration file that will save the current DSM configuration.

Save Master Correction Tables to File...

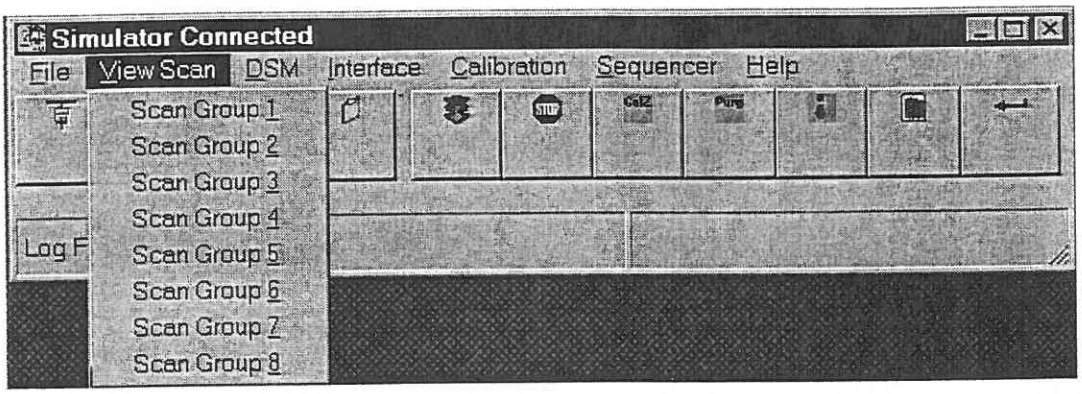
This option will permit the user to save all Master Planes to a file.

Upload File

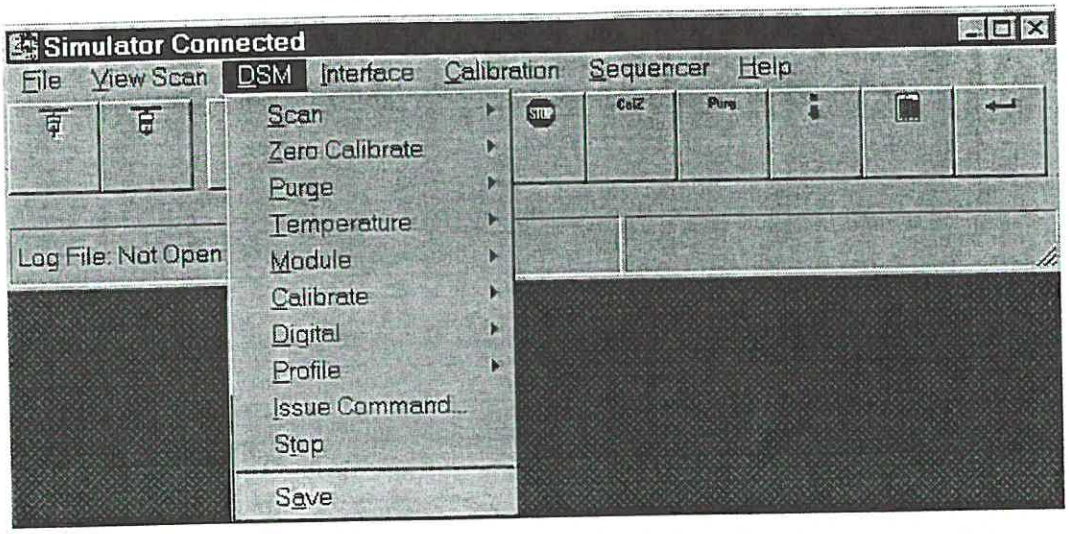
This option will permit the user to download a configuration or correction file to the DSM.

Exit

Close all program activities and return to program manager.



ViewScan This will activate a bar graph display of the scan data. The user may select one or all of the Scan Groups. This window must be opened before the scan is initiated in order to be able to view the Pressures and Bar Graph.



DSM This option permits the user to enter, verify, or modify module settings.

Scan
Set up Scan Groups and Initiate the scan function.

Zero Calibrate
Perform a zero calibration and view the zero offset file.

Purge
Set up the purge function and initiate a purge

Temperature
Enter or verify the Temperature Gain and Offset values. View the current module temperatures.

Module
Enter, View or Verify the current module settings.

Calibrate
Enter the Calibration settings, Edit, Delete or Fill the Correction Tables.

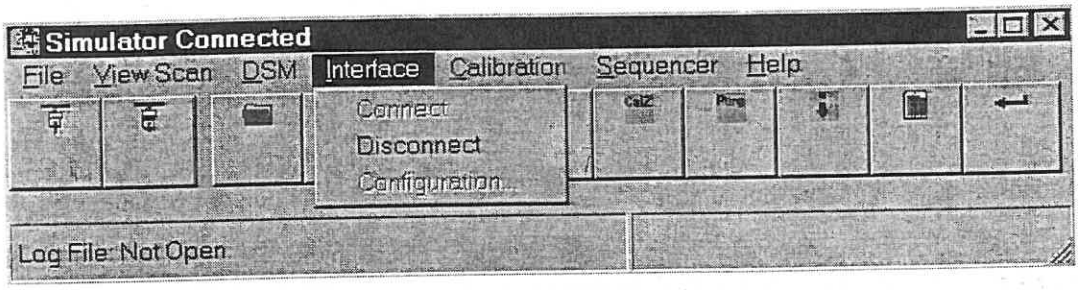
Digital
Set up the Digital Inputs and Outputs

Profile
Enter the DSM and Module Profile Information

Issue Command
Enter a command to the DSM.

Stop
Stop Scanning

Save
Save all settings. This command must be issued to save a modified variable.



Interface This option contains connection configuration options.

Connect

Connect the DSM to the network.

Disconnect

Disconnects the DSM from the network.

Configuration...

Enter, view, or verify the Interface configuration.

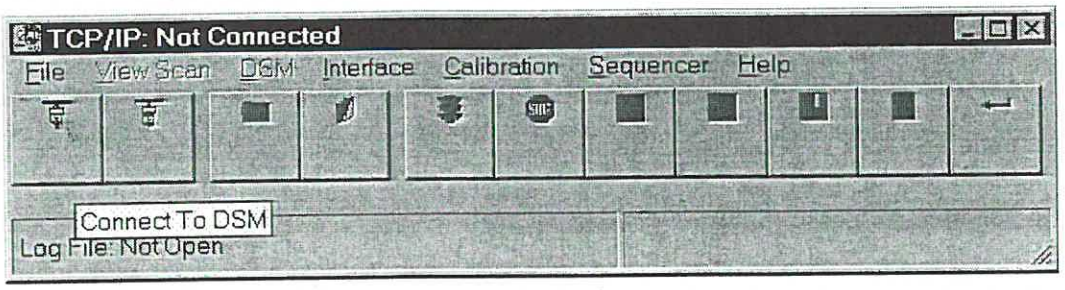
Calibration This function is used to use a SPC3000, SPC2500, or CALMOD2000 to calibrate modules connected to a DSM or DSAENCL. It is a stand alone function. The DSMLink Software must not be connected to a DSM when this software is initiated.

Sequencer This function is used to set up a series of commands to a DSM or a Calibrator. It is only active when the DSM is not connected. It does not function correctly in Windows 95. A user is warned that operation of this function may result in unpredictable operation of the DSM.

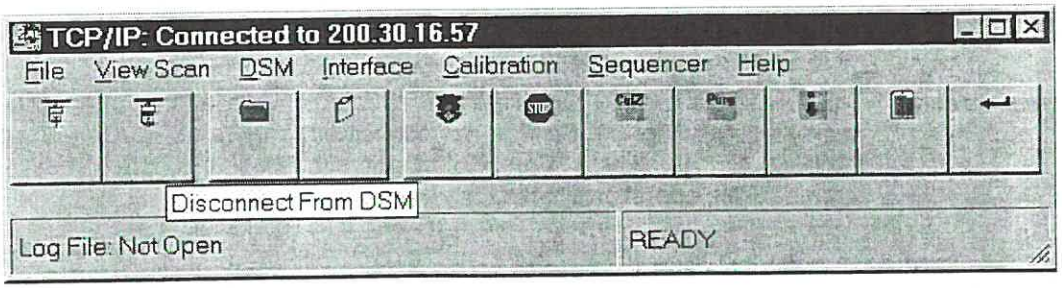
Help This function is not active

DSMLINK Operation - Button Bar

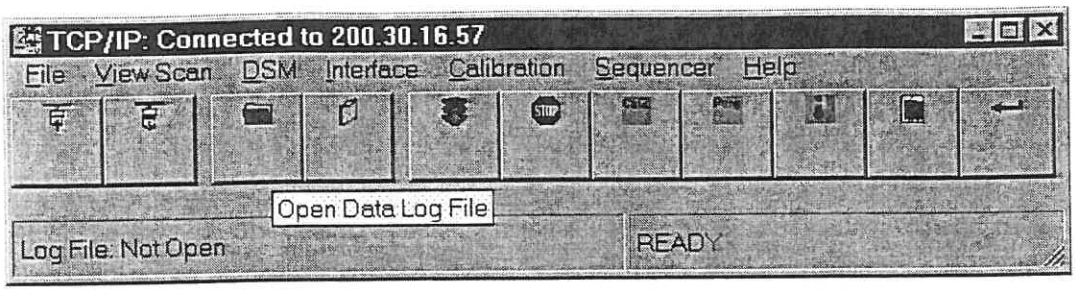
The DSMLINK program also has a button bar to permit fast implementation of several of the most used commands.



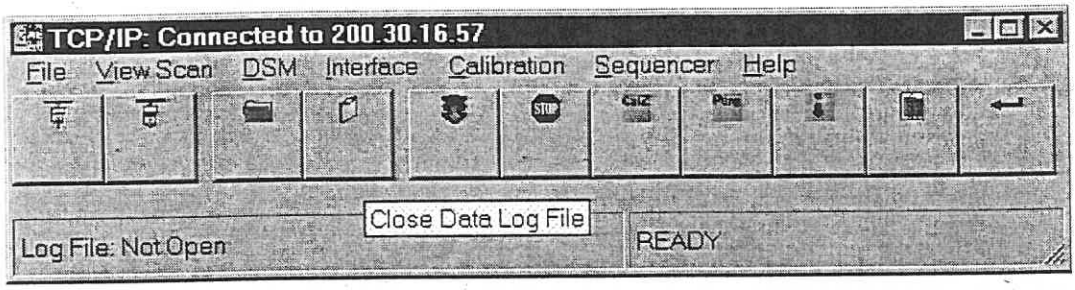
The first button will connect the host computer to the DSM



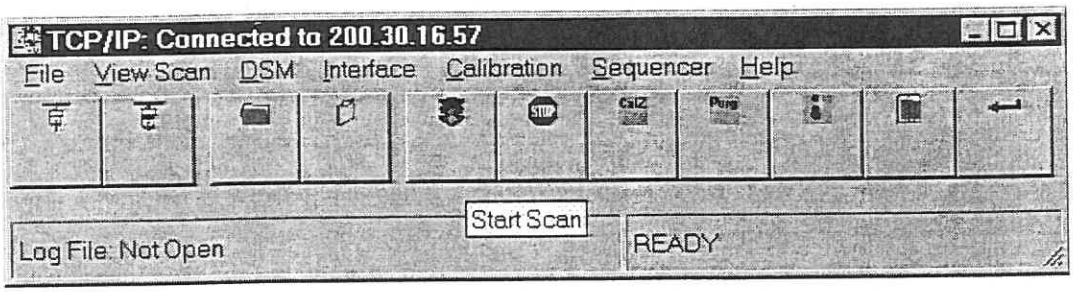
The second button will disconnect the host computer from the DSM.



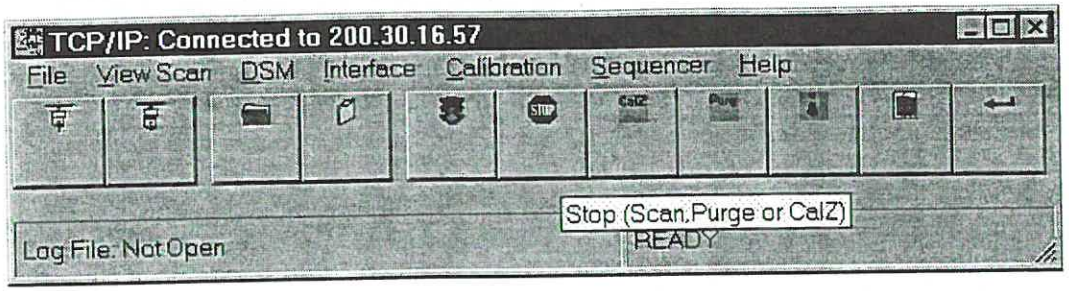
The third button will open a data log file.



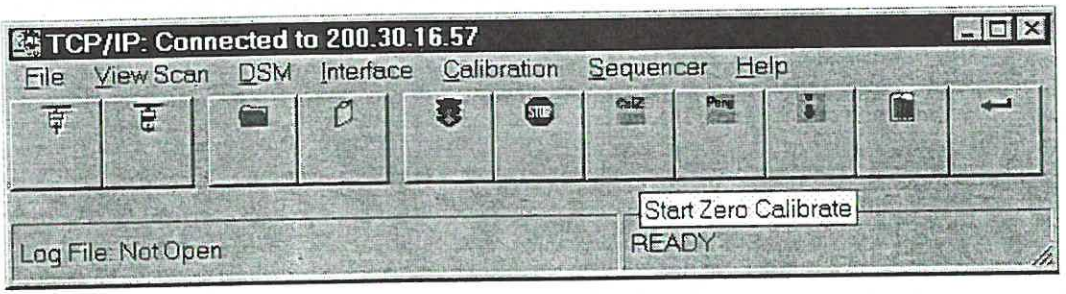
The fourth button will close the data log file.



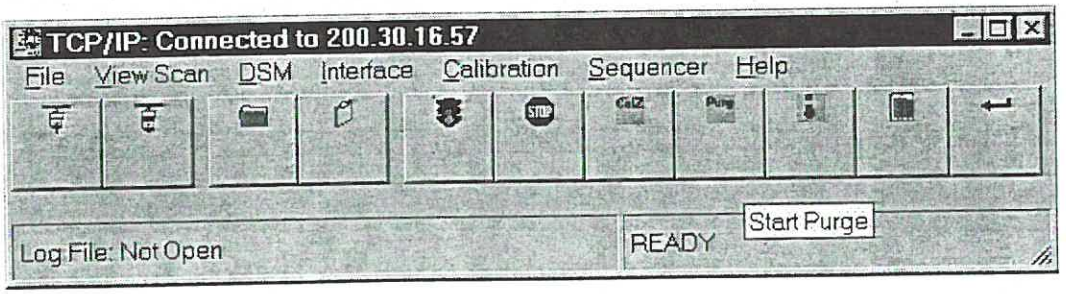
The fifth button will start the scan function.



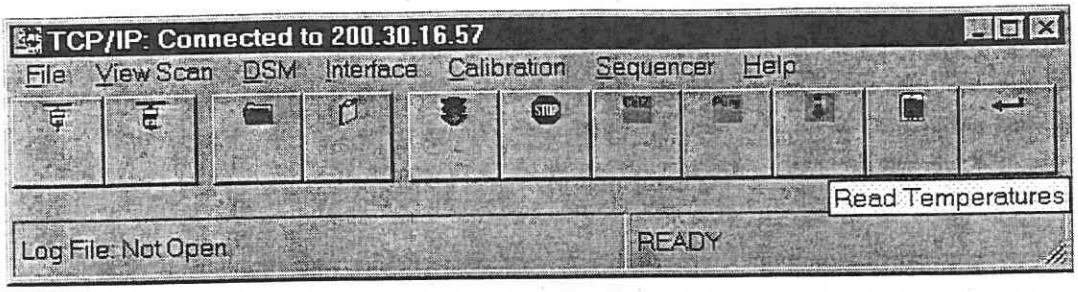
The sixth button will stop or terminate the Scan, Purge or CalZ functions.



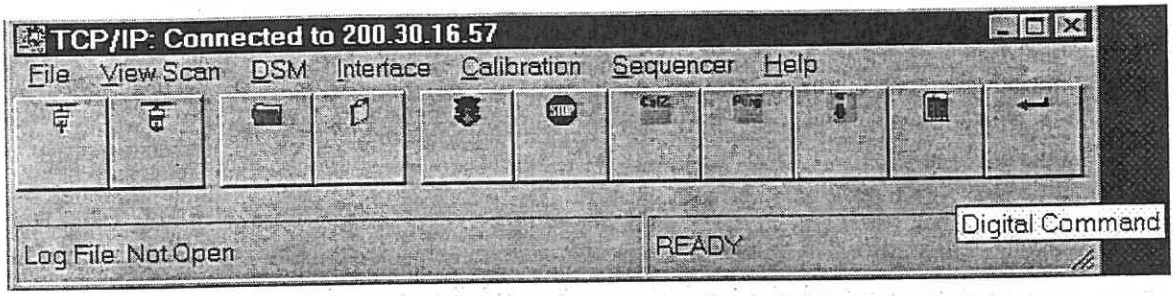
The seventh button will initiate a CalZ function.



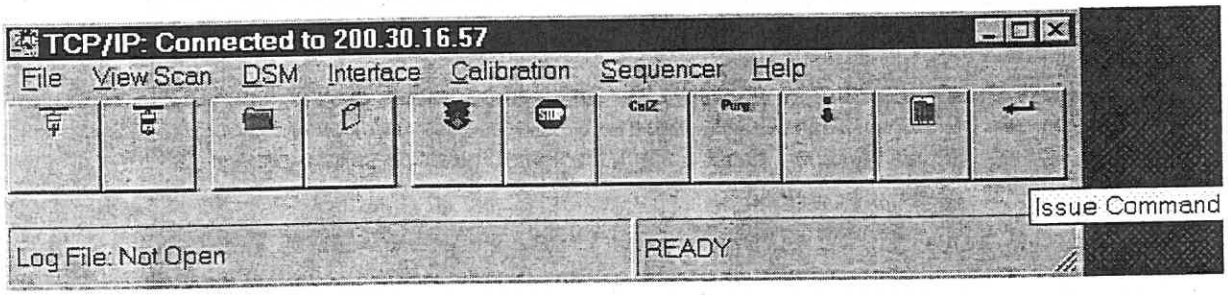
The eighth button will initiate a Purge function.



The ninth button will display the module temperatures.



The tenth button will permit digital commands to be issued.



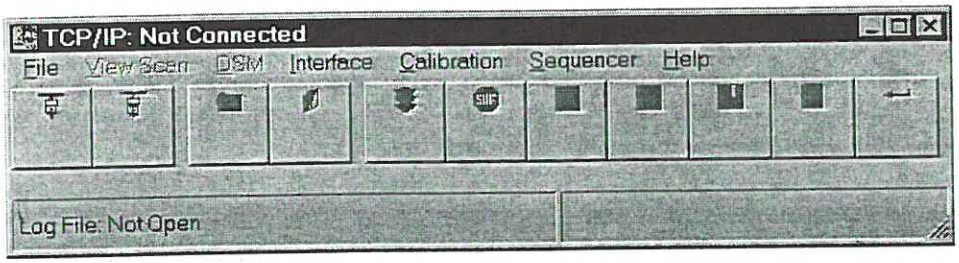
The eleventh button permits any command to be issued to the DSM.

DSMLINK Operation - Setup

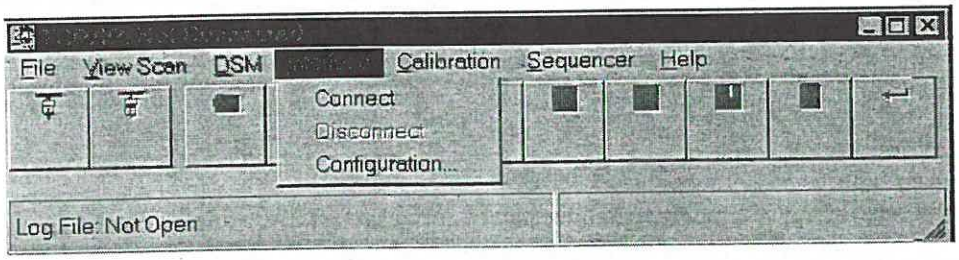
Start

Select: Start
Select: Programs
Select: DSMLINK

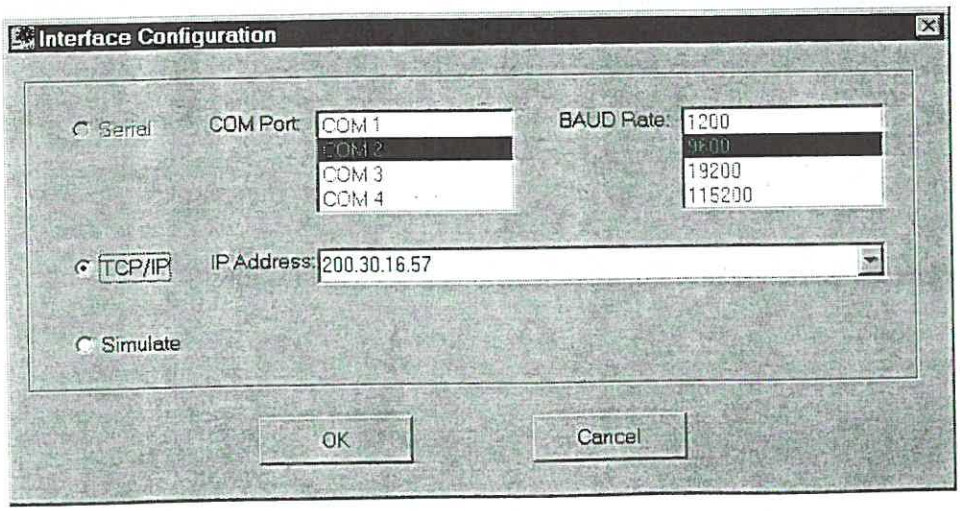
A window will open similar to the one below.



When the window is opened, First confirm that the configuration is correct.
Select: Interface
Select: Configuration

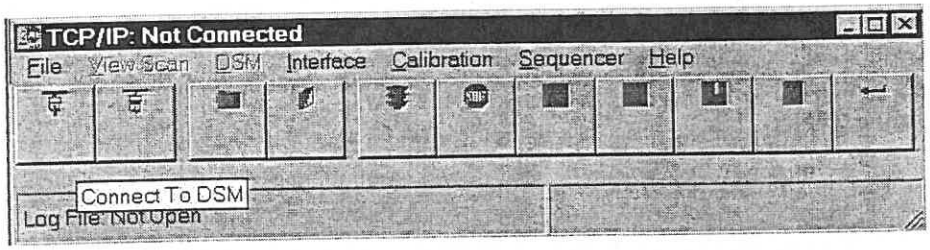


The window shown below will open. For Ethernet operation, click on the TCP/IP button and enter the IP Address of the DSM. Note that the Serial setup information is grayed. When the IP address has been entered, press Enter to highlight the address and click on OK.



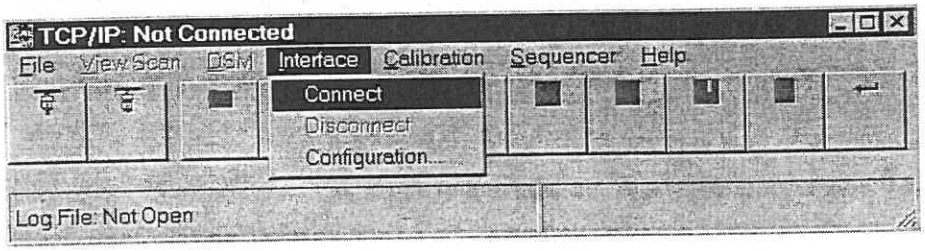
Network Connection

A connection to the network may be made by one of two ways:

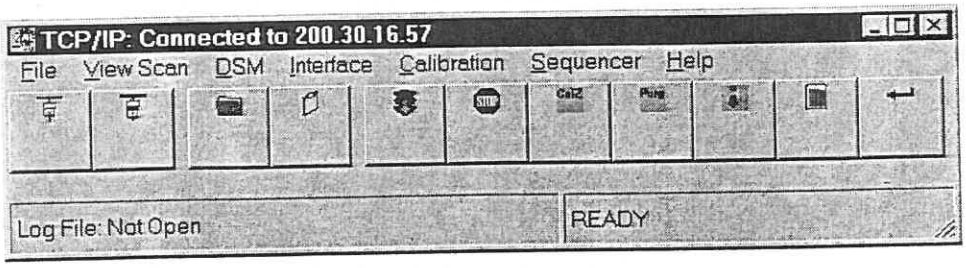


1. Move the mouse pointer to the left most button on the task bar and click once.

2. Or use the pull down menus
   Select: Interface
   Select: Connect



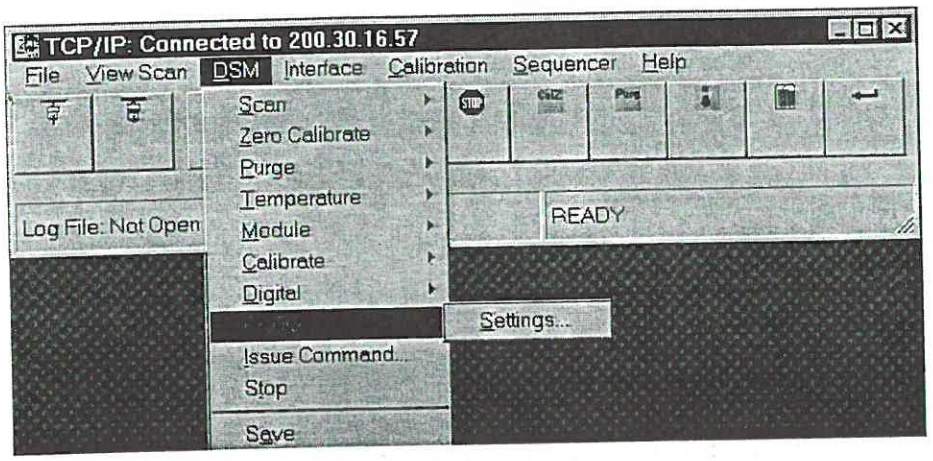
The Screen will give the message: Connecting to 200.30.yyy.xxx. When the DSM is connected, the message will change to : Connected to 200.30.yyy.xxx and "READY" will be displayed in the DSM Status window.



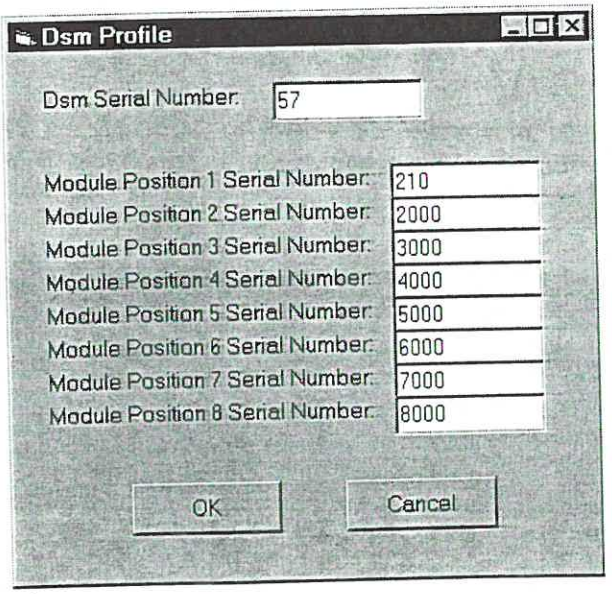
Profile Settings

The first setup parameters that must be entered or verified are the Module Profile Settings. These settings are used by the DSM to find and load the correct calibration coefficients.

Select: DSM
Select: Profile
Select: Settings



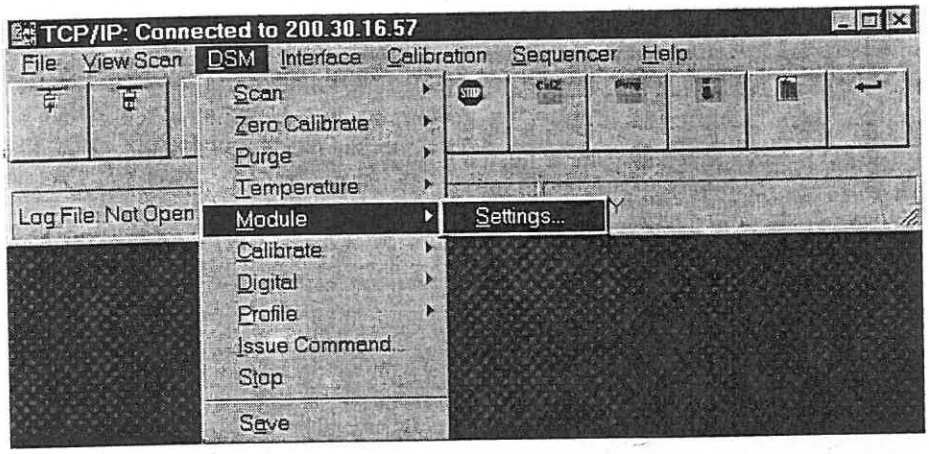
Enter the serial number of the DSM and the modules connected to each position. If a Module Profile File cannot be found by the DSM, an error will be logged.



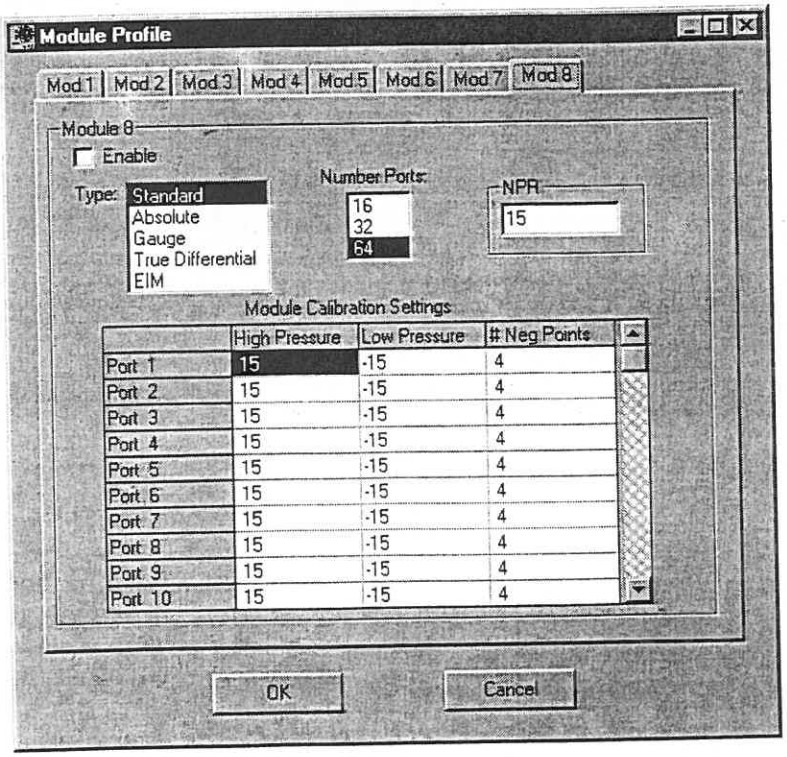
Module Settings

When the DSM is connected and the Profile entries are complete and correct, The DSM configuration must be verified.

Select: DSM
Select: Module
Select: Settings



This will open a window where module setup information may be entered. The setup information must be correct for each module.



Type: Click on the type of module connected.

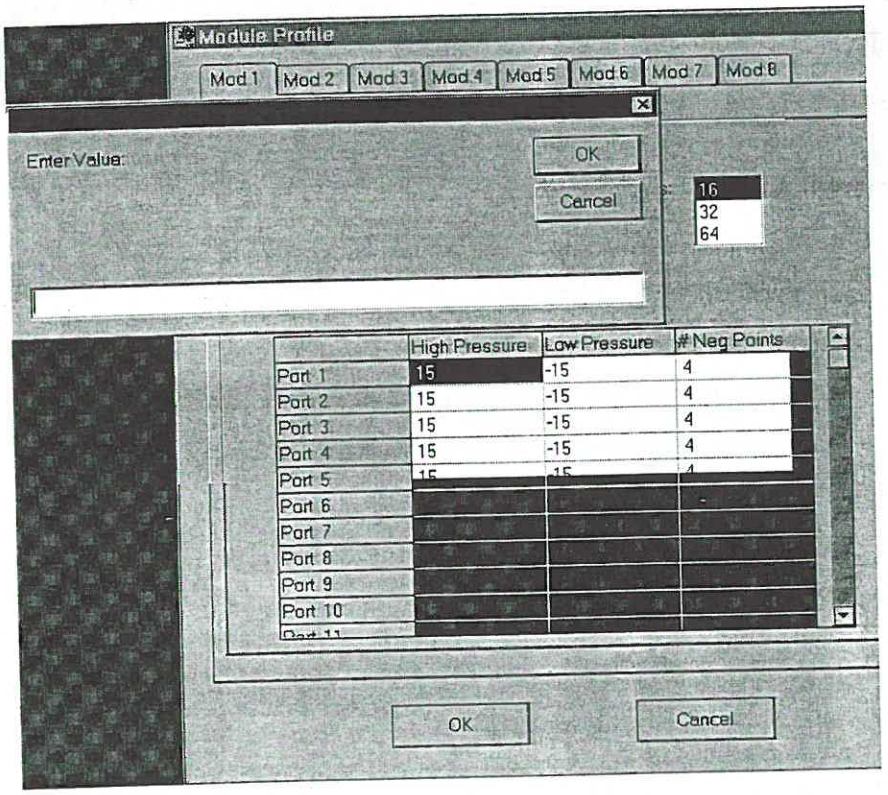
Number Ports: Click on he number of ports in the module.

Enable: Click this box if the module is to be scanned.

Module Settings: Enter the high and low pressure values for each channel by clicking on the applicable box and entering the pressure in the Enter Pressure Window. Click OK to enter the data. It is recommended that the value entered be 10 to 20% greater than the actual full scale value.

Enter the number of negative points used in the calibration. This is a critical parameter as the coefficient table could have large errors if the number does not match the MPF file data.

NPR: This is the nominal full scale pressure of the module. It is very important that this number be correct as it is used in the validation tests in the Calibration section. A 5 psi module may be calibrated to 5.5 psi, but the full scale value is still 5 psi.

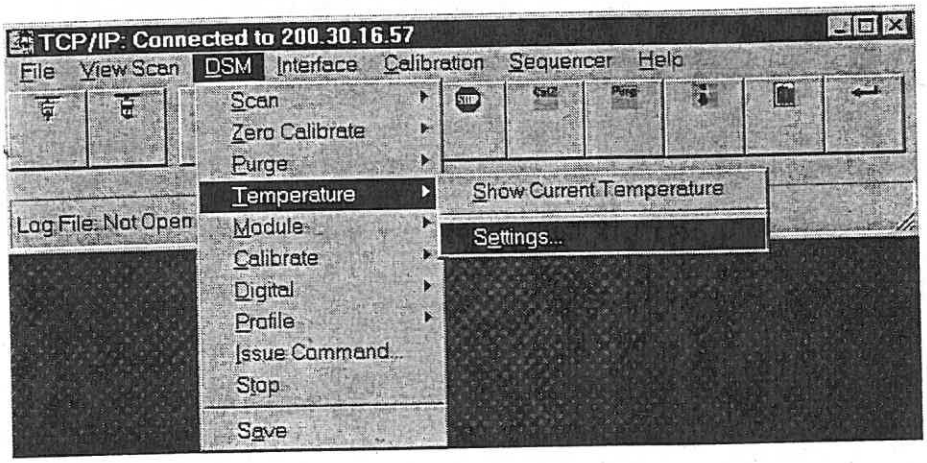


If more than one port or if the entire module will have the same values, the data entry process can be simplified by pointing the mouse pointer to the first port, clicking and holding the left button down, and dragging the pointer to the last port with the same value. At that time release the button and enter the value in the window. The value will be entered in all of the highlighted boxes.

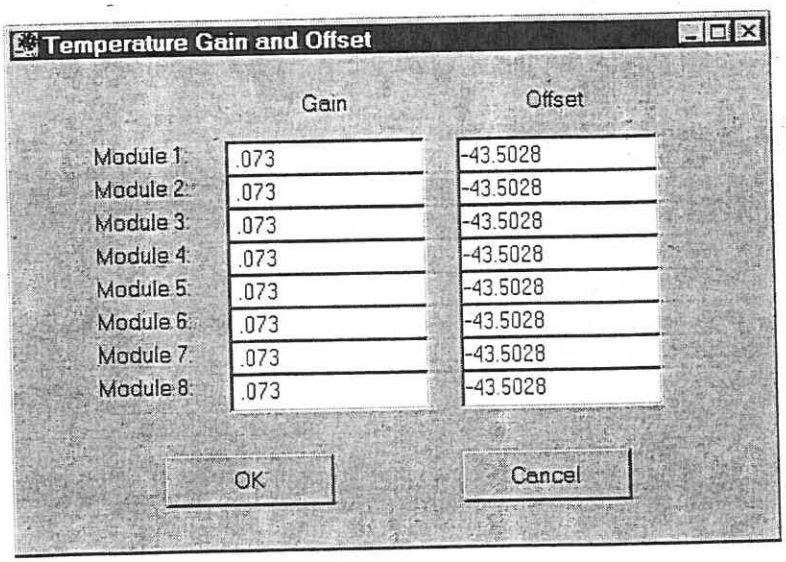
Temperature Settings

When all of the Module setup information has been entered and verified, the temperature settings must be checked.

Select: DSM
Select: Temperature
Select: Settings

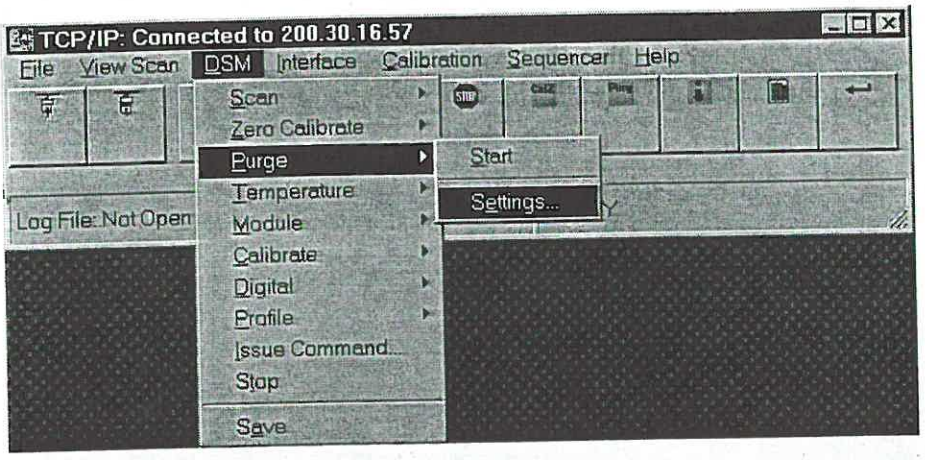


A window will open displaying the Gain and Offset settings for each module. The Gain and Offset settings are determined by the type of RTD installed in the ZOC Module. Most modules use a Nickel-Iron RTD(604Ω at 0°C). The values entered in the example below are the values for this RTD. When all of the values have been entered and verified, Click OK.



Purge Setup

Next, set up the Purge function. This step may be skipped if Purge will not be used.
Select: DSM
Select: Purge
Select: Settings



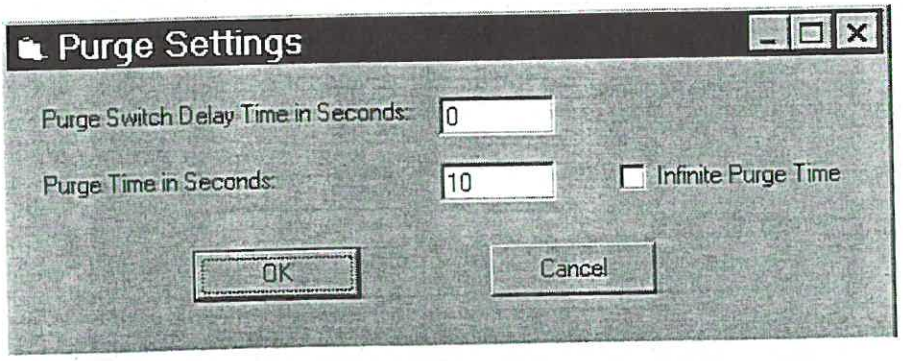
The Purge Settings Window will open.

Set the Purge Delay Time, in seconds. Valid values are 0 to 5 seconds.

Set the Purge Time, in seconds. Valid values are 10 to 3600 seconds.

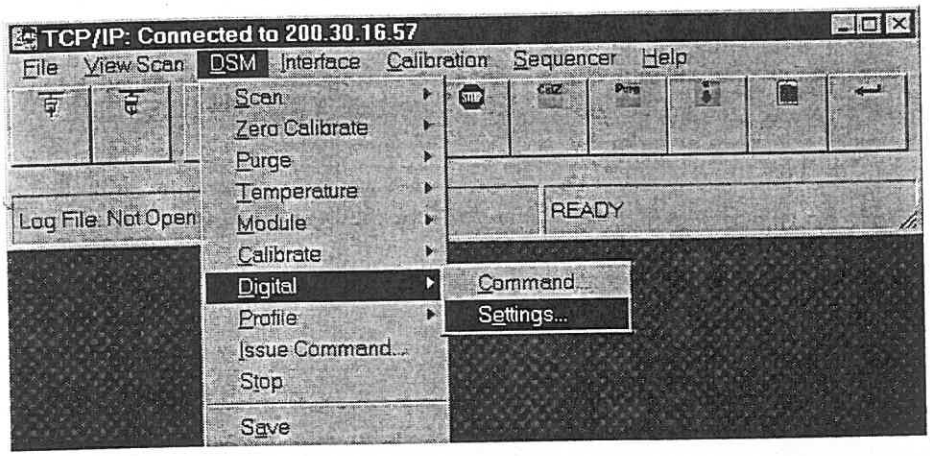
If an infinite Purge Time is desired, Click on the Infinite Purge Time Box.

Click OK when all of the data are entered.

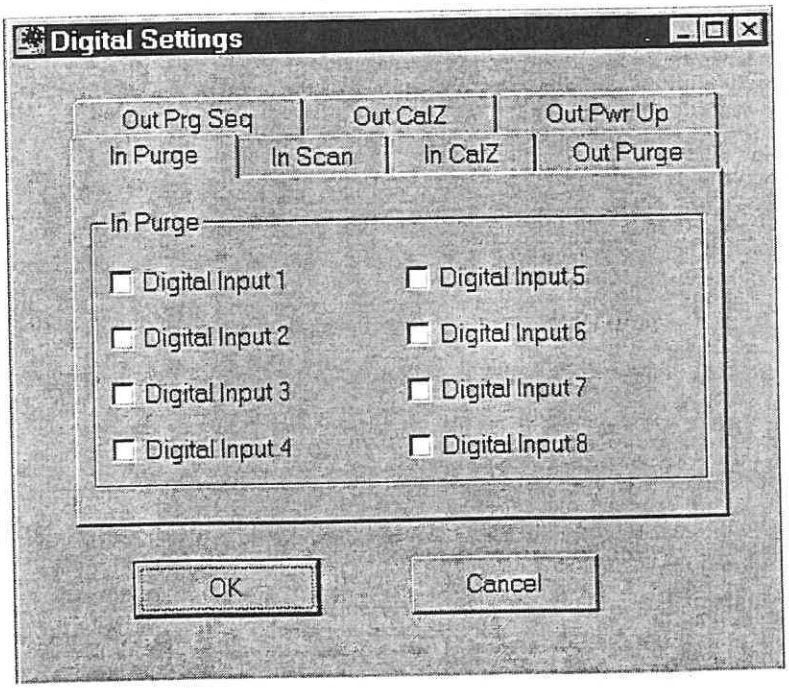


Digital Inputs and Outputs

Set the Digital Inputs.
Select: DSM
Select: Digital
Select Settings

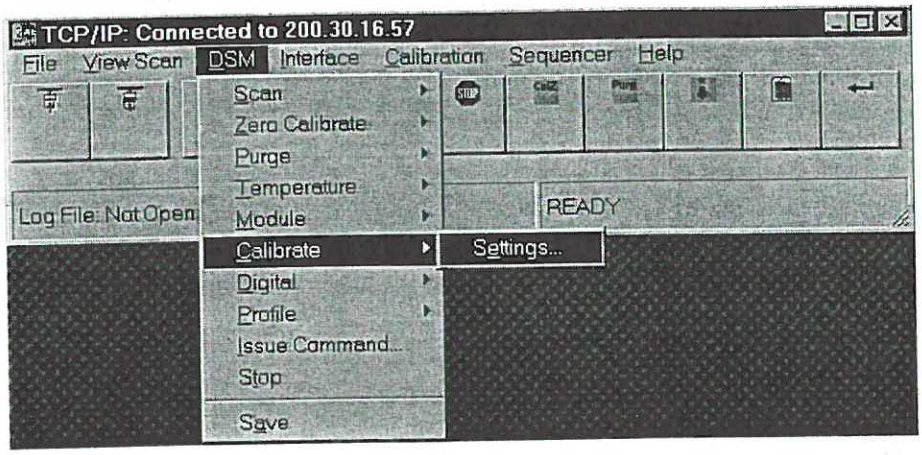


The Digital Settings Window will open. Digital Inputs are activated by clicking the button for the applicable input. The function will be activated or deactivated when the input is sensed. When the settings are completed, Click OK.

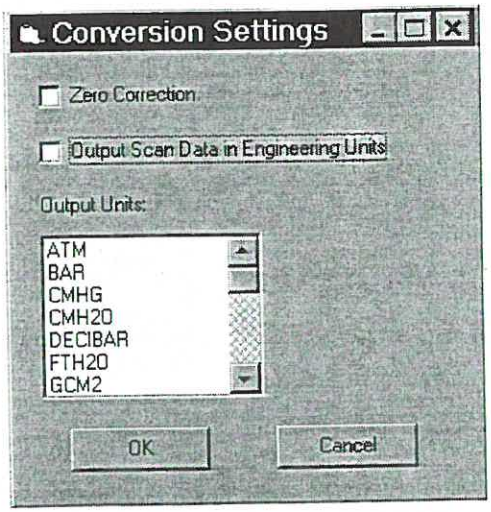


Calibration Variables

Set up the Calibration Variables.
Select: DSM
Select: Calibrate
Select: Settings



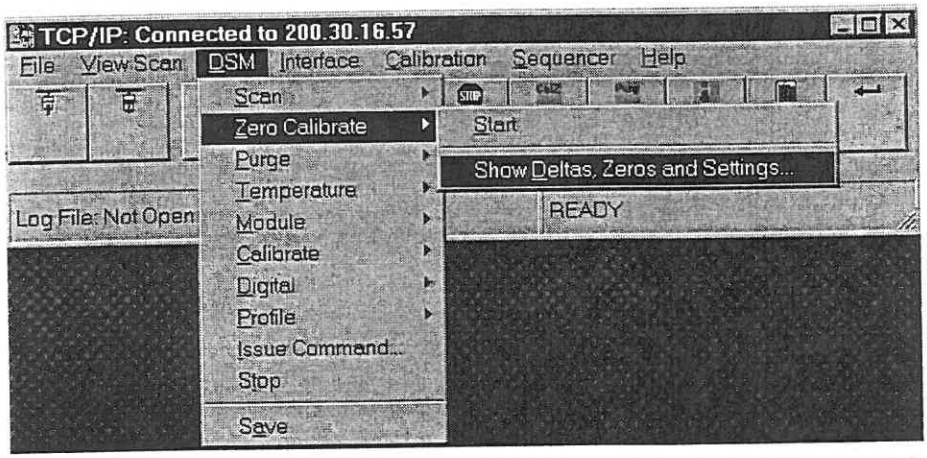
The Conversion Settings Window will open. Click on the output units desired. Click on the Output Scan Data in Engineering Units Box if Data output is to be in Engineering Units. Click on the Zero Correction Box if the zero offset data is to be used. to output data in units other than one of the pre defined units, Click User Defined Units and enter the value in the box.



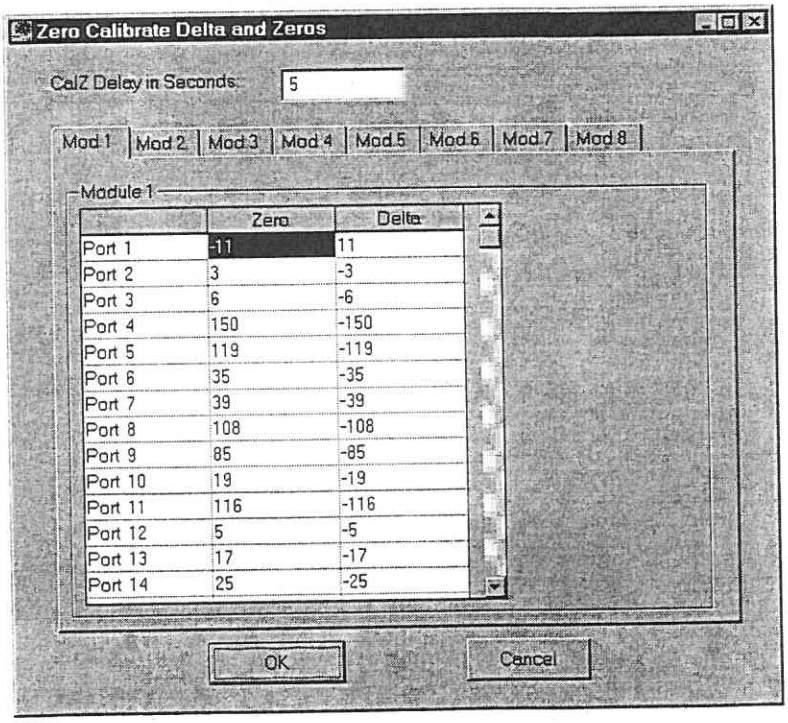
Zero Calibration

Set up the Zero Calibrate Function

Select: DSM
Select: Zero Calibrate
Select: Show Deltas and Zero



A window will open that will display the Zeros and the Deltas. The Zeros represent the offset in A/D counts measured during the most recent CALZ. Deltas represent the difference between the measured Zero and the data in the temperature plane when the CALZ was executed. The Delta value is an indication of the drift of the sensors. A very large Delta may indicate the need for a full calibration.

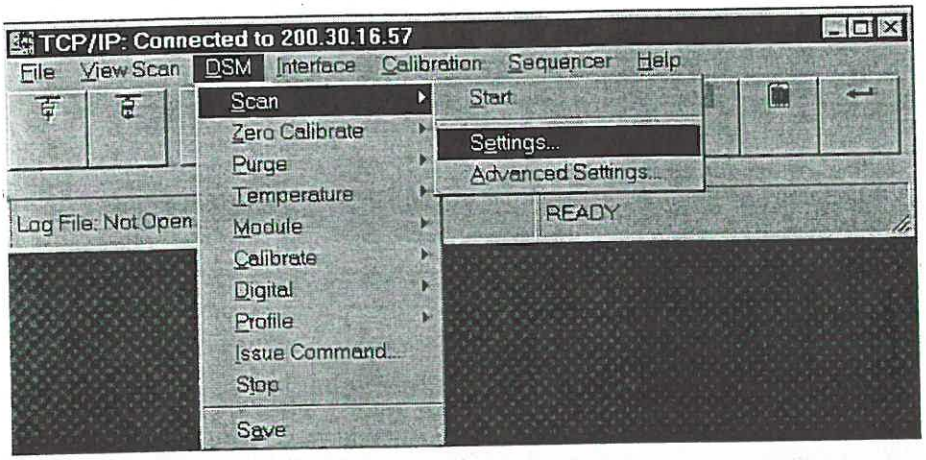


	Zero	Delta
Port 1	-11	11
Port 2	3	-3
Port 3	6	-6
Port 4	150	-150
Port 5	119	-119
Port 6	35	-35
Port 7	39	-39
Port 8	108	-108
Port 9	85	-85
Port 10	19	-19
Port 11	116	-116
Port 12	5	-5
Port 13	17	-17
Port 14	25	-25

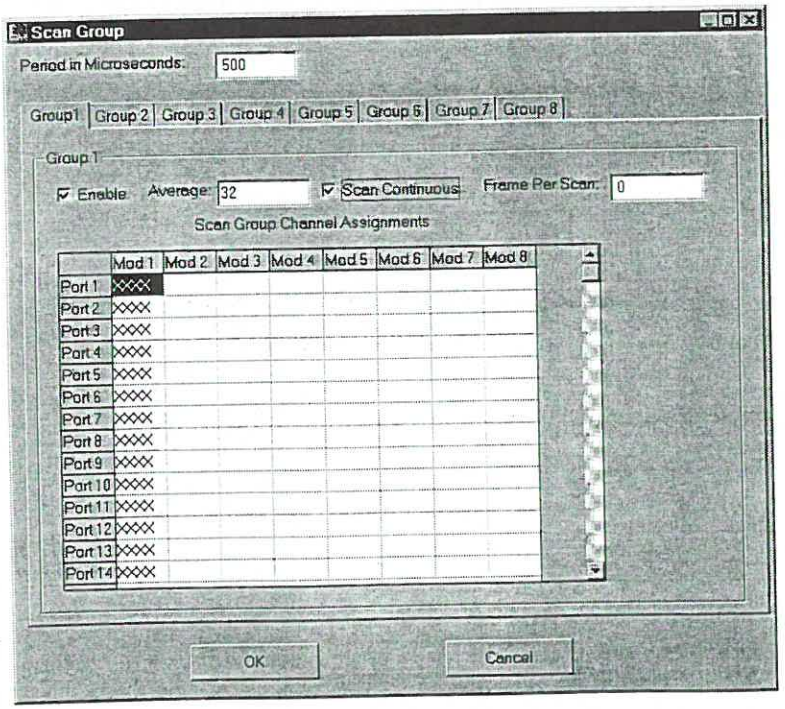
Scan Groups

Finally, set up the Scan Groups

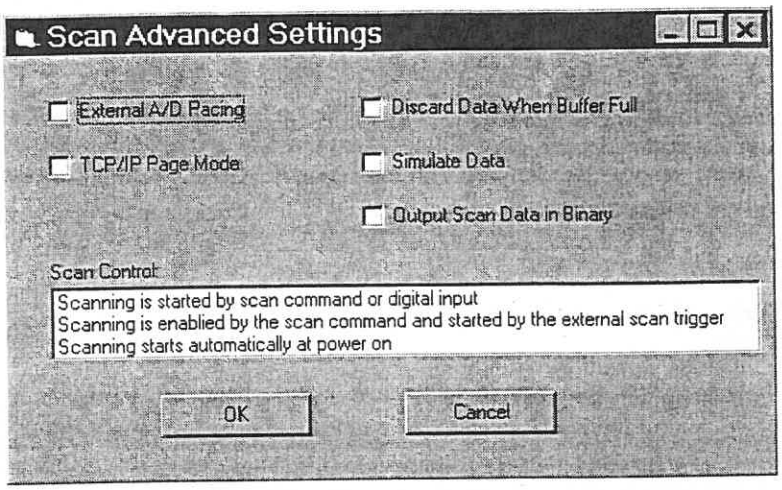
Select: DSM
Select: Scan
Select: Settings



The Scan Group window will open. The Period, Scan Average, and Frames per scan must be set according to the DSM Software Requirements Specification. Scan Groups are enabled by clicking the enable box. Channels are assigned to scan groups by clicking the appropriate box.



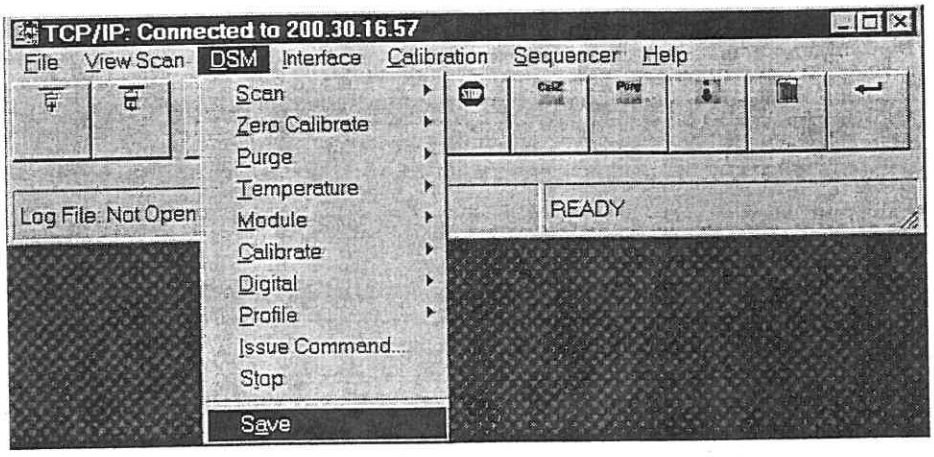
If the Advanced box is clicked, another window will be opened.



This window contains settings that normally do not need to be accessed or modified. For more information, please refer to the DSM Software Requirements Specification.

Save

SAVE the Settings:
Select: DSM
Select: Save

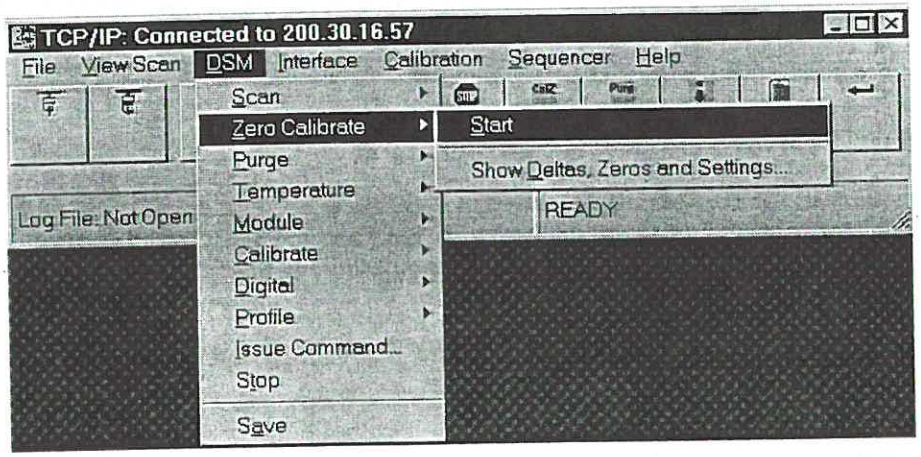


DSMLINK Operation - Program Operation

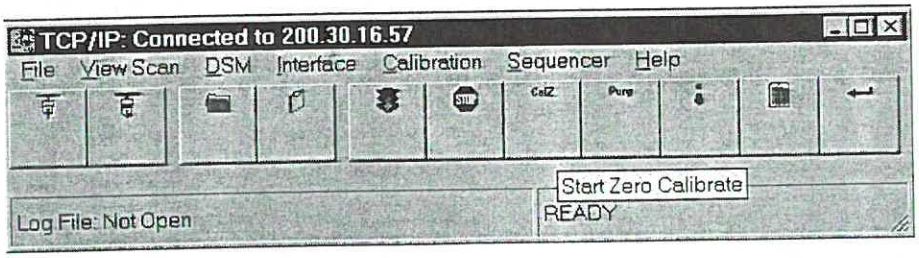
Zero Correction

A user is advised to update the Zero Correction file on a regular basis. Zeros should be updated whenever there has been a significant temperature change to the module environment. Also, Zeros should be updated once a day to insure that there has not been an unusual amount of zero drift. To update the Zero Correction File:

Select: DSM
Select: Zero Calibrate
Select: Start



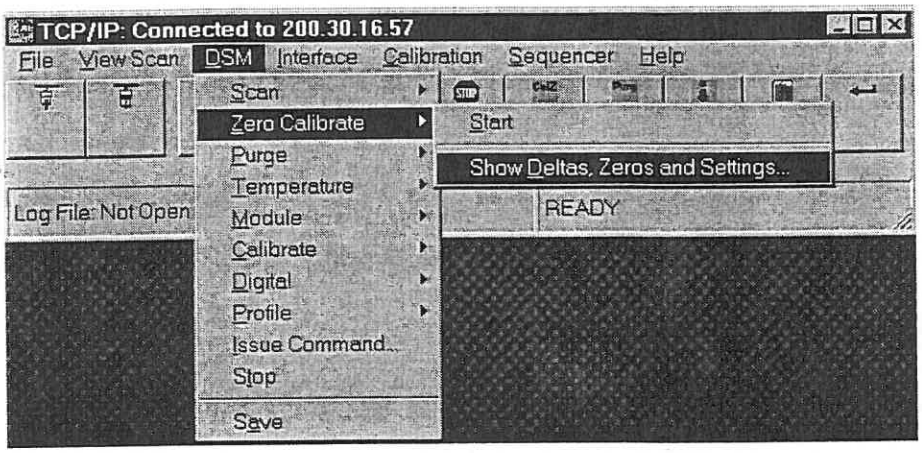
Or, Click on the CALZ Button on the Button Bar.



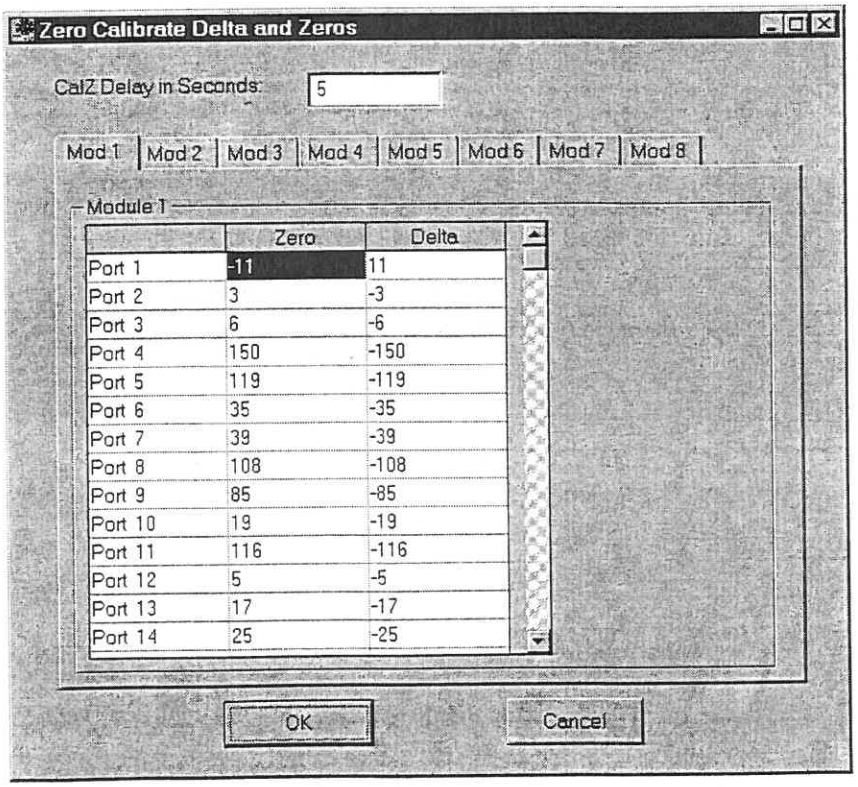
The DSM will update the Zero Correction File.

To View the Zero Correction Values:

Select: DSM
Select: Zero Correction
Select: Show Deltas, Zeros and Settings...



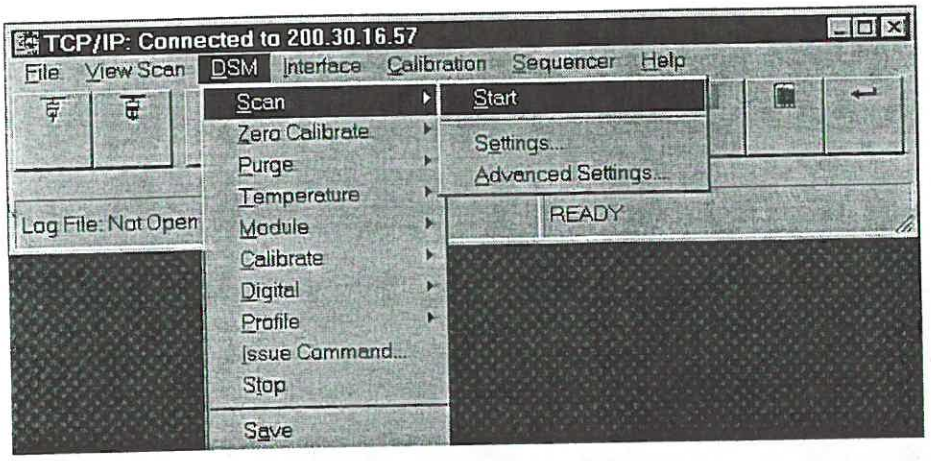
This will open the Zero Calibrate Delta and Zeros Window.



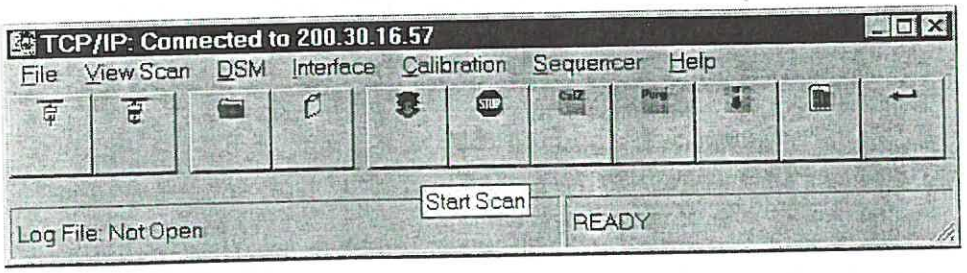
Scan

To initiate a Scan when a bar graph display will not be used:

Select: DSM
Select: Scan
Select: Start



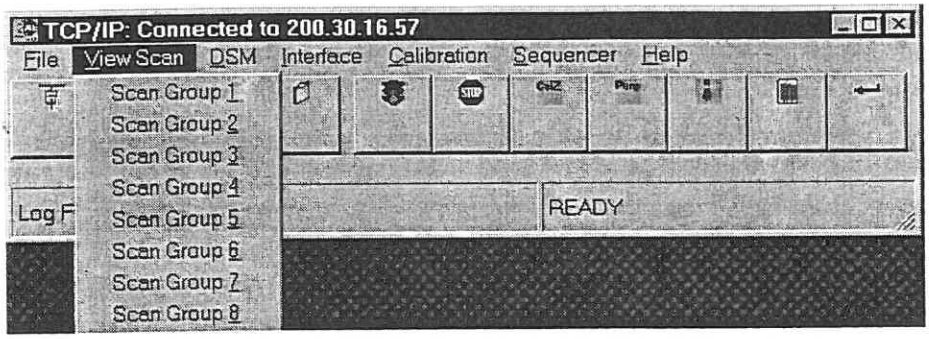
Or, Click the Scan Button on the Button Bar



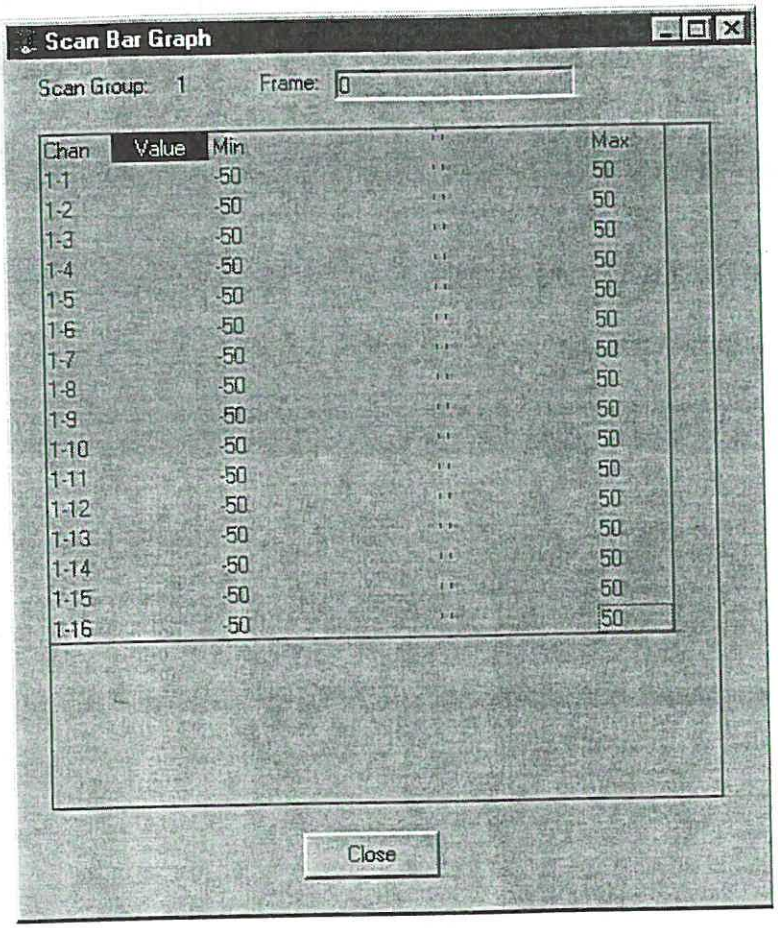
To initiate a Scan with a bar graph display:

Select: ViewScan

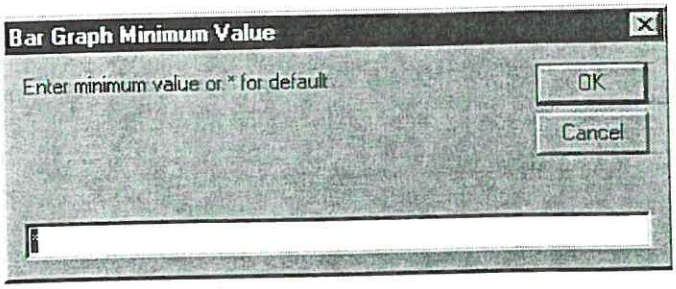
A drop down menu listing all eight scan groups will be displayed. Click on the scan group to be displayed. Multiple scan groups may be displayed, but a scan group window will have to be opened for each one.. A scan can then be initiated by clicking the Scan Button on the Button Bar.



The Scan Bar Graph window will open. Initially it will display the scan group with minimum and maximum values determined by the full scale values entered in the Module Profile Files. A user may rescale the bar graph. Individual channels, multiple channels or the entire group may be re-scaled.



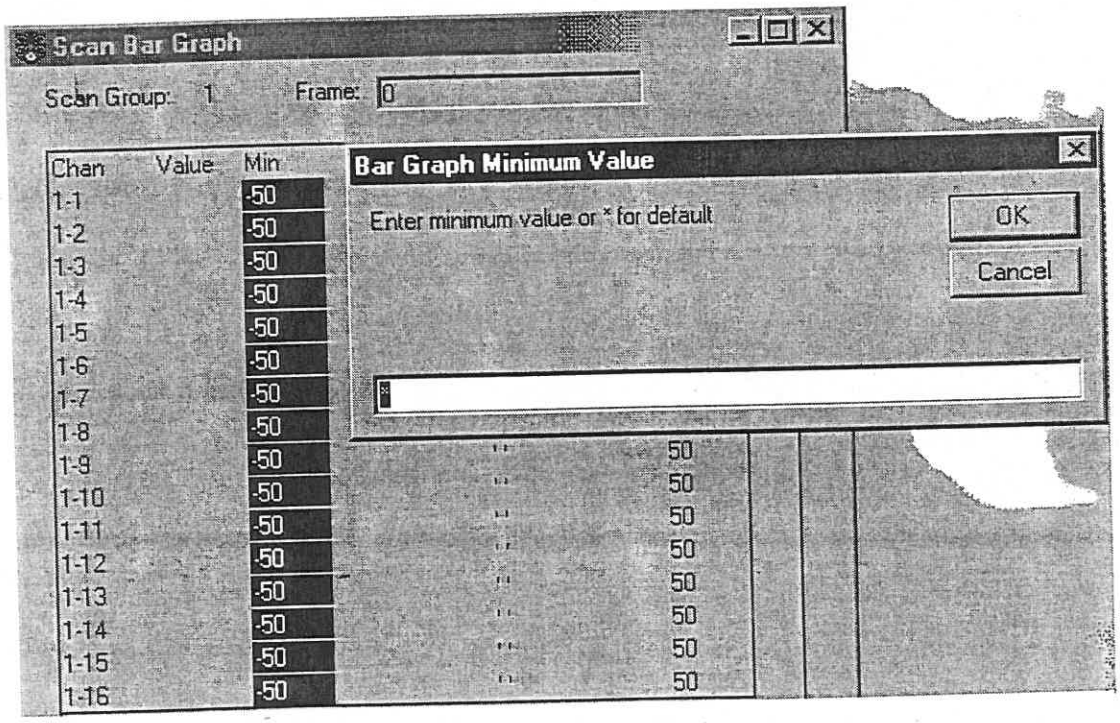
To change an individual channel, click on the Min or Max value to be changed. A Bar Graph Minimum or Maximum window will open. Enter the new value or * for the default value.



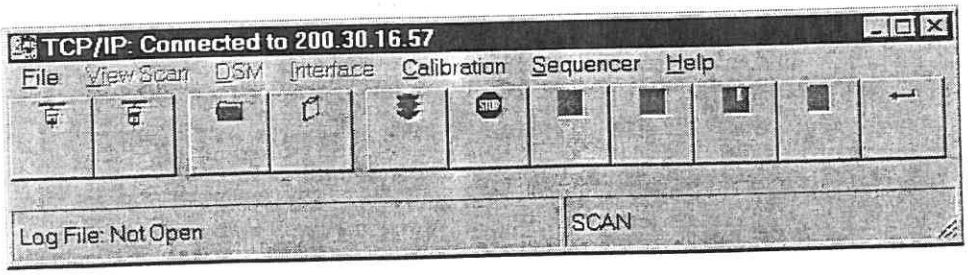
Multiple channels or all channels may be modified by:

1. Position the mouse pointer at the first channel to be modified.
2. Hold the left mouse button down
3. Drag the pointer to the last channel to be modified.
4. At the last channel, release the left mouse button. The channels that will be changed will be highlighted.

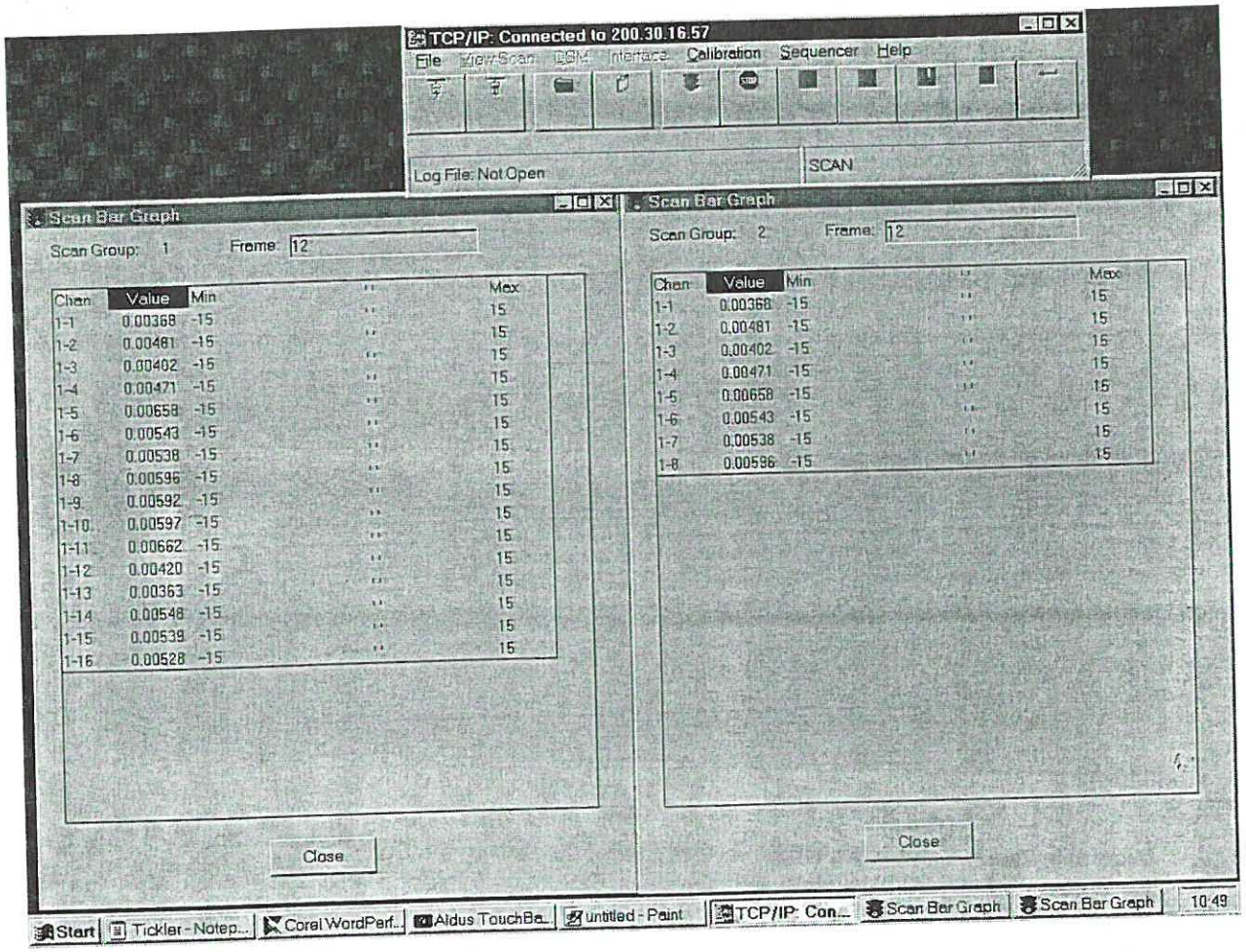
The Bar Graph Minimum or Maximum Value window. Enter the new value or * for the default value.



When the values are set, the scan may be initiated by clicking the Scan Button. The status window will display: SCAN. All Buttons except the Stop, Open Log File and Close Log File Buttons will be grayed out.



To View multiple Scan Groups, Click on ViewScan for each Scan Group desired. The windows will tile over one another, so the windows will have to be dragged to areas of the screen where they can be easily viewed.
For example, if two Scan Groups are to be displayed, the screen may look similar to the example below:

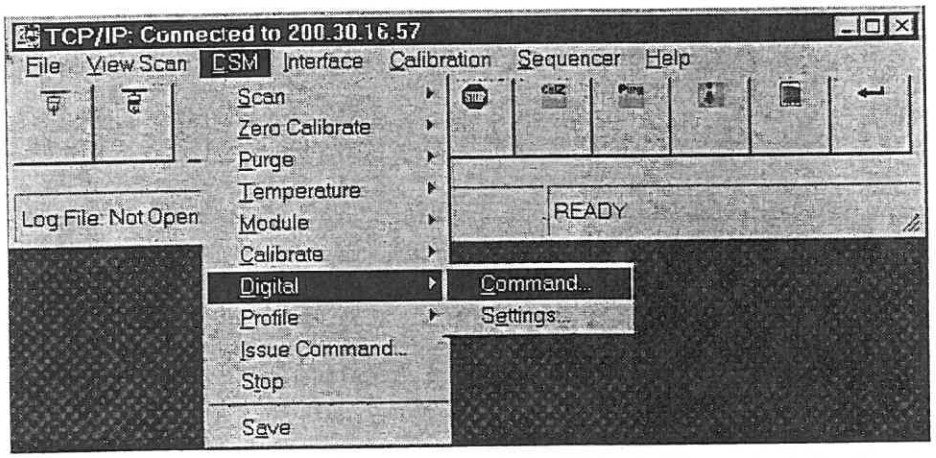


The Scan Data will be displayed in the Scan Groups defined during Setup.

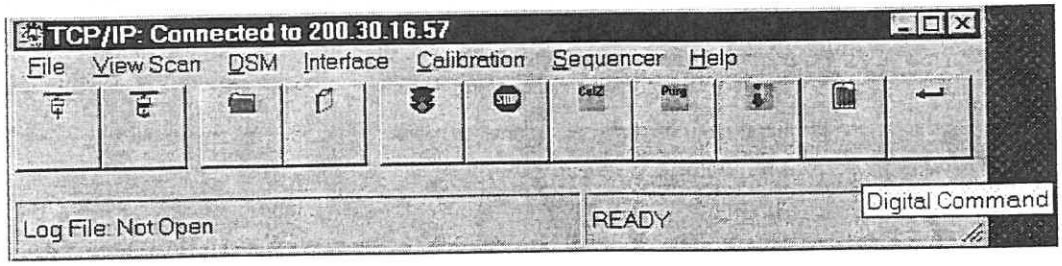
Digital Commands

The Digital Outputs may be commanded on and off during normal operation of the DSM. The commands will only be accepted if the DSM is in the Ready Mode. If the DSM is in the Scan, CalZ, or Purge Mode the command will not be accepted. To issue a Digital Output Command:

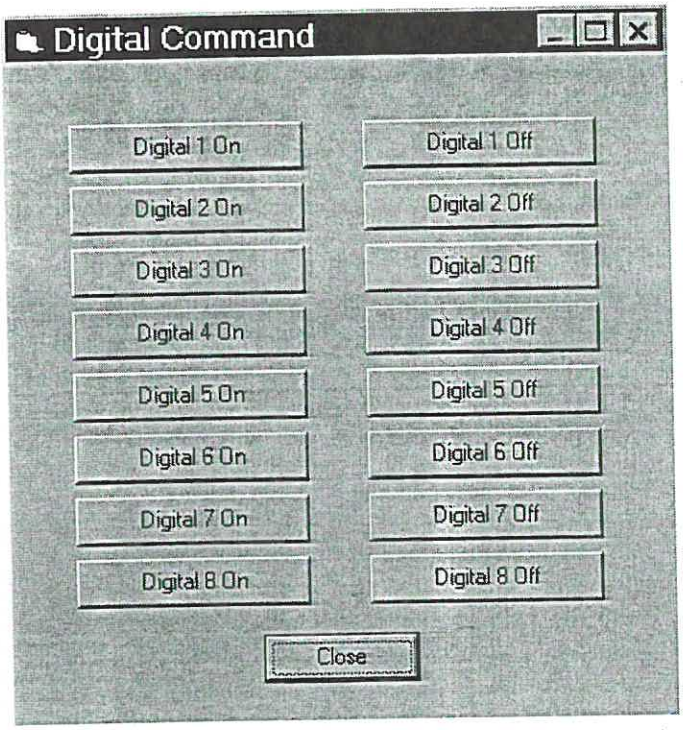
Select: DSM
Select: Digital
Select: Command



Or, Click the Digital Command Button on the Button Bar.



A Digital Command Window will open:

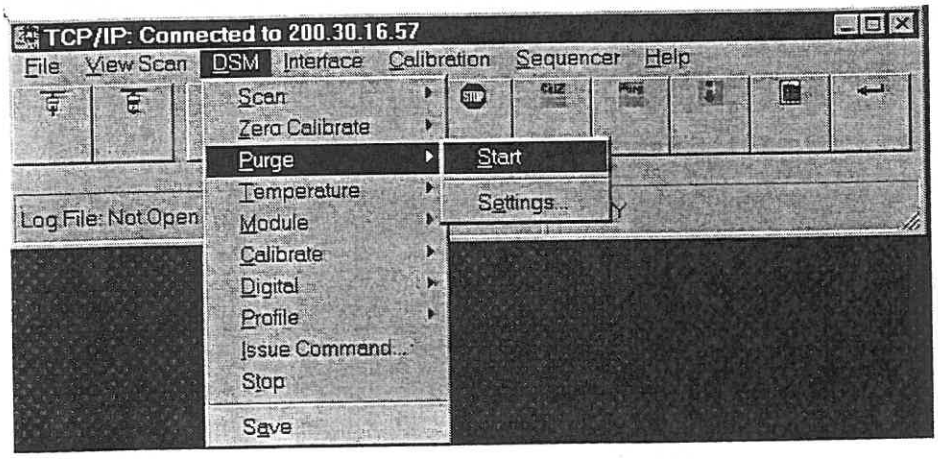


The Digital Outputs may be commanded On or Off by simply Clicking on the Button.

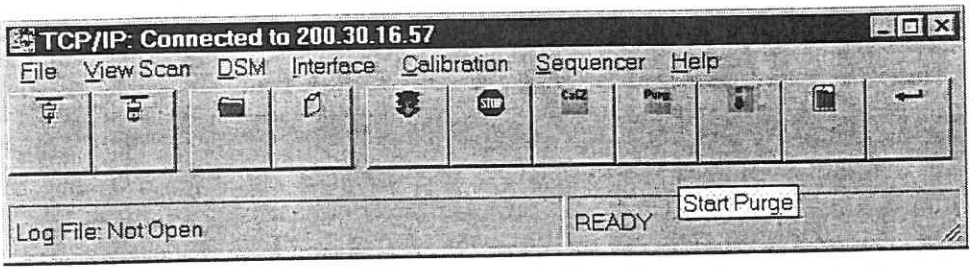
Purge

A Purge may be initiated at any time during program operation. If the DSM is in the Scan Mode, the Scan will be suspended until the Purge Sequence is completed. If the DSM is in the CalZ Mode, the Purge Sequence will commence when the CalZ is complete. For more information, please refer to the DSM Software Requirements Specification. To initiate a Purge Sequence:

Select: DSM
Select: Purge
Select: Start



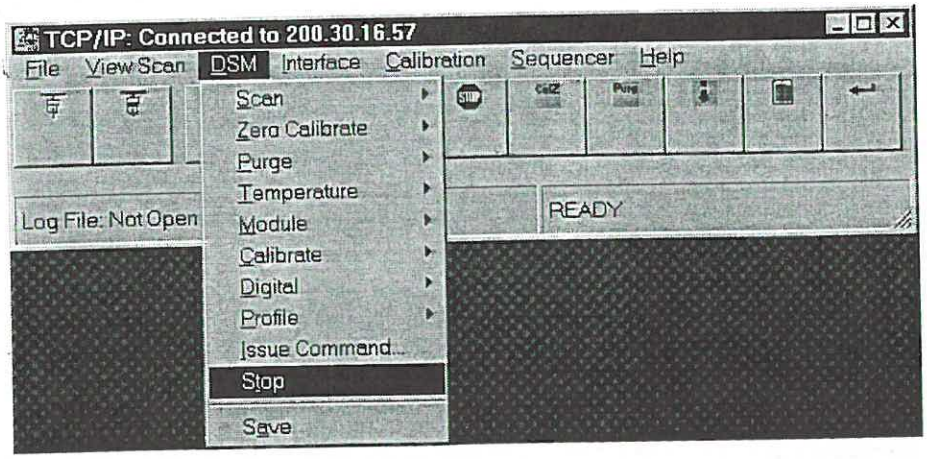
Or, Click the Purge Button on the Button Bar



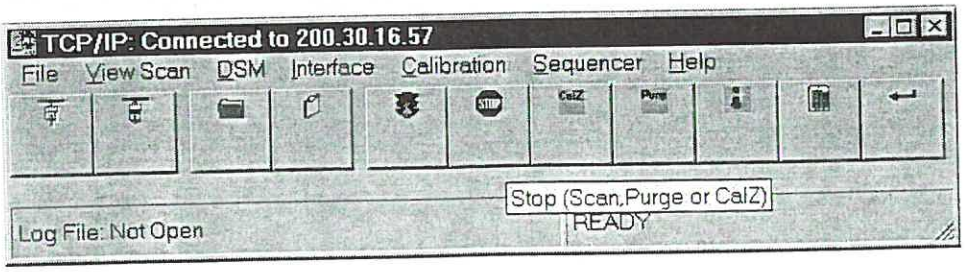
Stop

The Stop Command is used to Stop or Abort the Scan, CalZ, or Purge Operations. To issue a Stop Command:

Select: DSM
Select: Stop



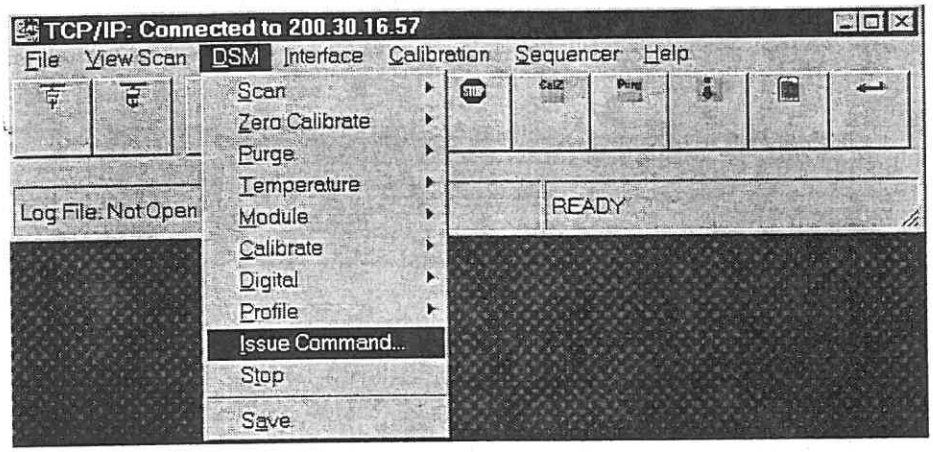
Or, Click the Stop Button on the Button Bar



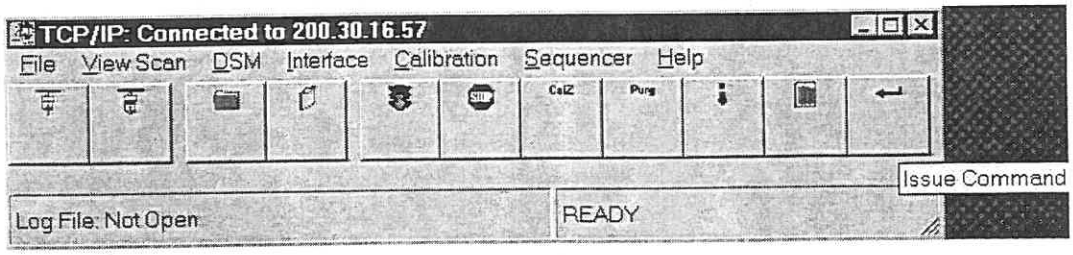
Issue Command

All of the Commands listed in the DSM Software Requirements Specification may be executed by the Issue Command Function. To use this function:

Select: DSM
Select: Issue Command

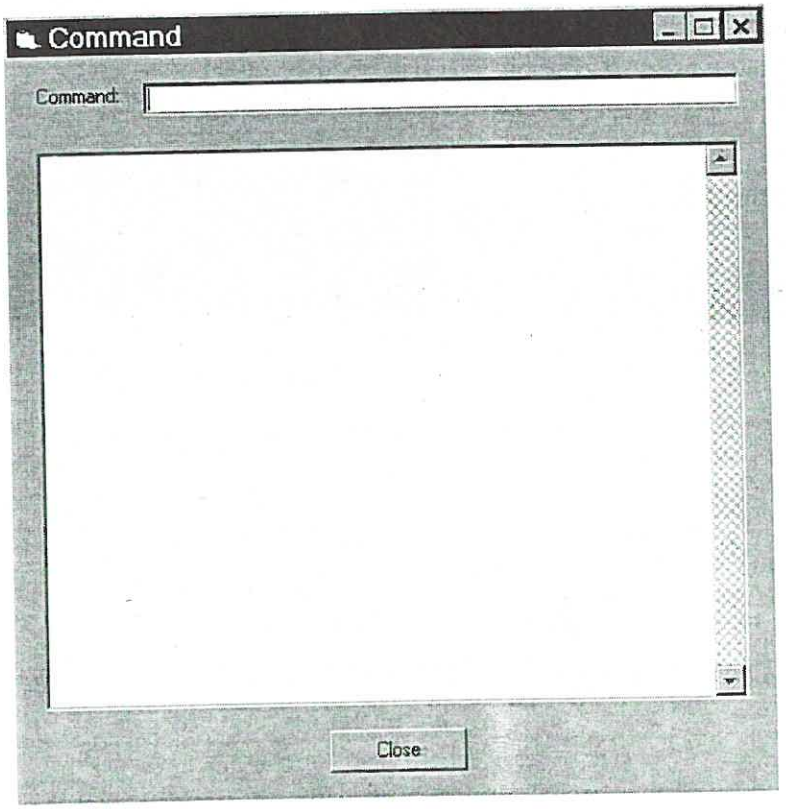


Or, Click the Issue Command Button on the Button Bar.



A Command Window will open. The command should be typed in the box marked Command:. The response from the DSM will be displayed in the larger box below. A complete description of the commands and the responses may be found in the DSM Software Requirements Specification.

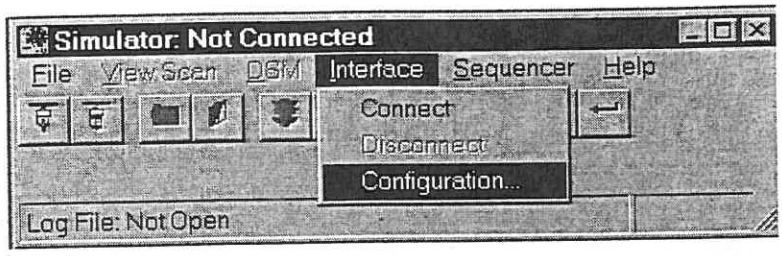
NOTE: A user may find that certain variables are not accessible from the "drop down" menus. These variables could have a detrimental effect on the operation of the Calibration software if they are not set correctly. All variables are accessible from the Command Window. Therefore a user must take care to insure that the variable being modified will not cause operational problems.



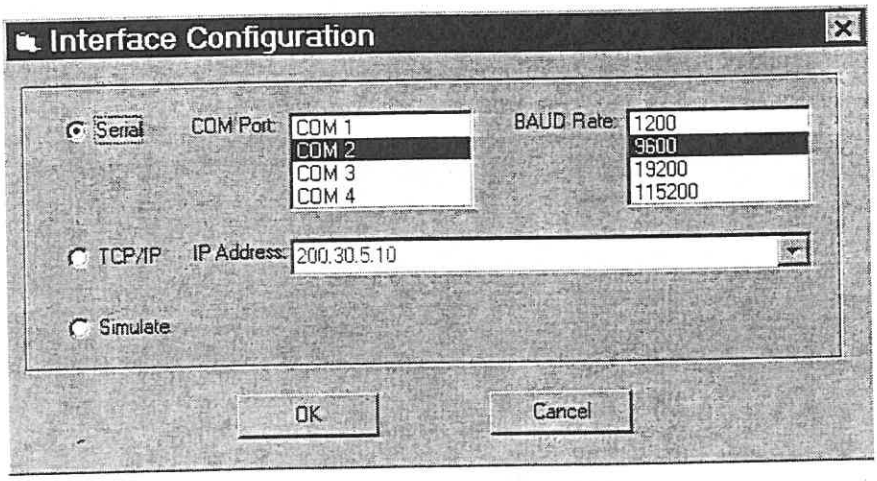
Serial Setup

The DSM can be set up to communicate in a serial mode.

Select: Interface
Select: Configuration...



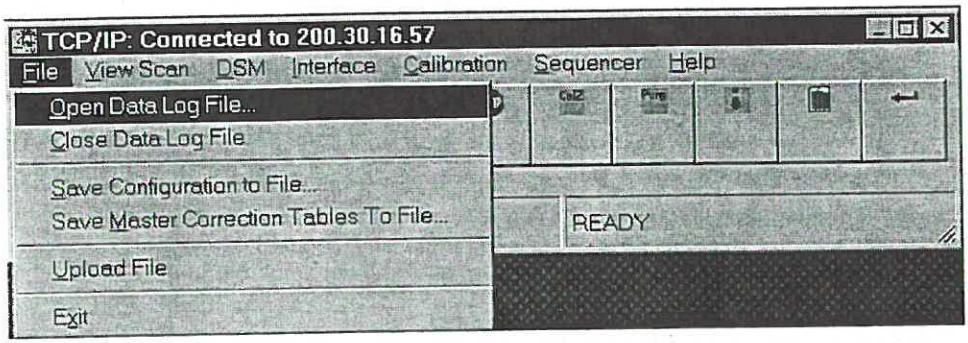
The Interface Configuration Window will open.
Click: Serial
Click on the COM Port to be used.
Click on the BAUD Rate.
Click OK when the configuration is correct.



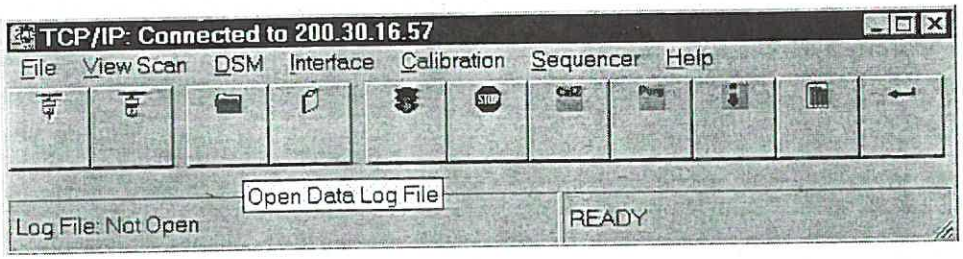
DSMLINK Operation - File Operation

Open Data Log File

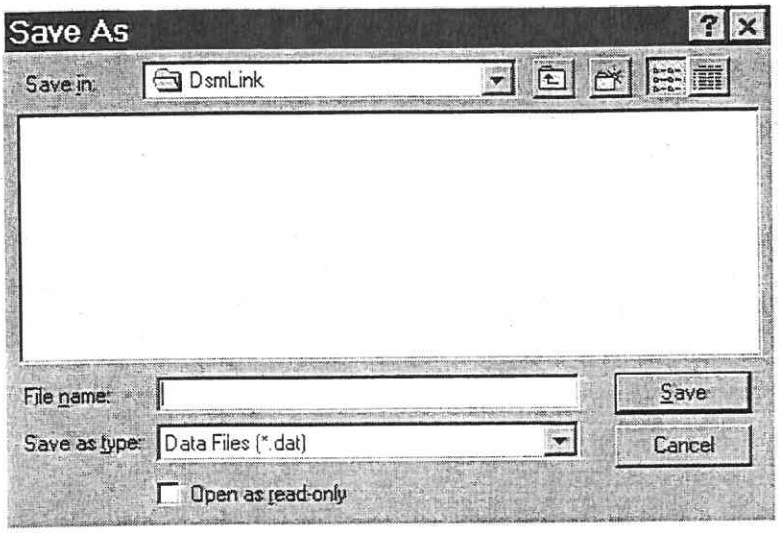
Scan Data may be logged to a file.
Select: File
Select: Open Data Log File...



Or, Click on the Open Data Log File Button on the Button Bar

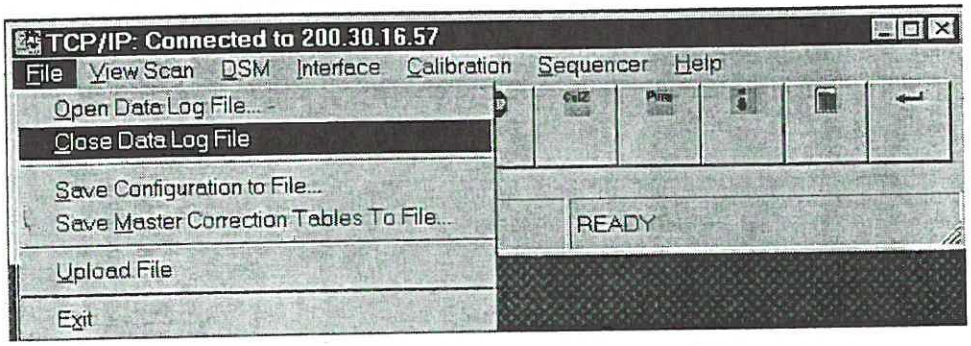


When Open Data Log File is selected, a window is opened that will permit the user to select a directory and file name. The file extension: .dat, must be used. Click save to open the file.

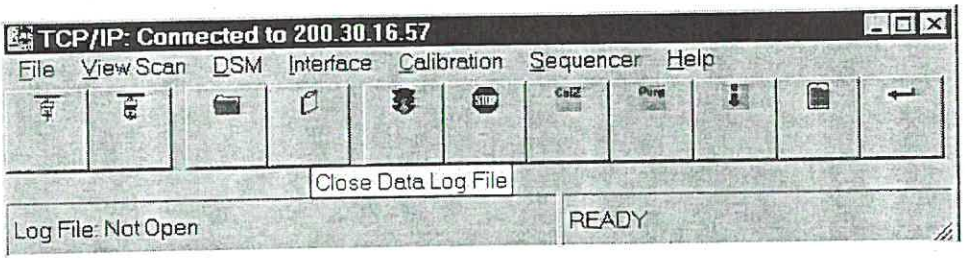


Close Data Log File

To Close a Data Log File:
Select: File
Select: Close Data Log File



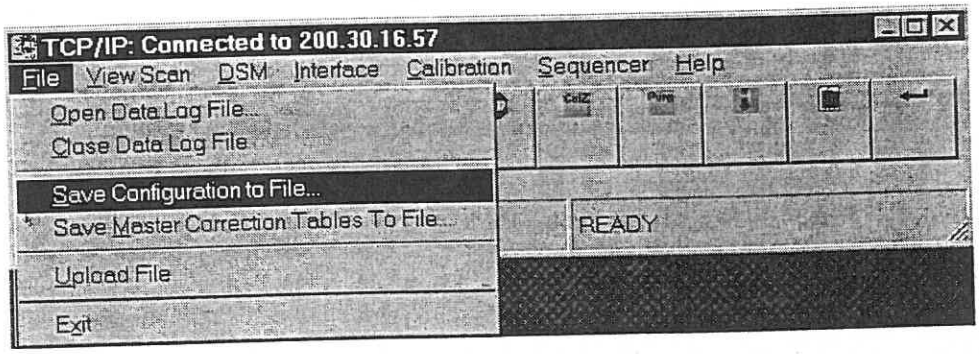
Or, Click the Close Data Log File Button on the Button Bar.



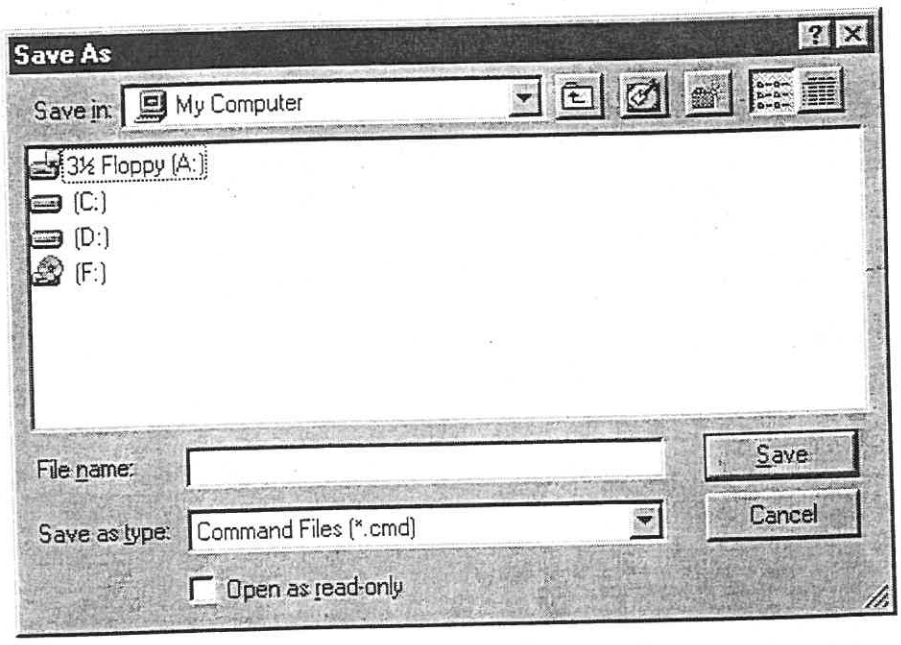
Save Configuration

It is possible to save configurations to a file so they may be recalled for another test..

Select: File
Select: Save Configuration to File...



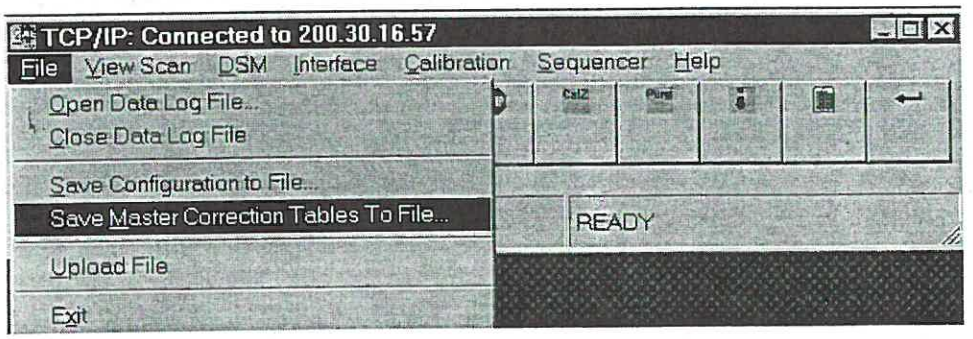
This will open a window that will list the saved configuration files. Any name may be used, but the extension: .cmd must be used. Click Save to store the configuration.



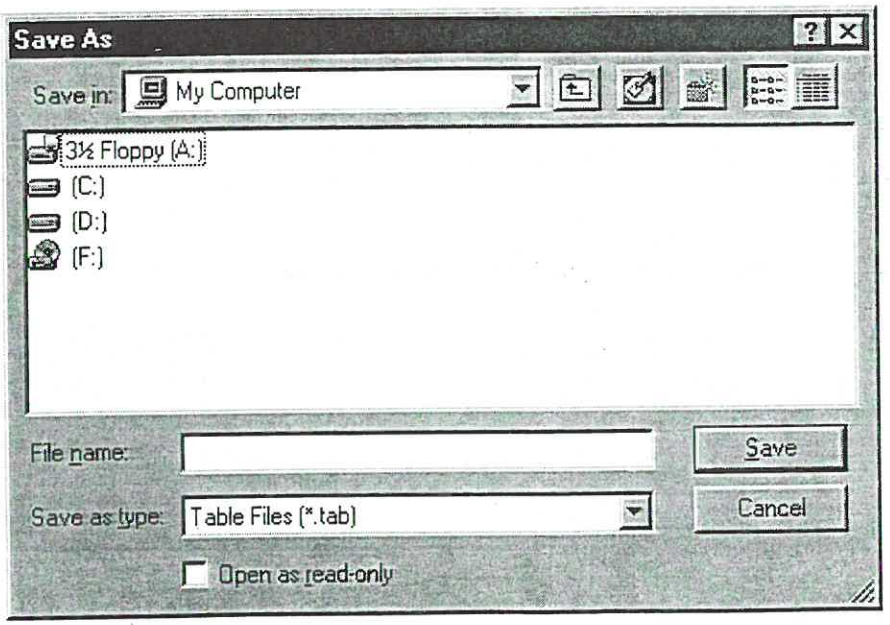
Save Master Correction Tables

The Master Correction Tables may be saved in a file. It is important to execute this command after a calibration.

Select: File
Select: Save Master Correction Tables To File...



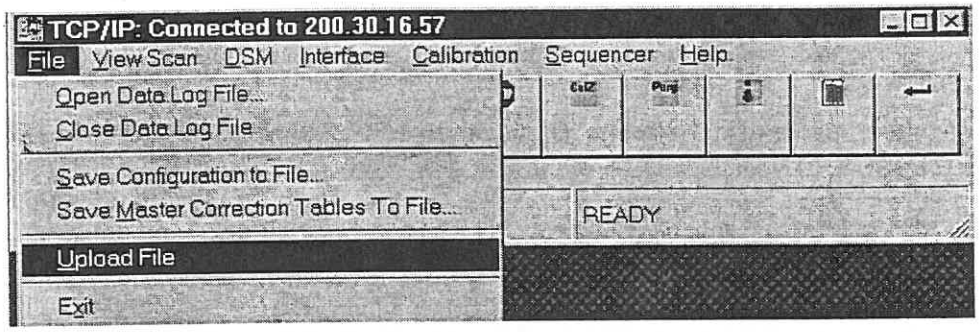
This will open a window that will permit a directory and file name to be selected. The extension: .tab must be used. Click save to complete the operation.



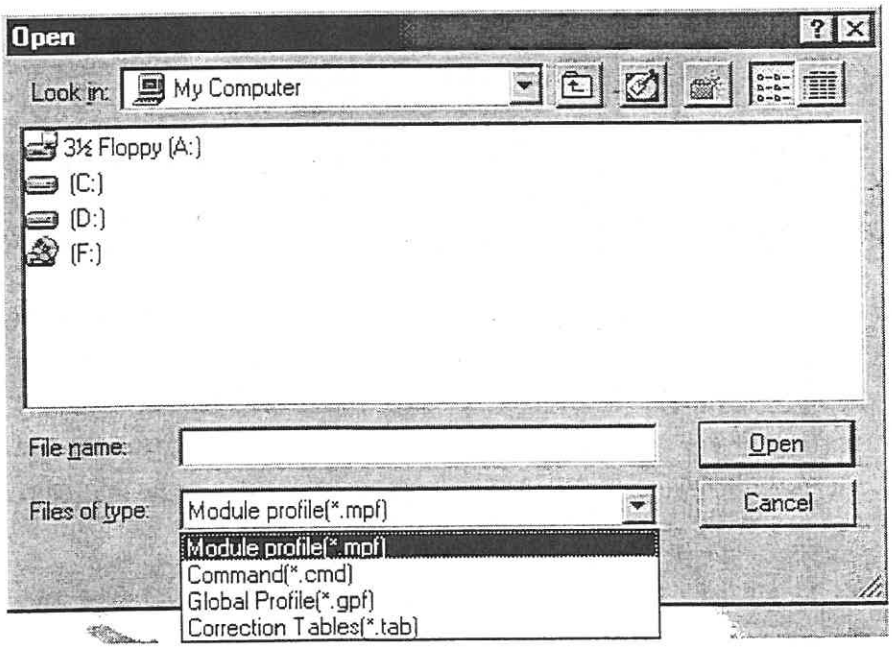
UpLoad File

A file stored on disk may be uploaded to the DSM.

Select: File
Select: Upload File



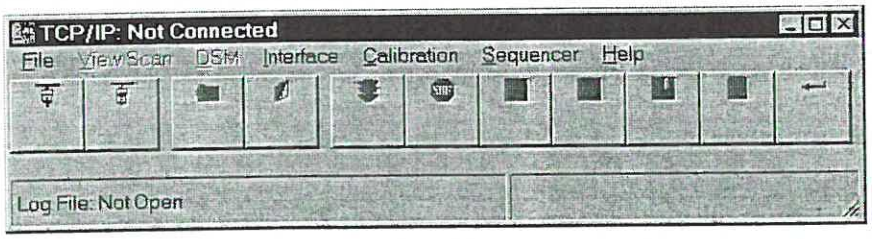
A window will open so a file type may be specified and the location can be selected for the UPLOAD. The File extension must be .mpf, .cmd, .gpf, or .tab. The information in these files are loaded into memory.



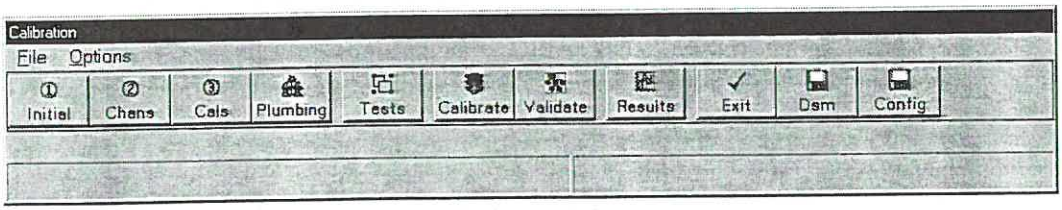
Calibration

The DSMLink Software contains a stand-alone Calibration program. This program can be used to calibrate any ZOC module connected to a DSM or DSAENCL. The software is designed to only work with a SPC3000, SPC2500, or CALMOD2000 manufactured by Scanivalve Corp.

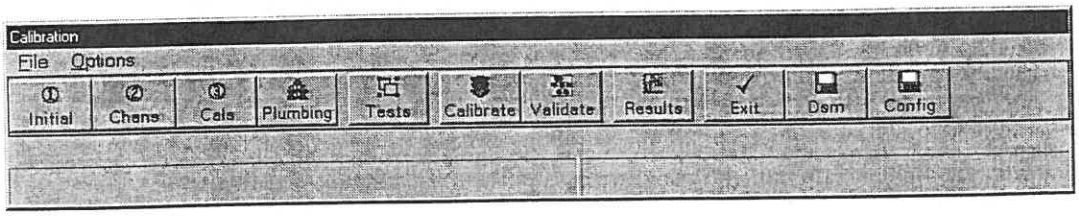
To open the Calibration Software, DSMLink must be running, but not connected to the DSM/DSAENCL containing the module(s) to be calibrated.



Click on **Calibration**
The Calibration Window will open.



The Window contains eleven task buttons and two menu options: **File** and **Options**. The task buttons are used to set up a configuration for calibration, test the configuration, calibrate the module(s), verify the results of the calibration, and print the data.



Initial This button is used to Initialize the Calibrator(s). Channel A/D Thresholds and Test Limits may be set using this button.

Chans This button is used to enable or disable modules and channels for calibration.

Cals This button is used to setup the calibrator(s) to be used in the calibration.

Plumbing This button is used to assign calibrators to module and setup and run the system plumbing test.

Tests This button is used to select and run the three stability tests: Noise, Rails, and Leak.

Calibrate This button is used to select and run the Calibration.

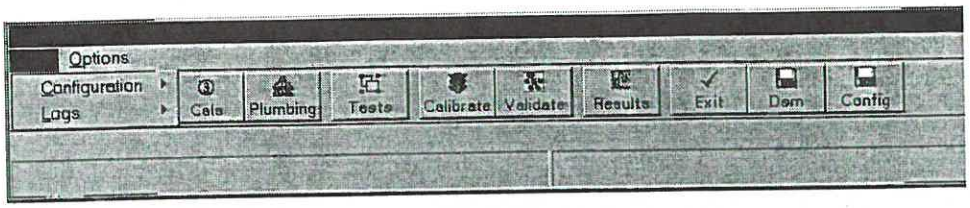
Validate This button is used to select and run the Validation tests.

Results This button is used to view and print the results of the Validation test.

Exit This button exits the calibration section and returns to the DSMLink main task bar.

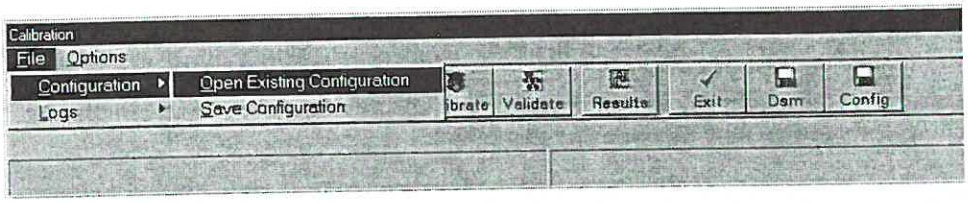
DSM This button will save changes made in the calibration section to the DSM.

Config This button saves configuration data to the current Configuration file.

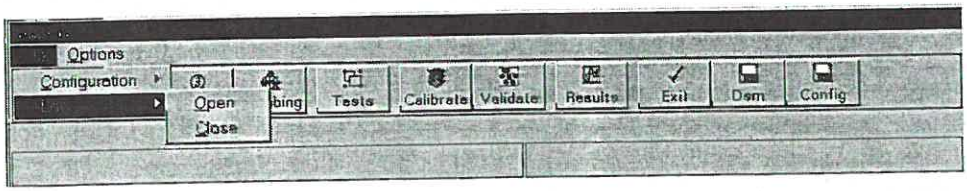


The File Menu Option contains two sub-menu options: Configuration and Logs

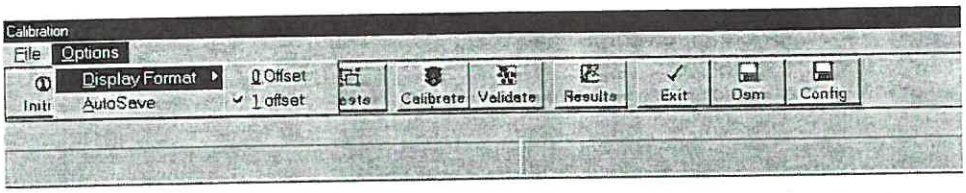
Configuration This function is used to open an existing, or save a new, calibration configuration file.



Logs This function is used to open or close a Log file of the calibration process.



The Options menu also contains two sub-menu items: Display Format and AutoSave

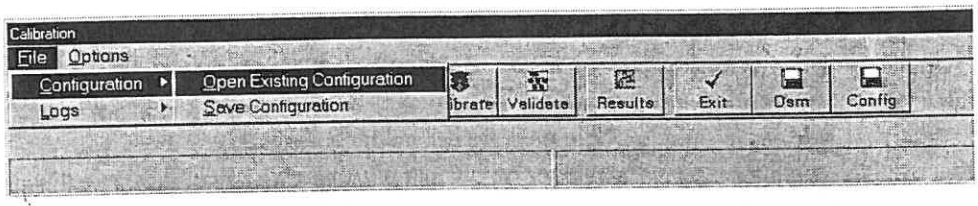


Display Format This option sets the channel offset. 0 Offset starts channel counts at 0, 1 Offset starts the channel count at 1.

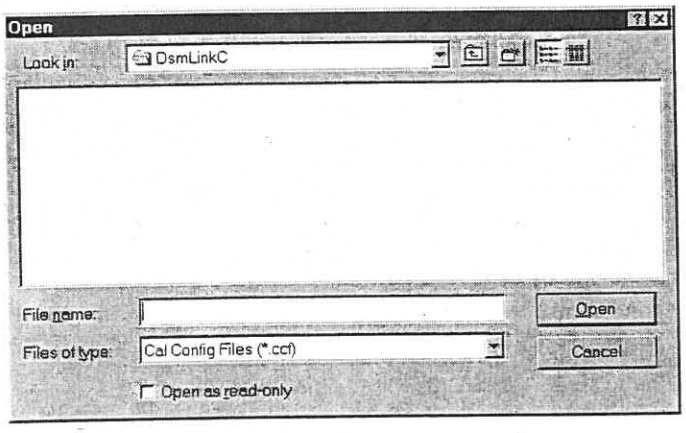
AutoSave This option, when selected, will save the configuration whenever Done is selected from any screen.

Configuration Files

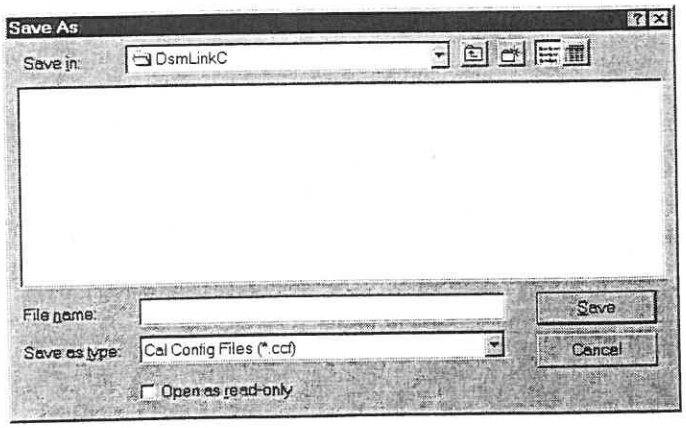
Multiple configurations can be set up and saved to minimize preparation and calibration time. Configuration is used to select an existing configuration for a calibration or save a new configuration.



When Open Existing Configuration is selected, a window is opened to the DSMLink directory where the Calibration configuration files are stored.

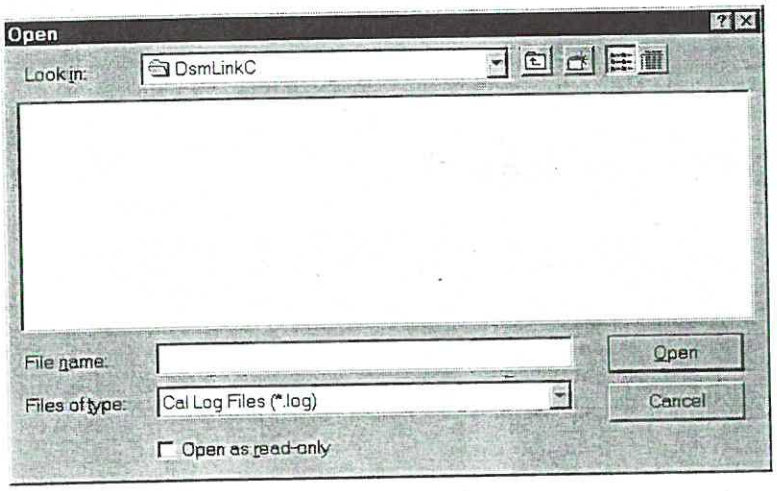


If Save Configuration is selected, The Save As window opens. The Calibration Configuration Files should be stored in the DSMLink Directory



Log Files

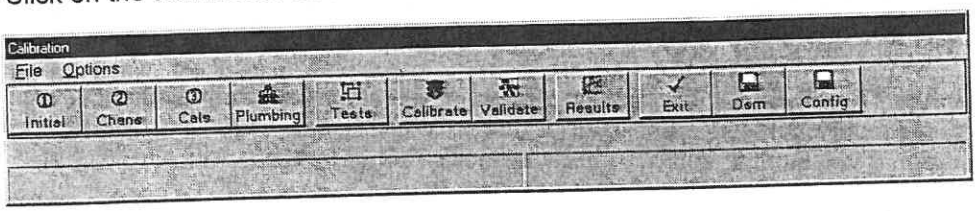
The Logs Option allows a user to track a calibration. Log files normally are stored in the DSMLink directory, but the user may select another directory. Files must have the .log extension.



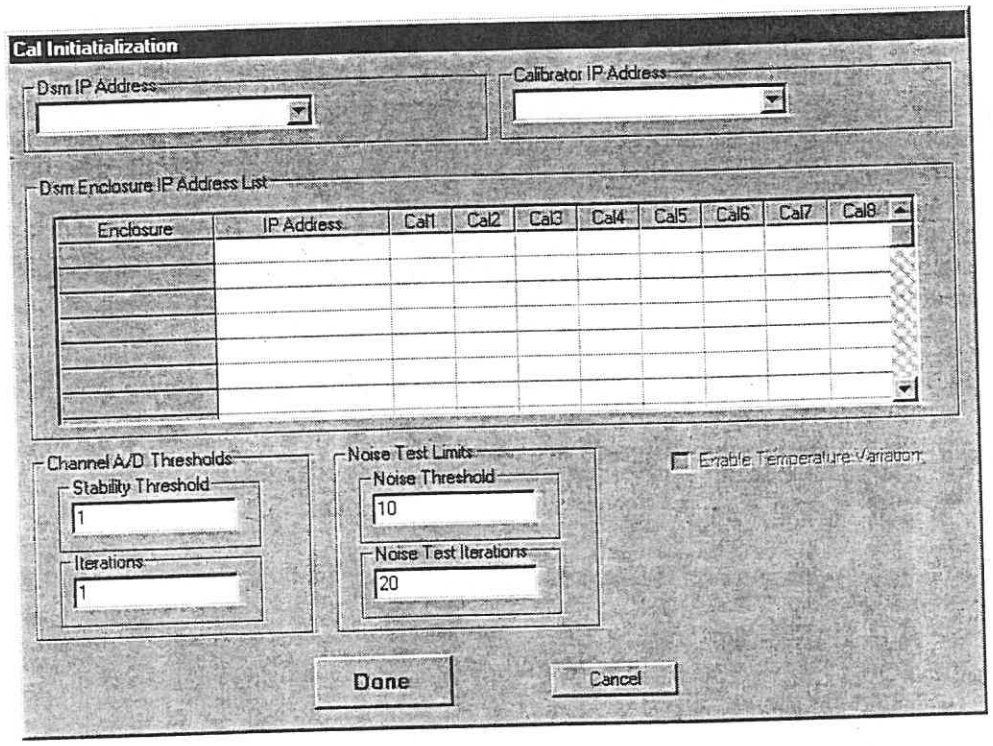
Initialization

An initialization procedure must be followed when a Calibration is to be performed on a configuration not previously saved,. If the procedure is not followed, errors will result.

Click on the task button labeled: **Initial**



A window labeled: **Cal Initialization** will open



DSM IP Address is the IP address of the DSM or DSAENCL that is communicating with the modules that will be calibrated. This unit may also control the calibrators to be used for the calibration.

Calibrator IP Address is the IP address of the SPCENCL that contains the calibrators to be used in the calibration. Enter the address of the SPCENCL here. If the DSM/DSAENCL will be the controlling device for the calibrators, this window should be left blank.

DSM Enclosure IP Address List is an IP address list of the DSM's, DSAENCL's and SPCENCL's that may be accessed during a calibration. The first IP address in the list must be the DSM or DSAENCL that is communicating with the modules under test. Multiple Calibrator addresses may be entered. After the addresses have been entered, control of the calibrators may be assigned to the DSM/DSAENCL or SPCENCL by clicking on the appropriate cell. Control may be unassigned by double clicking the appropriate cell.

Channel A/D Thresholds

Stability Threshold is the maximum number of A/D counts allowed between scans when the software tests for pressure stability. This number could be set as low as possible, generally less than ten. A low number improves the accuracy of the calibration.

Iterations is the maximum number of attempts to achieve stability. This number should be set to 20 or more. The best calibrations result form a low stability threshold and high iterations. This also will tend to optimize the time required to complete a calibration.

Noise Test Limits

Noise Threshold is the maximum number of A/D counts allowed between scans when the software tests for noise levels. A noise level of 3 is an optimum system. Most systems will function best when this number is 10 or less. If this number has to be set to 30 or more to pass the noise test, then the system has some serious noise problems that should be corrected.

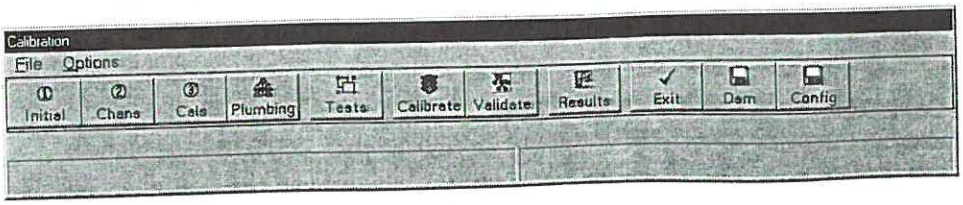
Noise Test Iterations is the number of data samples to be acquired during a noise test. This number should not be set greater than 100. Ten would be the minimum number of samples to adequately test the noise levels in a system.

When all of the channel to be calibrated are enabled,

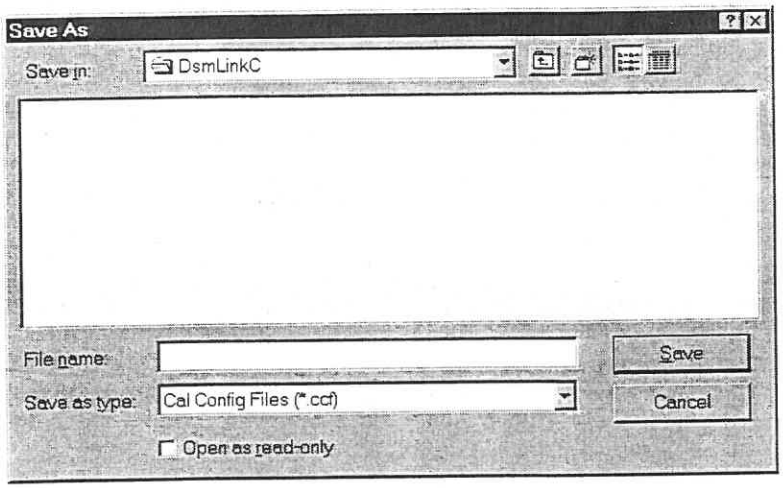
Click: **Done**

This will return the program to the Calibration Window. At this time the configuration should be saved:

Click: **Config**
Or
Click: **File**
Select: **Configuration**
Select: **Save Configuration**



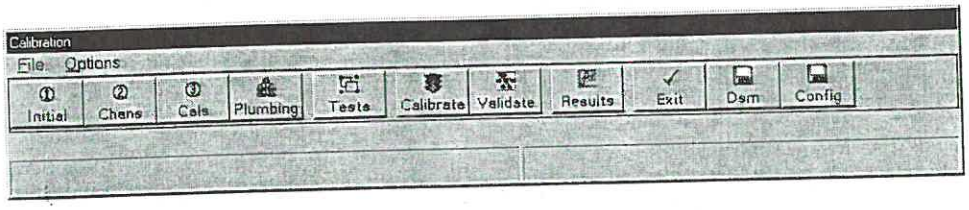
The Save As window will open. Enter a file name and click **Save**. The program will return to the main window.



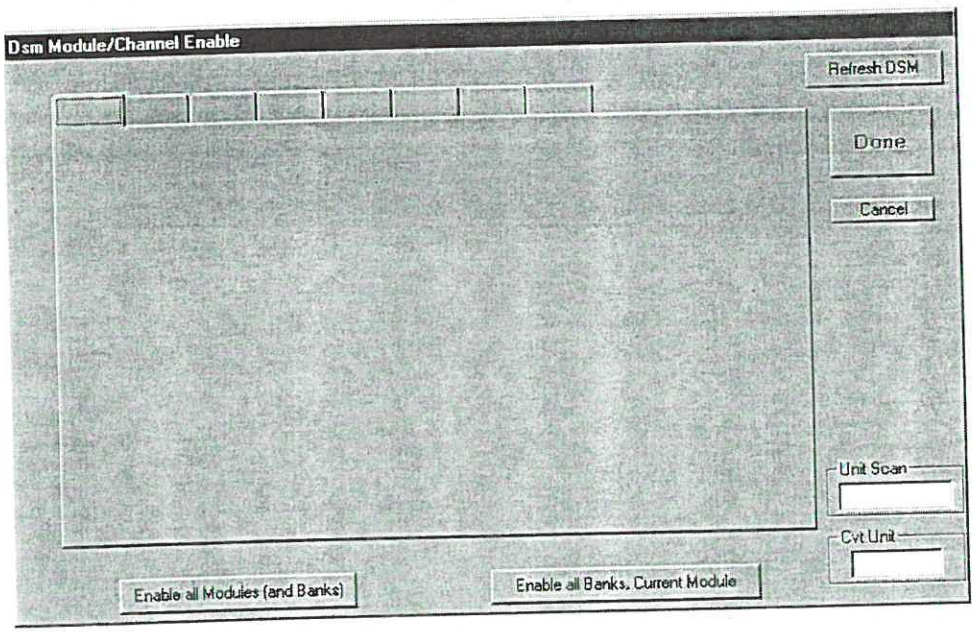
Channel Setup

The next step is to set up the channels to be calibrated.

Click on the task button labeled: **Chans**



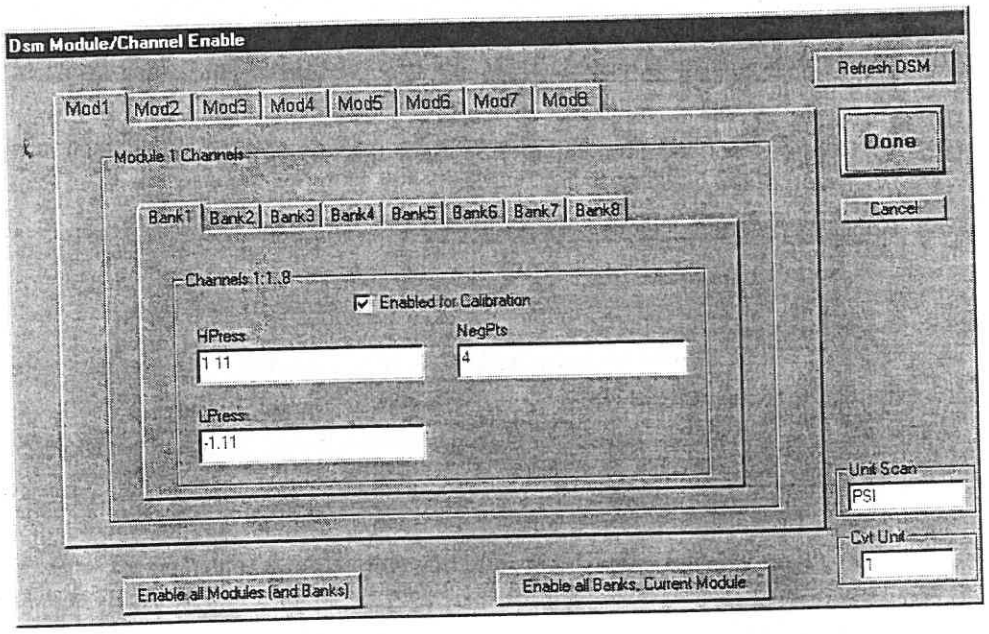
The DSM Module/Channel Enable Window will open. At first, the window will contain little information.



Click: **Refresh DSM**

The program will connect to the DSM, read the DSM setup information and display:

1. The number of enabled modules
2. The number of channels in each of those modules
3. The values of HPRESS and LPRESS
4. The value of NEGPTS
5. The value of UNITSCAN
6. The value of CVTUnits



If all channels in all modules are to be calibrated,

Click: **Enable all Modules (and Banks)**

If only certain channels are to be calibrated,

Click: **Disable all Banks, Current Module**

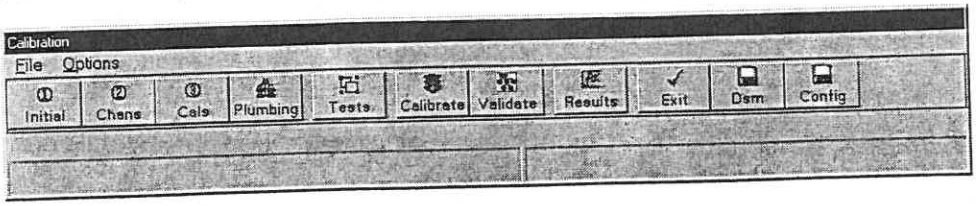
Click the Modules and Banks to be calibrated and at each bank to be calibrated:

Click the box marked: **Enabled for Calibration**.

When all of the channel to be calibrated are enabled,

Click: **Done**

This will return the program to the main window

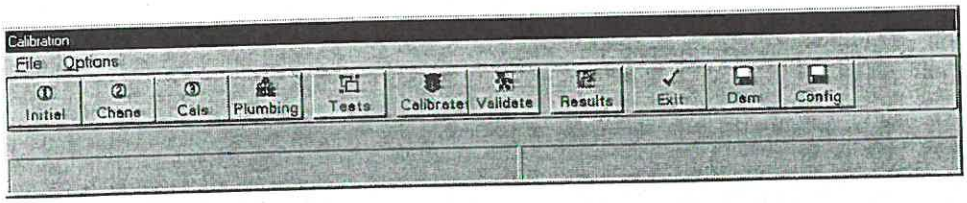


Click: **Config** to save the current configuration

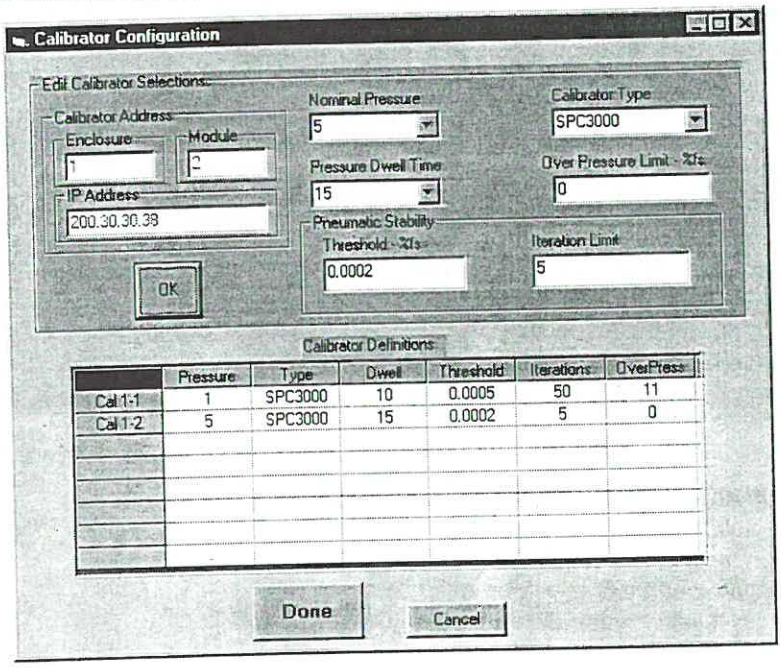
Calibrator Setup

The Calibrators must be set up to complete the configuration of the calibration.

Click the task button labeled: **Cals**



The Calibrator Configuration Window will open. The information entered in this section is critical to the correct operation of the Calibration Software.



Calibrator IP Address

If the Calibrator IP address is not correct, it can only be corrected at the Initialization Screen.

Module Select

This is the calibrator number as identified in the Initialization screen.

Nominal Pressure

Enter the Nominal Pressure Range of the Calibrator. The choices are:
1, 5, 15, 50, 100, 200, 300, 500, 1000

Calibrator Type

Select the Calibrator Type. The choices are:
SPC3000
CALMOD2000
NOTE: Select SPC3000 if a SPC2500 is being used.

Pressure Dwell Time

Enter the Dwell time in seconds. This time is the stabilization time at each pressure before data are acquired. The time entered here must be long enough to permit the pressure to stabilize, but a large number can cause the calibration to be slow.

Over Pressure Limit - %FS

Set the Over Pressure limit of the Calibration. The ability of a given calibrator to reach a pressure may be limited by Input Supply Pressure, the Calibrator Range Setting, and the output of the transducers being calibrated.

Pneumatic Stability

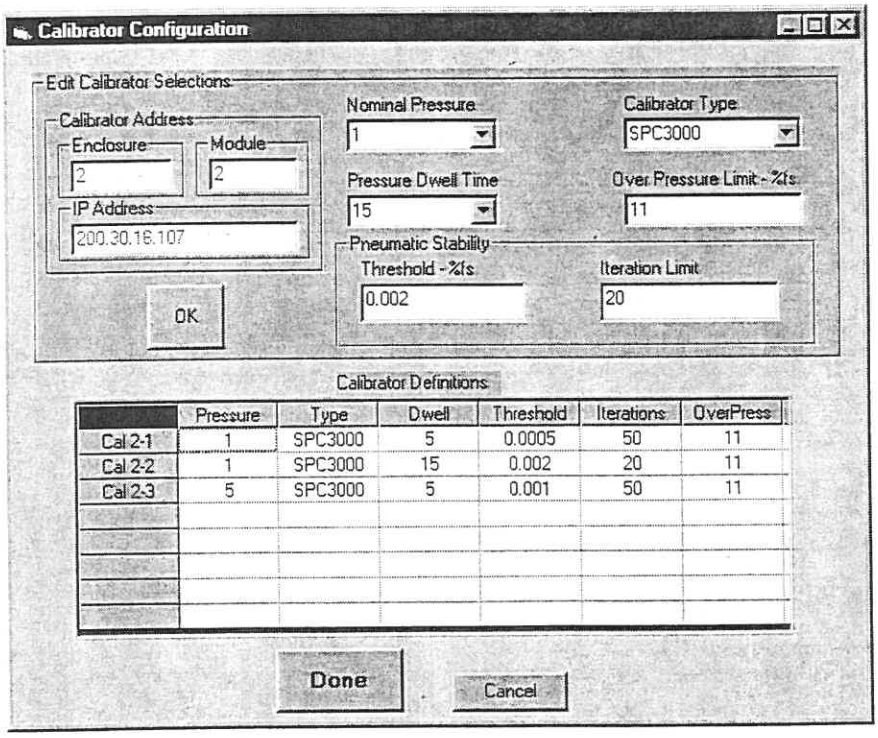
Threshold - %FS

This is the stability threshold to determine the stability of the calibrator during the calibration.

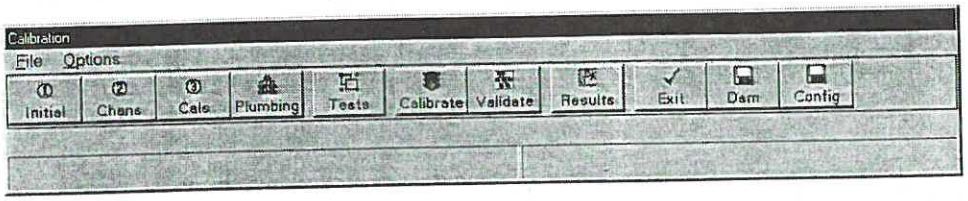
Iteration Limit

This is the number of attempts the software will make to determine calibrator stability. It is better to set the dwell time to a minimum time and use a high number of iterations to allow time for stabilization.

When the Calibrator configuration is correct, Click on OK to save the configuration. The settings entered will be displayed on the Calibrator Definitions Chart. If multiple Calibrators are to be used, Select the next Calibrator Address and repeat the Edit process for that calibrator. The window below shows a typical three calibrator system.



When all of the calibrators to be used in the calibration are configured, Click **Done**. The software will return to the main task bar.

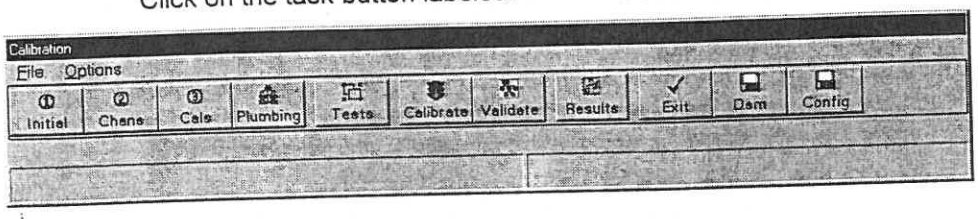


Click on **Config** to save the Calibrator Configurations

Plumbing Tests

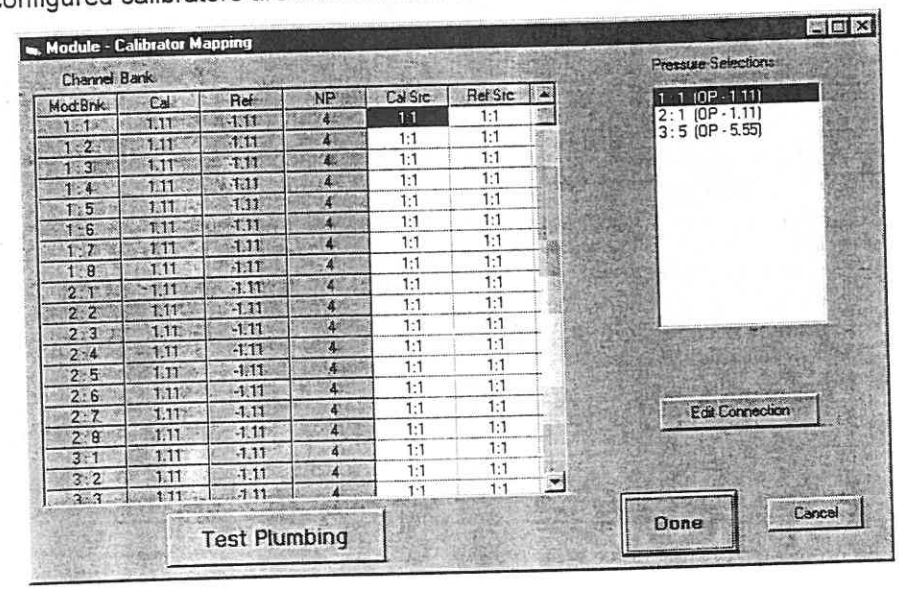
The Calibration Software will test the plumbing connections. This test should be run if this is the first calibration or if the plumbing has changed since the last calibration.

To Set up the Plumbing Tests,
Click on the task button labeled: **Tests**



The Module Calibrator Mapping window will open.

In the example below, a DSAENCL has a 1 psi 5 psi modules installed. When the window first opens, the Cal and Ref pressures sources are marked as the 1 psi Calibrator(Calibrator #1). The configured calibrators are listed in the Pressure Selections Section.



Mod Bnk Module and Bank identified as 1:1 for module 1 channels 1-8, 1:2 for module 1 channels 9-16, up to 8:8 for module 8 channels 57-64.

Cal The nominal full scale positive pressure

Ref The nominal full scale negative pressure

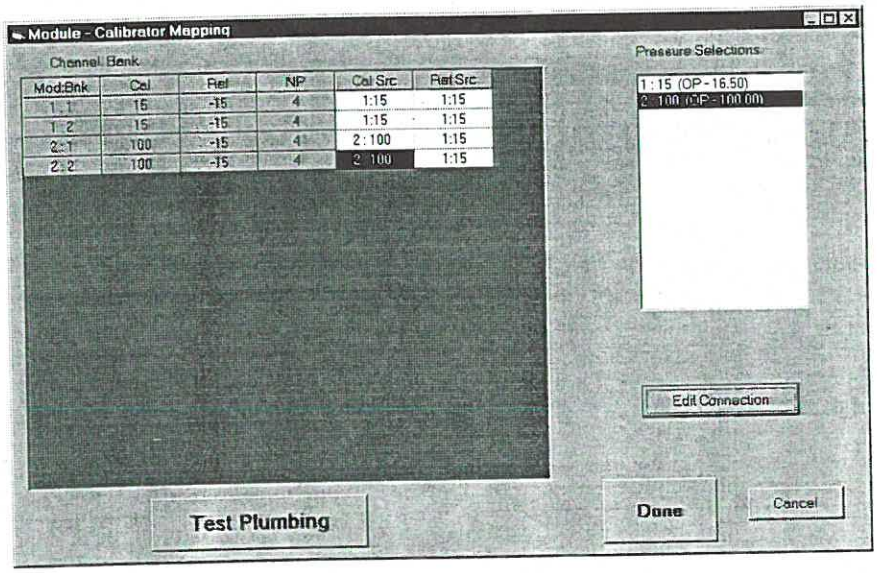
NP The number of negative pressure points

Cal Src The Calibrator number and full scale range of the positive calibration source

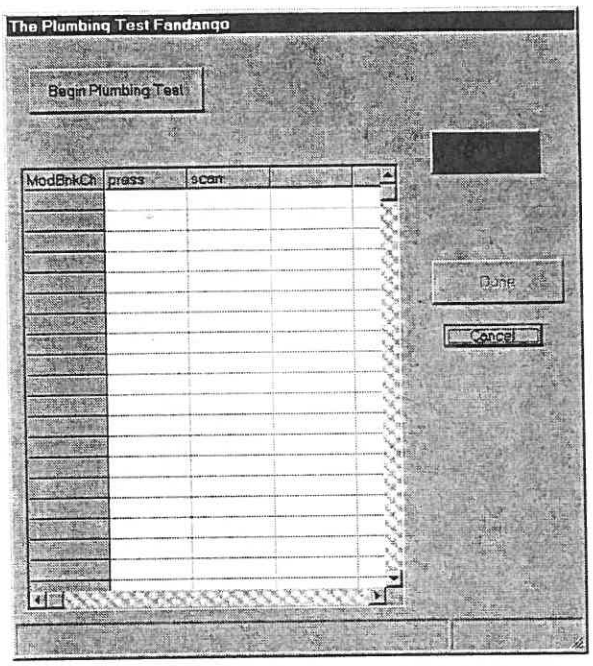
Ref Src The calibrator number and full scale negative pressure of the negative or reference side.

In the example below, the 15 psi Calibrator will be used for the 15 psi Calibration Source and the Reference Source for both modules. The 100 psi Calibrator will be used as the 100 psi Calibration Source for the 100 psi modules.

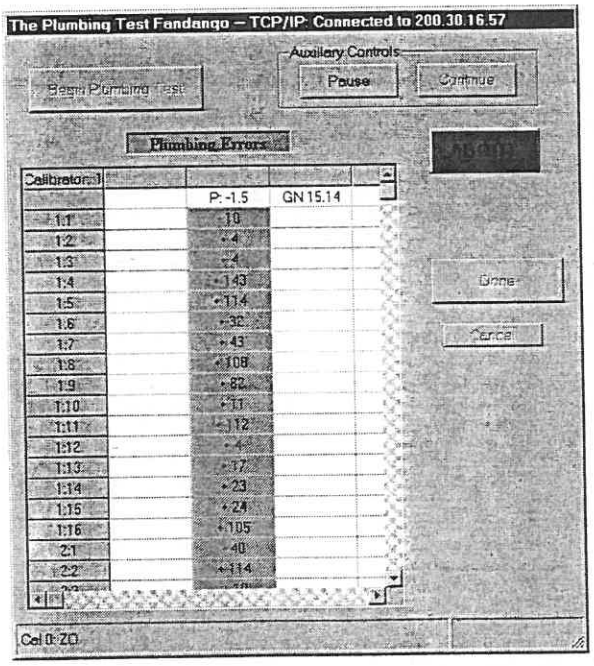
To change the Calibration Source of the 100 psi modules,
Highlight the 100 psi calibrator in the Pressure Selections window.
Click on the Cal Src boxes for the 100 psi modules.
The Calibration Source information will be updated.



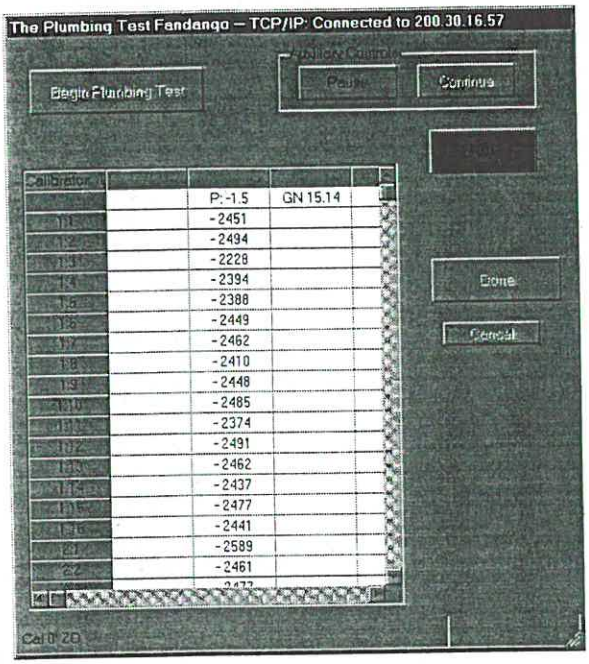
When the configuration is correct, Click the **Test Plumbing** Button.
The Plumbing Test Window will open
Click: **Begin Plumbing Test** to start the Plumbing Test.
The **ABORT** button will stop the test immediately



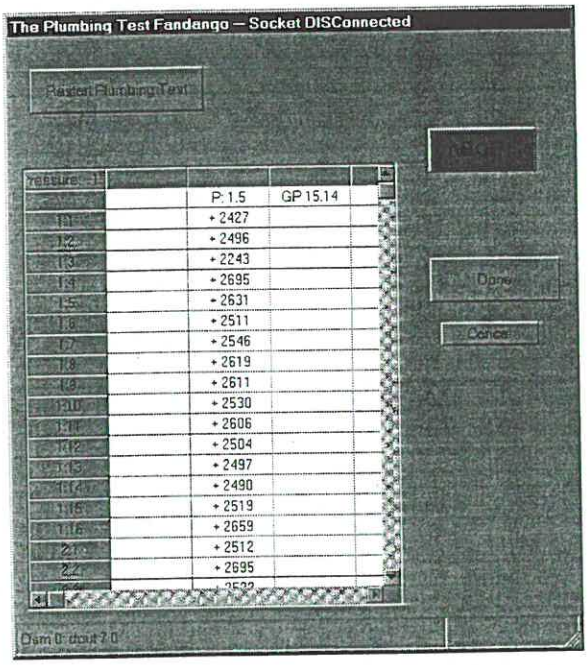
The program will first test the plumbing of the negative(Reference) side of the transducers by applying a pressure approximately 10% of FS. The pressures are allowed to stabilize and the outputs are read.



Errors are flagged for any channel with values less than 5% of FS or more than 15% of FS. An error does not necessarily indicate a problem. It does indicate that a problem may exist and should be checked.



The process is then repeated for the positive(Calibration) side of the transducers.

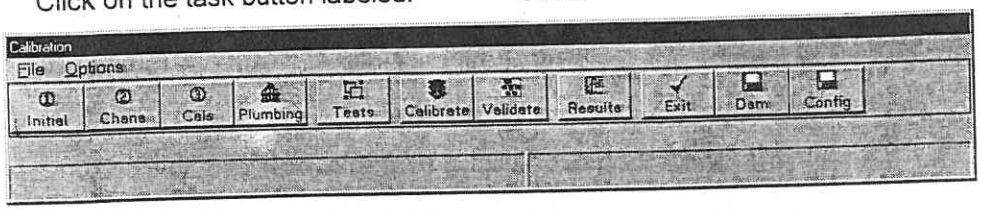


Click **Done** when the test is complete

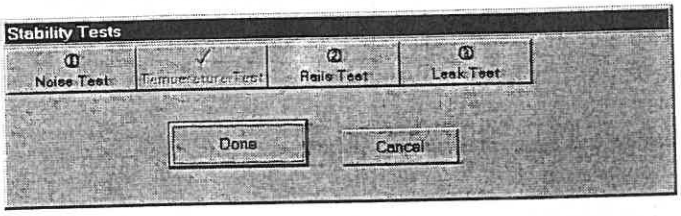
Noise, Rails, and Leak Tests

This series of tests should be performed every time a configuration is modified. If Calibrations are performed on configurations that have not changed during a test, these tests need only be run one time to verfiy that the system is functioning correctly. If a system passes the plumbing test and this series of tests, the calibration should be successful.

To Initiate these tests,
Click on the task button labeled: **Tests**

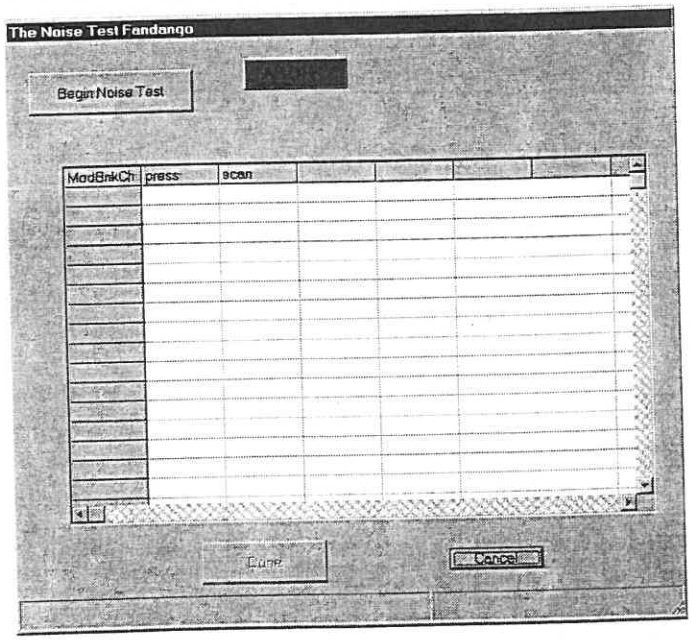


This will open the Stability Tests Window



Noise Test

Open the Noise Test Window by clicking on the **Noise Test** Button.

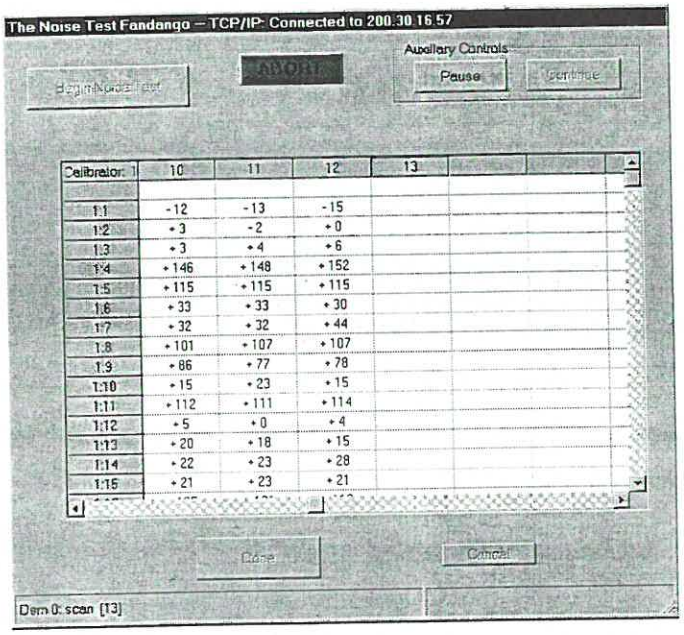


Click **Begin Noise Test** to start the Test.

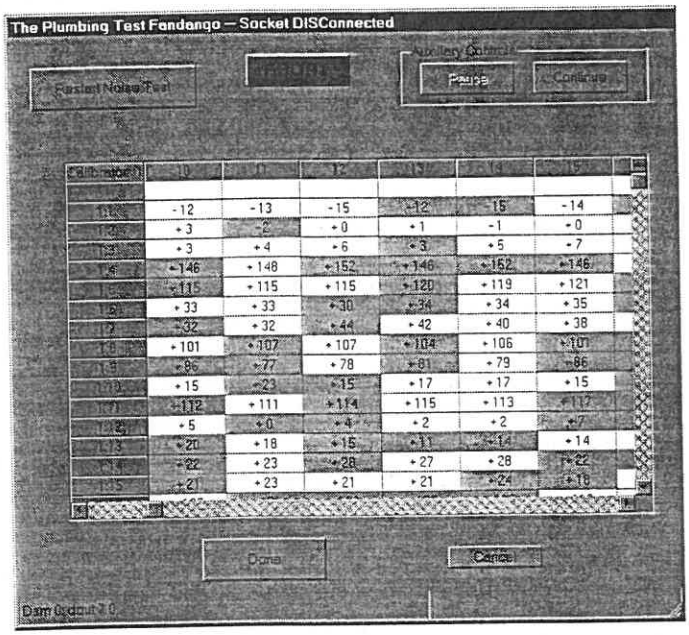
The program will perform the number of zero scans as defined in the Initialization section. When all data are acquired, the program tests all channels, all scans to insure that the delta counts do not vary more than the number entered in the Noise Threshold box.

ABORT will halt the test immediately.
Pause will suspend the test at a break point.

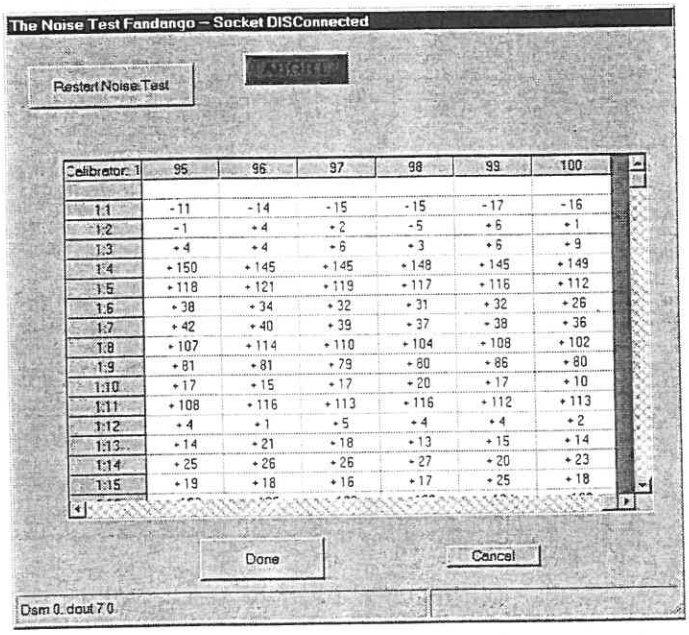
The progress of the test is monitored in the lower left corner of the Window.



Scan deltas that exceed the Noise Threshold are flagged at the end of the test. Errors may indicate problems or a Noise Threshold that is too stringent.



When errors are flagged, the Noise Test can be restarted by clicking **Restart Noise Test**. If the Noise Test is completed without errors, The window will look similar to the one below.

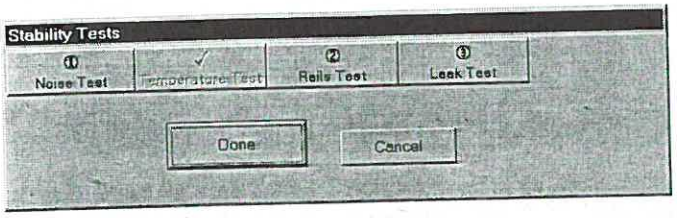


Click **Done** to complete the test and return to the Stability Test Window

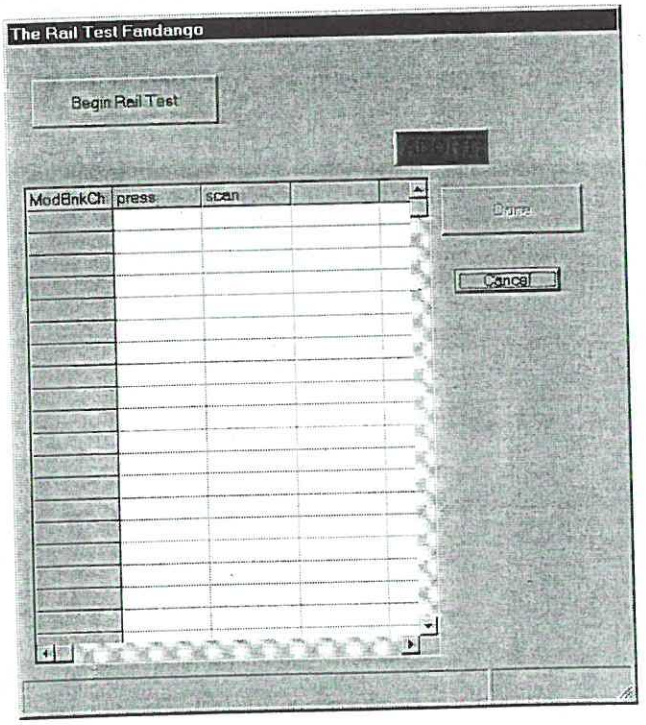
Rails Test

The Rails Test applies a full scale positive and Negative Pressure to the modules and takes one scan of data. The data are tested for values less than 32767 A/D counts full scale positive and -32768 counts negative. If the test finds channels that "rail" at one or both of the full scale pressures, an error is logged. An error may indicate a sensor with high output or a maximum pressure that is set too high.

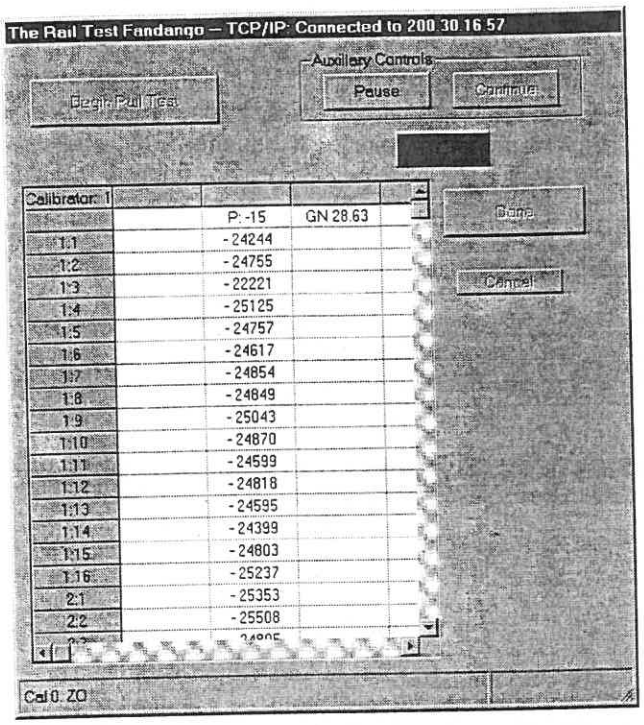
Click on **Rails Test** to open the Rails Test Window



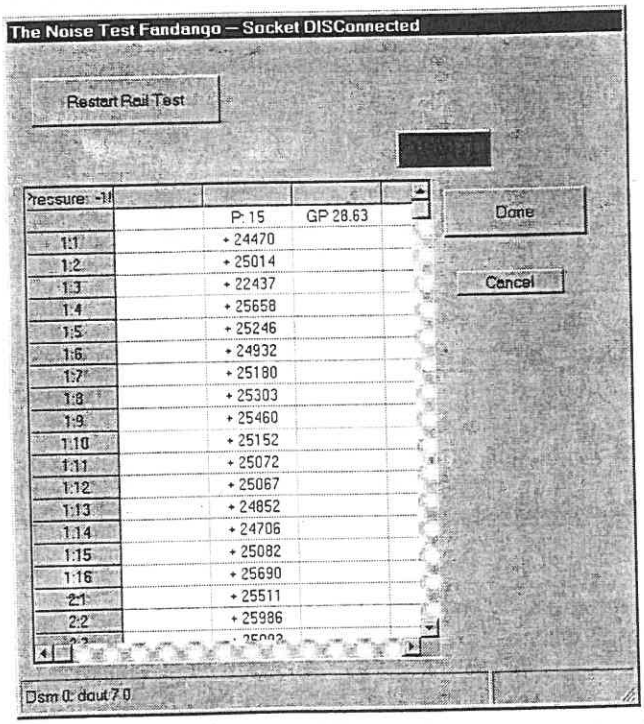
Click the **Begin Rails Test** Button to Start the Rails Test.
ABORT will stop the test immediately



The Rails Test first applies a Negative full scale pressure.
Pause will Halt, but not exit the Test at a safe break point.



The second phase of the test applies a full scale positive pressure. If no errors are detected, the window will be similar to the window below.

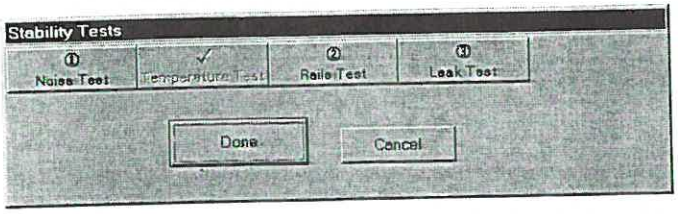


Click the **Done** button to complete the test and return to the Stability Test Window.

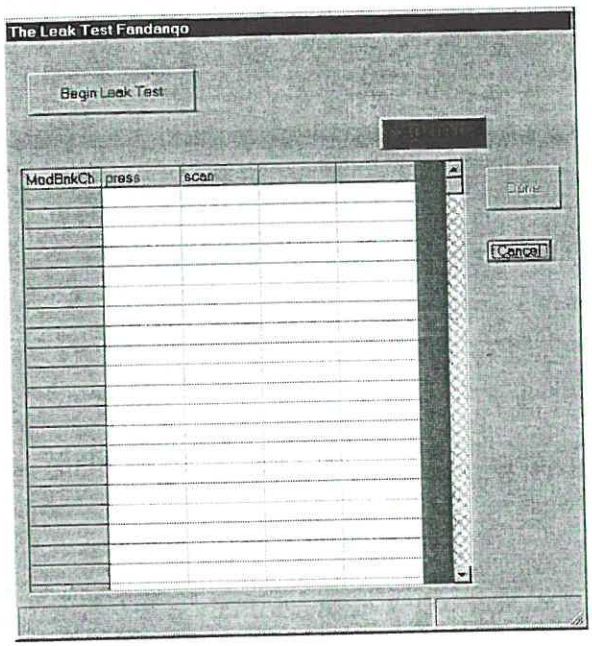
Leak Test

The Leak Test applies a pressure, near full scale, traps the pressure, waits 30 seconds and acquires a scan of data. The program waits for 30 seconds and acquires a second scan of data. The deltas are calculated for each channel. Errors are flagged if the deltas exceed 1% per second.

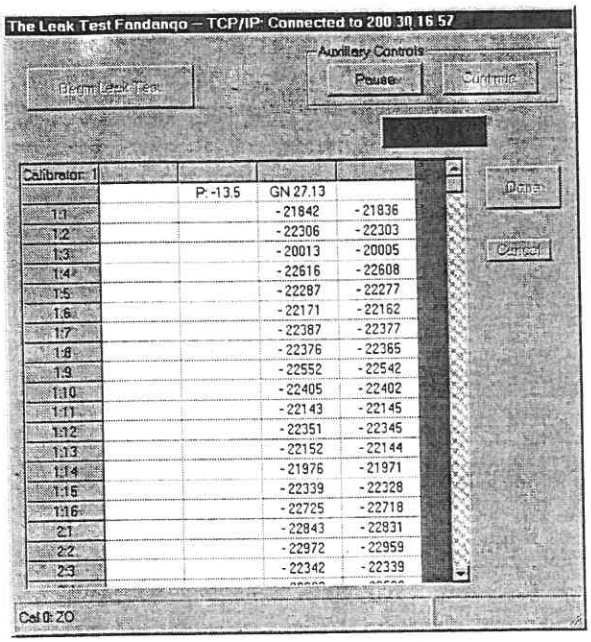
Click on the **Leak Test** button to open the Leak Test Window.



Start the Leak Test by clicking the **Begin Leak Test** Button
ABORT will halt the test immediately

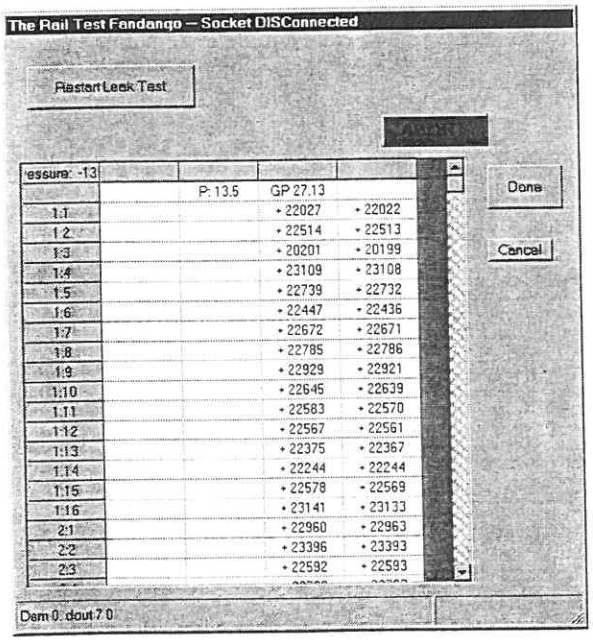


The Negative side is tested first.
Pause will halt the Test at a break point, but will not exit the test.

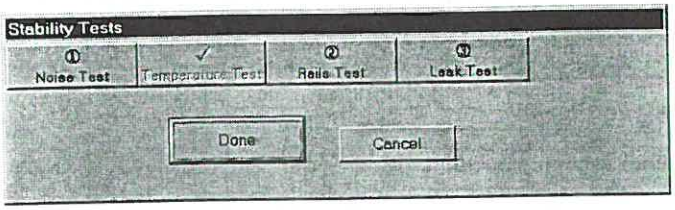


If an apparent Leak is detected, an Error will be flagged.
When the Reference Side is complete. The positive side will be tested.

When the positive side test is complete, the window will be similar to the one below



Click **Done** to end the Test and return to the Stability Test Window.



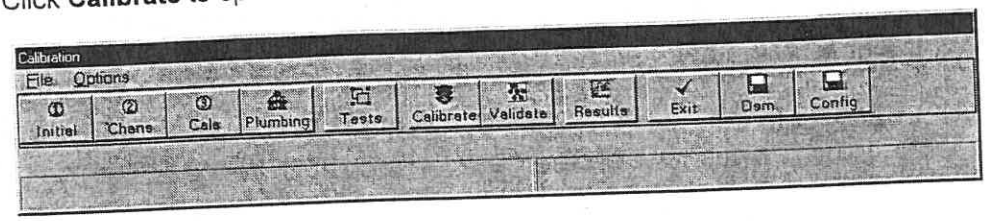
If all of the tests were completed successfully,

Click **Done** to return to the main task bar.

Calibration

Successful completion of all of the preliminary tests does not insure a successful calibration, but it does improve the chances.

Click **Calibrate** to open the Calibration Window

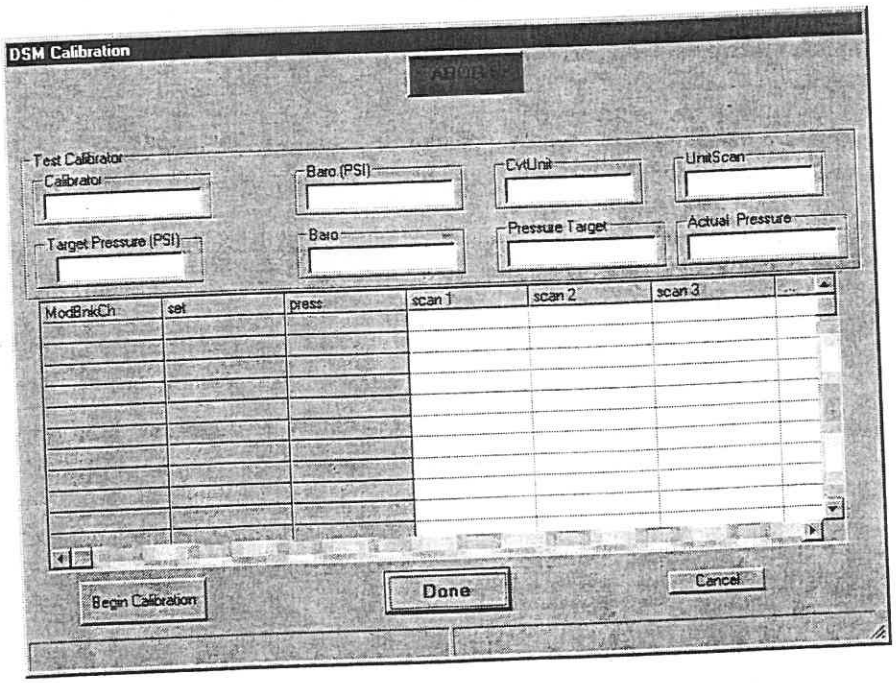


It is important that a user properly prepare for a calibration.

If the calibration is to be a single temperature plane, then the setting of **MPBS** becomes very important. **MPBS** sets the temperature range of **MASTER** temperature planes to be erased on either side of the new temperature plane during a calibration. MPBS is expressed in .25 °C increments. For example, If **MPBS** is set to 20, all **MASTER** planes within ±5.0 °C of the new **MASTER** plane will be deleted during the calibration. If **MPBS** is set to 0 or to a low number, new calibration data could be mixed with old data which may result in errors. For more information, please refer to the DSM Software Requirements Specification.

If the calibration will be several temperature planes, it is best to delete all of the old temperature planes before starting the calibration. The **DELETE** command is described in the DSM Software Requirements Specification.

Click **Begin Calibration** to start the Calibration.
ABORT will halt the test immediately



When the Calibration is started, a Pause Button is made available. Pause will suspend the program at a safe break point.

The progress of the calibration can be monitored. There are eight windows in the Calibration screen and a status box at the bottom of the screen.

Calibrator	This window displays the calibrator being accessed.
Target Pressure	This window displays the pressure setpoint
Baro(psi)	The actual Barometric reading in psia or the actual zero reading if a Mensor Transducer is the Secondary Standard.
Baro	The actual Barometric reading or the actual zero reading in the current pressure units.
CVT Unit	The pressure conversion units
UnitScan	The pressure conversion variable
Pressure Target	The target pressure - The calculated setpoint
Actual Pressure	The actual output pressure of the calibrator

The status box on the left will display the commands issued to the DSM or the SPC Enclosure. The status box on the right will display the response from the DSM or SPC Enclosure.

Pressure setpoints are calculated using the **SLOTS** command from the DSM. The Negative pressures are applied first. After three scans, a stability check is performed. If the sensors are stable, a CALINS is performed. If not, another scan is acquired and the stability test is repeated. If stability cannot be achieved in the number of iterations, and error will be flagged. A window will open to give the user the opportunity to continue the Calibration, or abort. The error box will not time out. The calibration will be suspended until one of the options is selected.

The Calibration will continue , applying a zero point, and the positive points. For pressures 15 psi and below, the program will update the Barometric reading between each pressure point.

When the calibration is complete, the window will highlighted and the left status box will display:

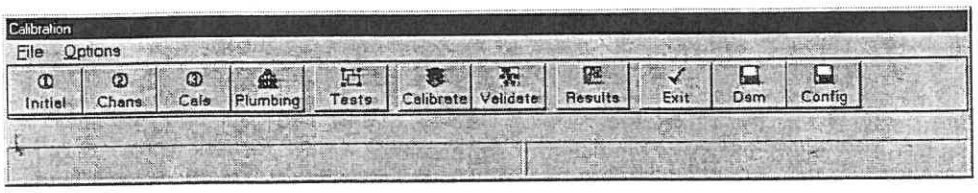
DSM 0 dout 7 0

Also, the **Done** button will be active.

Validation Test

When the calibration is complete, the new, updated coefficients are stored in the DSM/DSAENCL memory, but the Module Profile Files on the hard drive have not been modified. It is important that the accuracy of the new coefficients be verified before they are saved to disk.

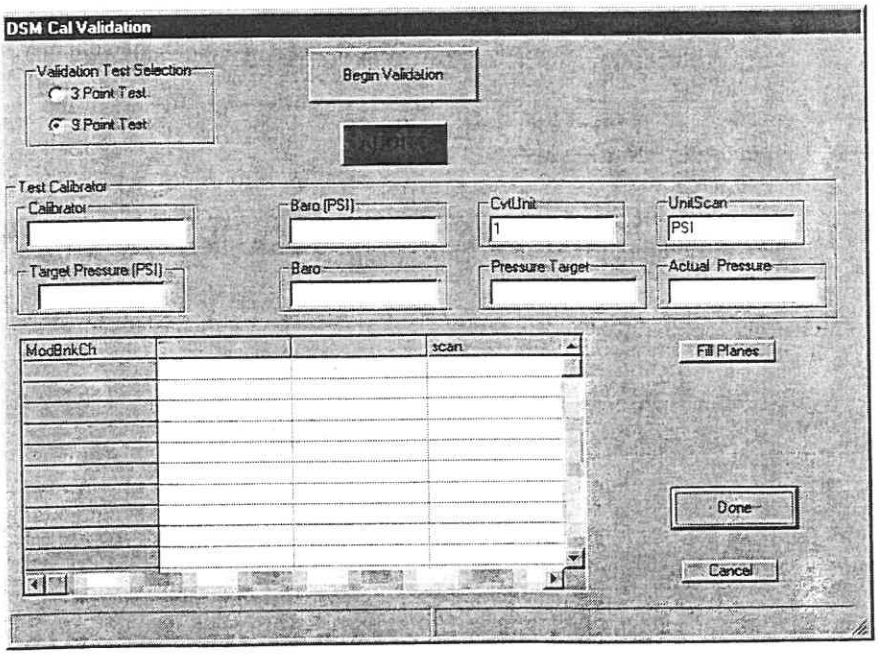
Start the Validation process by clicking the **Validate** button on the main menu



The Validation Window will open. Click the **Fill Planes** button to recalculate the calculated planes.

If the calibration was a full calibration with several new master planes at different temperatures, the **FILL** command will calculate new temperature planes between the **MASTER** planes generated by the calibration.
If the calibration was a single plane calibration, the **FILL** command will recalculate the planes from the new Master plane to the nearest old **MASTER** planes.

NOTE: This is a very important step that must not be skipped. If the **FILL** is not generated, the validation may indicate that the calibration was not successful.



A user may select from one of two Validation Test options, a three point or a nine point test. The three point test applies pressures at negative 80%FS, zero, and positive 80% FS. This permits a user to determine if a calibration was successful in a relatively short period of time. The nine point test applies pressures calculated from the SLOTS command in the DSM. The setpoints are different from those applied during the calibration.

To start the Validation process:

Click the **Begin Validation** button

ABORT will halt the validation immediately.

Pause will suspend the test at the next breakpoint.

The progress of the Validation may be tracked. There are eight windows in the Calibration screen and a status box at the bottom of the screen.

Calibrator	This window displays the calibrator being accessed.
Target Pressure	This window displays the pressure setpoint
Baro(psi)	The actual Barometric reading in psia or the actual zero reading if a Mensor Transducer is the Secondary Standard.
Baro	The actual Barometric reading or the actual zero reading in the current pressure units.
CVT Unit	The pressure conversion units
UnitScan	The pressure conversion variable
Pressure Target	The target pressure - The calculated setpoint
Actual Pressure	The actual output pressure of the calibrator

When the Validation is complete,

Restart Validation will repeat the test

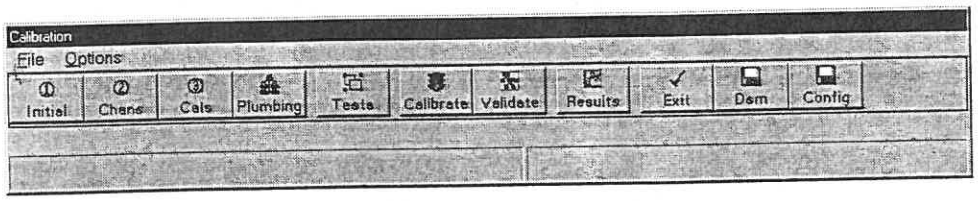
Done will exit the test and return to the main screen

Results

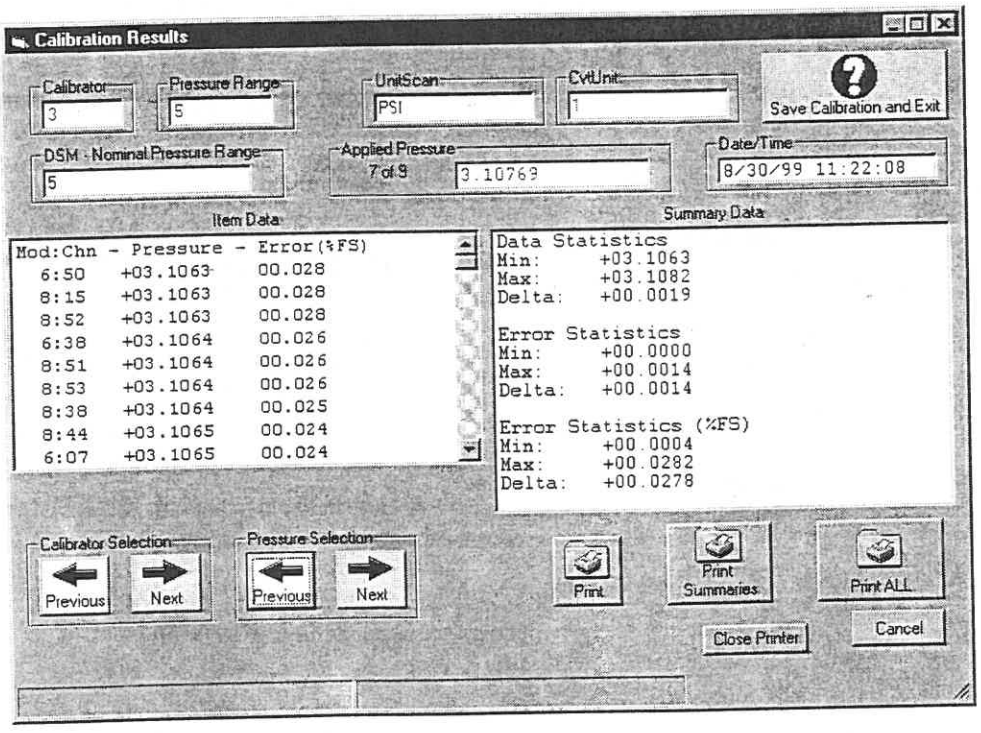
Results displays the results of the Validation Test. The results may be: printed or saved as a text file, or imported to a spreadsheet program .

This is the point in the Calibration process where the calibration can be saved. If the results show that the calibration is not within specifications, the Calibration may be exited without saving the data. No changes will be made in the Module Profile Files.

To view the results of the Validation Test,
Click the **Results** button.



When the Results button is clicked, the **Calibration Results** window will open.



This screen contains all of the information relating to the calibration.

Calibrator — This window displays the identification number of the selected calibrator as defined in the Initialization screen.

Pressure Range — This window displays the full scale range of the selected calibrator.

UnitScan — The Pressure Conversion Units

CVTUnit — The Pressure Conversion Variable - this number is the conversion factor to convert psi to the current value of CVTUnit.

DSM - Nominal Pressure Range — This is the Nominal Pressure range of the module(s) being calibrated. This value is read from the DSM during Initialization. It is used to calculate the FS errors of the individual channels.

Applied Pressure — This is the pressure applied to the sensors, measured by the secondary standard.

Date/Time — The current date and time.

Item Data — This is a list of the channels calibrated. The list is sorted in error order. The largest error is listed first. The data displayed are module-channel, indicated pressure, and % FS error.

Summary Data — This is a summary of the data for the current pressure setpoint. The minimum and maximum indicated pressures, actual errors and % FS errors are displayed.

Calibrator Selection

Previous — Clicking this button will display the results of the previous calibrator in the calibrator list.

Next — Clicking this button will display the results of the next calibrator in the calibrator list.

Pressure Selection

Previous — Clicking this button will display the results of the previous calibration setpoint in the calibration.

Next — Clicking this button will display the results of the next calibration setpoint in the calibration.

Print — Clicking this button will print the data for the current calibrator and setpoint

Print Summaries — Clicking this button will print all of the data summaries.

Print All	Clicking this button will print all of the data, that is all setpoints from all calibrators.
Close Printer	Clicking this button will terminate the print process
Cancel	When this button is clicked, the program will close this screen and return to the main screen.
Save Calibration and Exit	When this button is clicked, the program will issue a **SAVE** command to the DSM and return to the main screen.

DSMLINK Operation - Program Shutdown

To exit the program:
Select: **DSM**
Select: **Stop**
Close all file operations
Select: **Interface**
Select: **Disconnect**
Select: **File**
Select: **Exit**

NOTE: It is very important to exit this program correctly. It must be exited by Selecting File, Exit so that the program can perform a normal shutdown sequence.

If you have any problems with any of the procedures in this manual or the operation of the DSMLINK Software, please contact:

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Fax: (509) 891- 9481
E-Mail: scanco@scanivalve.com